

# Catalogue

## Fixing Systems











### Dear partner,

There are many trends affecting the fixings industry: the growing number of construction materials, the joining of different materials, increasing requirements for design and execution, and digitalisation. As one of the world's leading specialists in fixing systems, we set the direction and shape the market. In the process, we provide you with the best and most cost-effective solution for your fixings project quickly and flexibly. We are also a reliable partner for you when it comes to individual requests and customised solutions.

Our product portfolio includes chemical systems, steel anchors and plastic fixings. We also provide a wide range of screws, drill bits, adhesives, sealants, foams and product ranges tailored to specific applications, such as façade and thermal insulation systems, or the installation of sanitary, heating, ventilation and electrical systems. We attach high value to quality, safety and easy installation.

Our goal is to be the best in our respective industries with regard to both our products and our services. With our own national subsidiaries, sales partners, qualified sales representatives and engineers providing technical advice, we have a particularly dense network for providing individual consultation and support throughout the world. We are also amongst the pioneers in the industry in the digital environment and provide modern software tools, such as the design and construction software FIXPERIENCE and the Product Finder apps for end users and pros.

Our comprehensive range of training courses enables us to keep you up to date with regard to fixings solutions and regulations – at the fischer akademie, in more than 70 competence centres throughout Germany, on site at the user's premises, and in various locations in Germany and Europe with the help of the fischer TourTruck.

We hope you enjoy discovering and using our products.



Florian Birkenmayer



## A brand and its promise to perform

„Whoever chooses fischer receives more than a range of safe products. The aim is to always develop the best solutions for our customers across the globe.“

Besides the innovative products, this predominantly concerns support that is focused on the customer, and services designed to improve customer benefit.



## Continuous improvement

With the fischer ProcessSystem (FPS), we ensure that we are adapting and optimising our processes in line with customer requirements in a flexible manner and on a continuous basis. Thus we are glad having been awarded with the 1. place "Excellence in Operations" within the challenging contest "Factory of the Year".



**Award 2016**  
Excellence in Operations

## Always with its finger on the pulse of the times

At fischer, innovation is more than just a sum of the patents. We are open to new things and are prepared for change – always with the aim of offering our customers the greatest possible benefits. Over the years, our own development and production sites have been developing numerous fixing solutions for the most wide-ranging applications.

Be it new production procedures or materials, such as renewable raw materials: We are carrying out the research for your safety and will continue to do so in the future. This gives us such great flexibility that we can even develop tailor-made customer solutions. This power to innovate has seen fischer become market leader in anchor technology and the fixing industry.

## Safety that connects – Decisive quality

We don't make any compromises when it comes to the safety of our products. A whole host of our products are distinguished by comprehensive, up-to-date and international approvals. The fischer product range is well-positioned in all sectors of fixing technology – Steel, Nylon and Chemical fixings. In award-winning quality which continues to impress both professional clients and private customers with equal measure.



See ICC-ES  
Evaluation Report  
at [www.icc-es.org](http://www.icc-es.org)



**International approvals**  
characterise many of our  
products







## We take responsibility

Our active environment management policy means that we are helping to maintain an intact environment for our generation and for those that follow. The environment management policy at the Tumlingen site has been certified in line with DIN EN ISO 14001.

We are a member of the German Sustainable Building Council (DGNB), and our products have been successively certified in line with the guidelines provided by the Institute for Construction and the Environment (IBU). With our greenline products, we have introduced the first fixing assortment in the market, based on over 50% of regrowing raw materials.



**UX GREEN** based on over 50 % of regrowing raw materials

## Our service to you

**We are a reliable partner, one that will stand at your side and address your individual requirements with advice and action:**

- Our products range from **chemical systems to steel anchors** through to **plastic anchors**.
- **Competence and innovation** through own research, development and production.
- **Global presence** and active sales service in over 100 countries.
- **Qualified technical consulting** for economical and compliant fastening solutions. Also on-site at the construction site requested.
- **Training sessions**, some with accreditation, at your premises or at the fischer academy.
- **Design and construction software** for demanding applications.



**fischer 360°-Service**





## 01 fischer DUO-Line assortment

Clever combinations for more power and intelligence.

Page 406    Page 348    Page 394

## 02 fischer FIS EM Plus

The powerful injection mortar for rebar connections and cracked concrete.

Page 86

## 03 fischer bolt anchor FAZ II

For highest demands. Powerful and flexible.

Page 202

## 04 fischer ULTRACUT FBS II 8, 10 and 12 A4 stainless steel

The powerful concrete screw for top installation comfort in external areas.

Page 232

## 05 fischer ULTRACUT FBS II 6 zinc-plated steel

The high-performance concrete screw for absolute installation ease.

Page 242

## 06 fischer hollow drill bit FHD








Hollow drill bit for drilling with low dust as well as for efficient and approved anchoring.

Page 561








<b>Selection guide of products and applications</b>	<b>8</b>	<b>1</b>
<b>greenline</b>	<b>23</b>	<b>2</b>
<b>Chemical fixings</b>	<b>47</b>	<b>3</b>
<b>High performance steel anchors</b>	<b>201</b>	<b>4</b>
<b>Frame fixings / Stand-off installation</b>	<b>293</b>	<b>5</b>
<b>General fixings</b>	<b>347</b>	<b>6</b>
<b>Cavity fixings</b>	<b>393</b>	<b>7</b>
<b>Electrical fixings</b>	<b>415</b>	<b>8</b>
<b>Sanitary fixings</b>	<b>455</b>	<b>9</b>
<b>Scaffold and eye screw fixings</b>	<b>465</b>	<b>10</b>
<b>Insulation fixings / Façade fixings</b>	<b>475</b>	<b>11</b>
<b>Foams and sealants</b>	<b>501</b>	<b>12</b>
<b>Adhesives</b>	<b>541</b>	<b>13</b>
<b>Drills and bits</b>	<b>549</b>	<b>14</b>
<b>Basic knowledge</b>	<b>572</b>	<b>15</b>
<b>Services</b>	<b>592</b>	<b>16</b>







## 2 greenline









		Page
Universal plug UX GREEN		26
Expansion plug SX GREEN		28
Plasterboard fixing GK GREEN		30
Hammerfix N GREEN		32
Aircrete anchor GB GREEN		34
Insulation fixing FID GREEN		36
Injection mortar FIS GREEN		38

## 3 Chemical fixings

		Page
<b>MORTARS AND CAPSULES FOR GENERAL APPLICATIONS</b>		
Introduction		48
Highbond-System FHB II		52
Highbond-System FHB II Inject		59
Superbond-System FSB		64
Resin anchor RM II		79
Epoxy mortar FIS EM Plus		86
Epoxy mortar FIS EB		95
Injection mortar FIS V		101

		Page
Injection mortar FIS VL		117
Injection mortar FIS GREEN		126
Injection mortar FIS P Plus		133
Injection mortar FIS P		140

### ANCHOR RODS

Introduction		144
Threaded rod FIS A		146
Threaded rod RG M		154
Internal threaded anchor RG M I		159
Internal threaded anchor FIS E		161
Accessories for push-trough installation		164
Anchor sleeve FIS H K		167
Anchor sleeve FIS H L		167
Anchor sleeve FIS H N		167

## 4 High performance steel anchors

1

Selection guide

	Page
<b>SPECIAL APPLICATIONS</b>	
Introduction	169
Highbond anchor dynamic FHB dyn	170
Dynamic-Anchor FDA	174
UMV multicone dynamic bonded anchor	176
Rebar connections	179
Concrete-Concrete Shear Connector FCC	185
Remedial wall tie VBS 8	187
Weather facing reconstruction system FWS II	189
Can System FCS	191
Fill & Fix injection fixing	193
<b>DISPENSERS</b>	196
<b>ACCESSORIES</b>	198





















	Page
Bolt anchor FAZ II	202
High performance anchor FH II	209
High performance anchor FH II-I	217
ZYKON undercut anchor FZA	220
ZYKON hammerset anchor FZEA II	228
Concrete screw ULTRACUT FBS II 8-14	232
Concrete screw ULTRACUT FBS II 6	242
Hammerset anchor EA II	247
Hammerset anchor EA-N	252
Nail anchor FNA II	256
Nail anchor FNA II RB	260
Ceiling nail FDN II	263
Ceiling nail FDZ	265
Bolt anchor FBN II	267
Heavy-duty anchor TA M	272
Heavy-duty anchor TA M-T	276
Sleeve anchor FSA	278
Fixing set for Diamond Drills FDBB	281
Wall screw MR	283
Hollow-ceiling anchor FHY	285
Aircrete anchor FPX-I	288











## 5 Frame fixings / Stand-off installation

		Page
Frame fixing SXRL		294
Frame fixing SXR		300
Frame fixing FUR		306
Anti-corrosion spray FTC-CP		310
Hammerfix N		311
Hammerfix N GREEN		315
Nail sleeve FNH		317
Window frame fixing F-S		319
Metal frame fixing F-M		321
Window frame screws FFSZ and FFS		324
Wall tie VB		328
Adjustable fixing S10J		329
Adjustable screw JUSS		331
Spacing screw ASL		332
Stand-off installation Thermax 8 / 10		334
Stand-off installation Thermax 12 / 16		337
Remedial wall tie mechanical VBS-M		343









## 6 General fixings


		Page
DUOPOWER		348
Universal plug UX		351
Universal plug UX GREEN		356
Expansion plug SX		358
Expansion plug SX GREEN		361
Expansion plug S		363
Threaded rod plug RODFORCE FGD		366
Metal expansion anchor FMD		368
Expansion plug M-S		370
Anchor M		372
Brass fixing MS		374
Aircrete anchor GB		376
Aircrete anchor GB GREEN		378
Turbo aircrete anchor FTP K		380
Turbo aircrete anchor FTP M		382
Brass fixing PA 4		384
Balcony cladding fixing P 9 K		386
Stair-tread fixing TB / TBB		388
Repair pad FIX.it		389
Doorstop TS		390

## 7 Cavity fixings




		Page
Nylon toggle DUOTEC		394
Metal cavity fixing HM		397
Gravity- and spring-toggle K, KD, KDH, KM		400
Board fixing PD		404
Plasterboard fixing DUOBLADE		406
Plasterboard fixing GK		408
Plasterboard fixing GK GREEN		410
Plasterboard fixing metal GKM		412

## 8 Electrical fixings

		Page
Locking clip SCN		416
Pipe clip RC		418
Pipe clip FC		420
Saddle clip SCH		422
Fastening tie FF		424
ClipFix plus LS/ES/ZS		426
ClipFix plus SD		428
Cable clasp KB		430





		Page
Cable harness SHA		432
Multi cable support metal SHA M		434
Wall slot clip FWSC		436
Nail disc NSB		437
Nail clip NS/MNS		439
Spacer pipe clamp AM		441
Conduit clip BSM		443
Textile web strapping GWB		445
Perforated steel banding LBV / LBK		446
Impact nail ED		447
Cable tie BN/UBN		449
Cable tie plug FCTP		451
Wireclip		452

## 9 Sanitary fixings

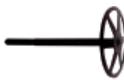











		Page
Sanitary fixings for board materials		456
Ceramic fixings		458
Wash basin and urinal fixings		460






















# 10 Scaffold and eye screw fixings















		Page
Scaffold anchoring GS 12 + plug		466
Scaffold anchoring FI G		468
Eye screw GS		470
Ring nut RI		472

# 11 Insulation fixings / Façade fixings

		Page
Insulation support DHK		476
Insulation support DHM		478
Render fixing DIPK		480
Render fixing FIF-PN 8		482
Render fixing FIF-CN II 8		485
Render fixing FIF-CS 8		488
Insulation discs		490
Retaining disc with screw DHT S		492
Insulation fixing FID		494
Insulation fixing FID GREEN		496
Holding clamp DVN		498
Fibre cement panel screw FAFZ H		499




# 12 Foams, sealants

		Page
One-component gun foam PUP S 750		502
One-component premium gun foam PUP 750		503
One-component maxi gun foam PUP S 500		504
One-component premium gun foam compact PUP 500		505
One-component premium gun foam PUP 750 B3		506
One-component premium gun foam PUP BS 750		507
One-component premium B1 gun foam PUP B1 750		508
One-component premium adhesive foam PUP ETICS 750		509
One-component premium perimeter adhesive foam PUP P 750		510
One-component rapid installation foam PU S 500/750		511
One-component premium rapid installation foam PU 500/750		512
2-component premium rapid foam 2K PU 400		513
Accessories		514
Premium sanitary silicone DSSA		516
Sanitary silicone DSSI		517
Multi-silicone DMS		518
Premium high temperature silicone DHS		519
Premium construction silicone DBSA		520
Roof and wall silicone DBSI		521















	Page
Premium silicone for natural stone DNS 	522
Premium B1 silicone DFS 	523
Construction sealant Premium DKM 	524
Façade acrylic Premium DFA 	525
Premium painting acrylic DMA 	526
Premium structured acrylic DSA 	527
Acrylic sealant DA 	528
Repair mortar DEC 	529
Premium all-weather sealant DDK 	530
Roof sealing compound DD 	531
Accessories for sealants 	532
Sealant selection matrix	534
Zinc spray FTC-ZS 	536
Zinc spray bright grade FTC-ZB 	537
Zinc-alu spray FTC-ZA 	538

## 13 Adhesives

	Page
Assembly adhesive MK 	542
Power Adhesive Express KK 	543

	Page
All-round adhesive gluing and sealing KD 	544
All-round Adhesive Gluing and Sealing KD transparent 	545
Flexible power adhesive Premium HTM 	546




## 14 Drills and bits

	Page
Hammer drill bit Quattric II 	550
Hammer drill bit SDS Plus II Pointer 	553
Masonry drill bit Pointer M 	557
Hammer drill bit SDS Max II / SDS Max IV 	558
Hollow drill bit FHD 	561
Stone drill bit D-S 	562
Premium chisel FCP 	563
Standard chisel 	564
Profi-bit FPB 	565
Diamond-bit FDB 	566
Maxx-bit FMB 	567
Bit holder FBH 	568
Bit-Set 	569
Accessories for impact driver 	570





## Non-cracked concrete




			Single fixings for non-cracked concrete		
			Chemical systems		
Product	Type		Epoxi mortar-system FIS EM Plus	Superbond-System FSB	Injection mortar FIS V
	Page		86	64	113
	Image				
Connection thread or Screw diameter	Anchor rod or anchor size		M8 - M30	M8 - M30	M6 - M30
	Internal thread		M8 - M20	M8 - M20	M8 - M20
	Reinforcing bar		Ø 8 - 40 mm	Ø 8 - 32 mm	Ø 8 - 28 mm
	Screw diameter				
Steel/material	gvz		•	•	•
	A4		•	•	•
	C		•	•	•
	Nylon				
Usable length	up to		∞	∞	∞
Approvals / Certificates	Approvals	ETA	•	•	•
		ICC	•	•	•
		DIBt			
		Seismic	•	•	•
		Dynamic			
	Certificates	Shock			
		Fire resistance reports	•	•	•
Type of installation	Pre-positioned installation		•	•	•
	Push-through installation		•	•	•
	Stand-off installation		•	•	•
Drilling method	Hammer drilling		•	•	•
	Hollow drilling		•	•	•
	Diamod-drilling		•	•	
Waiting time until loading at 20 °C	none				
	short	< 5 Minutes			
	middle	≤ 20 Minutes		•	•
	long	> 20 Minutes	•	•	•
Substrate			+5 °C	-30 °C	-10 °C
Special features	approved without borehole cleaning				
	Installation in concrete < C20/25 acc. certificate				
	Installation in concrete > C50/60 acc. certificate				
	approved in water-filled drill holes		•	•	
	Installation in steel fibre concrete possible		•	•	•
	Installation possible in narrow members ≤ 120 mm		•	•	•
	removable	flush with the surface	•*	•*	•*
		completely			

\* With internal threaded anchor








































































































\* With internal threaded anchor



## Cracked concrete

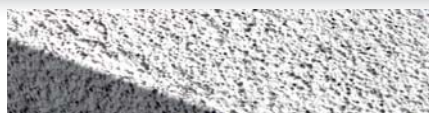
			Single fixings for cracked concrete		
			Chemical systems		
Product	Type		Highbond-System FHB II	Superbond-System FSB	Injection mortar FIS V
	Page		52	64	113
	Image				
Connection thread or Screw diameter	Anchor rod or anchor size		M8 - M24	M8 - M30	M10 - M30
	Internal thread			M 8 - M 20	
	Reinforcing bar			Ø 8 - 32 mm	Ø 10 - 28 mm
	Screw diameter				
Steel/material	gvz		•	•	•
	A4		•	•	•
	C		•	•	•
	Nylon				
Usable length	up to		165 mm	∞	∞
Approvals / Certificates	Approvals	ETA	•	•	•
		ICC		•	•
		DiBt			
		Seismic		•	•
		Dynamic			
	Certificates	Shock	•		
		Fire resistance reports	•	•	•
Type of installation	Pre-positioned installation		•	•	•
	Push-through installation		•	•	•
	Stand-off installation		•	•	•
Drilling method	Hammer drilling		•	•	•
	Hollow drilling		•	•	•
	Diamond-drilling			•	
Waiting time until loading at 20 °C	none				
	short	< 5 Minutes	•		
	middle	≤ 20 Minutes	•	•	•
	long	> 20 Minutes		•	•
Substrate			-5 °C	-30 °C	-10 °C
Special features	approved without drill-hole cleaning		•		
	Installation in concrete < C20/25 acc. certificate		•	•	•
	Installation in concrete > C50/60 acc. certificate		•	•	•
	approved in water-filled drill holes		•	•	
	Installation in steel fibre concrete possible		•	•	•
	Installation possible in narrow members ≤ 120 mm		•	•	•
	removable	flush with the surface		•*	
		completely			

\* With internal threaded anchor







Single fixings for cracked concrete				Redundant fixtures (multiple fixtures)		
Steel anchors			Frame fixings	Steel anchors		Frame fixings
Bolt anchor FAZ II	Concrete Screw FBS II	High performance anchor FH II	SXRL 10	Nail anchor FNA II	Drop-in anchor EA II	SXR / SXRL
202	232	209	294	256	247	294
						
M8 - M24	Ø 6 - 14 mm	Ø 10 - 32 mm	Ø 10 mm	Ø 6 mm M6 - M8		Ø 8 - 14 mm
		M6 - M12			M6 - M12	
			7 mm			Ø 5 - 10 mm
						
						
						
						
300 mm	205 mm	100 mm	220 mm	120 mm	∞	290 mm
						
						
						
						
						
						
						
						
						
						
						
						
						
						
-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
						
						
						
						
						
						
						

\* With internal threaded anchor





## Aircrete concrete

			Chemical systems	Steel-anchor	Frame fixings	General fixings		
Product	Type		Injection mortar FIS V	Aircrete anchor FPX-I	SXRL	Aircrete anchor GB	DUOPOWER	Turbo aircrete anchor FTP K/M
	Page		113	288	294	376	348	380
	Image							
Connection thread or Screw diameter	Anchor rod or anchor size		M6 - M16		Ø 8 - 14 mm	GB 10	Ø 5 - 14 mm	Ø 4 - 10 mm
	Internal thread		M6 - M12	M6 - M12				M6 - M10
	Screw diameter				Ø 5 - 10 mm	Ø 5 - 10 mm	Ø 3 - 12 mm	Ø 5 - 10 mm
Steel/material	gvz		•	•	•			•
	A4		•		•			
	Nylon				•	•	•	•
Usable length	up to		∞	∞	290 mm	105 mm	∞	∞
Approvals / Certificates	Approvals	ETA	•	•	•			
		DiBt			•	•		
	Certificates	Fire resistance reports	•	•				
Type of installation	Pre-positioned installation		•	•		•	•	•
	Push-through installation		•		•		•	
	Stand-off installation		•	•				
Drilling method	Hammer drilling		•		•			
	Rotary drilling		•	•	•	•	•	•
Waiting time until loading at 20 °C	none			•	•	•	•	•
	short	< 5 Minutes						
	middle	≤ 20 Minutes	•					
	long	> 20 Minutes	•					
Minimum component temperature			-10 °C	-40 °C	-40 °C	-20 °C	-40 °C	-40 °C
Special features	approved without borehole cleaning							
	applicable in aircrete concrete ceilings			•				
	removable	flush with the surface	•*	•	•	•	•	•
		completely			•	•	•	•







\* With internal threaded anchor



## Solid- & perforated brick

1







Product overview by materials

			Chemical systems	Frame fixings				General fixings
Product	Type		Injection mortar FIS V	SXR	SXRL	FUR	Nail plug N	DUOPOWER
	Page		113	320	294	306	311	348
	Image							
Connection thread or Screw diameter	Anchor rod or anchor size		M6 - M16	Ø 6,8,10 mm	Ø 8 - 14 mm	Ø 10 mm	Ø 5-10 mm	Ø 5-14 mm
	Internal thread		M6 - M12					
	Screw diameter			Ø 6 - 7 mm	Ø 6 - 10 mm	Ø 7 mm	3,5 - 7 mm	Ø 3 - 12 mm
Steel/material	gvz		•	•	•	•	•	
	A4		•	•	•	•	in A2	
	Nylon			•	•	•	•	•
Usable length	up to		∞	210 mm	290 mm	160 mm	180 mm	∞
Approvals / Certificates	Approvals	ETA	•	•	•	•		
		DiBt			•			
	Certificates	Fire resistance reports	•					
Type of installation	Pre-positioned installation		•					•
	Push-through installation		•	•	•	•	•	•
	Stand-off installation		•					
Drilling method	Hammer drilling		•	•	•	•	•	•
	Rotary drilling		•	•	•	•	•	•
Waiting time until loading at 20 °C	none			•	•	•	•	•
	short	< 5 Minutes						
	middle	≤ 20 Minutes	•					
	long	> 20 Minutes	•					
Minimum component temperature			-10 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
Special features	approved without borehole cleaning							
	removable	flush with the surface	•*	•	•	•	•	•
		completely		•	•	•	•	•

\* With internal threaded anchor



## Panel building materials

			Cavity fixings					General fixings
Product	Type		Metal cavity fixing HM	Gravity toggle/ spring toggle KD	DUOTEC	Board fixing PD	Plasterboard fixing GK/GKM	DUOPOWER
	Page		397	400	394	404	408	348
	Image							
Connection thread or diameter of the screw	anchor size		M4 - M8	M3 - M10	Ø 10 and Ø 12 mm	Ø 8-12 mm		Ø 5,6,8 and 10 mm
	Screw diameter		Metric Screw M4 - M6; Hexagon-headed screw M8; Angle hook M4 and M5	Metric thread M3 - M10; Round hook M3 - M8	Metric thread M5 - M6 Chipboard screws 4,5 - 6 mm	Chipboard screw 4,0-6,0 mm	Chipboard screw 4,0-5,0 mm	Chipboard screw 3,0-8,0 mm
Steel/material	gvz		•	•			•	
	A4							
	Nylon				•	•	•	•
Panel thickness			3-50 mm	9,5-90 mm	9,5-55 mm	min. 6 mm	min. 9,5 mm	min. 9,5 mm
Usable length	up to		30 mm	63 mm	∞	∞	∞	∞
required cavity depth by 12,5 mm board thickness			min. 19 mm	min. 27 mm	min. 40 mm	min. 23 mm	min. 13 mm	min. 18 mm
Type of installation	Pre-positioned installation		•	•	•	•	•	•
	Push-through installation							•
	Stand-off installation			•	•			
Drilling method	Rotary drilling		•	•	•	•	•	•
Waiting time until loading	none		•	•	•	•	•	•
Special features	removable	flush with the surface		•		•		
		completely					•	•



Insulated building materials (e.g. ETICS)

			Stand-off installation system		Insulation fixing FID
Product	Type		Thermax 12 and 16	Thermax 8 and 10	FID 50 and 90
	Page		337	334	494
	Image				
Connection thread or Screw diameter	Anchor rod or anchor size		M12 and M16	M8 and M10	
	Screw diameter			4,5 - 6 mm, M6 - M10	4,5-6 mm
Steel/material	gvz		•	•	•
	A4		•		
	Nylon			•	
Usable length	up to		∞	∞	∞
Approvals / Certificates	Approvals	ETA			
		DiBt	•		
Type of installation	Pre-positioned installation		•	•	•
	Push-through installation				
	Stand-off installation		•	•	
Drilling method	Hammer drilling		•	•	
	Rotary drilling		•		
Waiting time until loading at 20°C	none			•	•
	short	< 5 Minutes	depends on the injection mortar		
	middle	≤ 20 Minutes	depends on the injection mortar		
	long	> 20 Minutes	depends on the injection mortar		
Minimum component temperature			-10 °C	-40 °C	-40 °C
Special features	removable	flush with the surface	•	•	•
		completely			•







## 2 greenline

Page

Universal plug UX GREEN



26

Expansion plug SX GREEN



28

Plasterboard fixing GK GREEN



30

Hammerfix N GREEN



32

Aircrete anchor GB GREEN



34

Insulation fixing FID GREEN



36

Injection mortar FIS GREEN



38

2

greenline



## Environmentally friendly and secure

### Sustainable building

With the introduction of its greenline products, fischer is the first manufacturer worldwide to offer a range of bio-based fixing systems.

We are adapting to the demands of processors and builders who greatly value sustainability when building and renovating, even when it comes to installation.



### Grown naturally

All greenline products are produced with at least 50 % renewable raw materials. These do not compete with food and feed products or with corresponding cultivation areas. The regenerative material percentage is always confirmed by independent testing and certification by the DIN CERTCO / TÜV Rheinland.

All products are in the „BIOBASED 50 - 85 %“ class.



### Durably secure

With the introduction of its greenline products, fischer is the first manufacturer worldwide to offer a range of bio-based fixing systems.

We are adapting to the demands of processors and builders who greatly value sustainability when building and renovating, even when it comes to installation.



### Ecological proof of performance

The FIS GREEN has an Environmental Product Declaration from the Institute of Building and Environment (IBU) and thereby a data basis for ecological building rating.

Furthermore, it has been classified in the best possible emission class: A+ „very low emission“ for volatile substances as per the French VOC directive. Ecological advantages that also pay dividends in competition.



### We take responsibility

For decades fischer has been actively practising environmental protection and taking on responsibility so that the environment remains intact for future generations.

We have an environmental management system certified according to DIN ISO 14001 and are a member of the German Sustainable Building Council (DGNB).



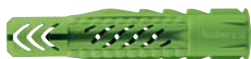
# The first range of fixing products with renewable resources

**2**
**greenline**

## General fixings

### Universal plug UX GREEN

The nylon plug for all construction materials


**Page 26**

## Special fixings

### Expansion plug SX GREEN

The powerful nylon plug with 4-way expansion


**Page 28**

## Chemical fixings

### Injection mortar FIS GREEN 300 T

Injection mortar for high loads


**Page 38**

### Plasterboard fixing GK GREEN

The fastest installation in gypsum plasterboard


**Page 30**

### Hammerfix N GREEN

The hammer-in plug for simple, fast and economic installation


**Page 32**

### Aircrete anchor GB GREEN

Secure in aerated concrete







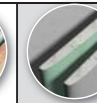
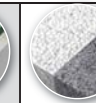








**Page 34**

### Insulation fixing FID GREEN

Thermal bridgefree installation in insulation materials


**Page 36**

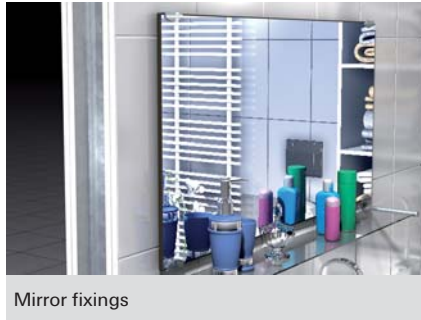

The fischer greenline product line has a green solution for every building material.

									
UX GREEN		✓	✓	✓	✓	✓	✓	✓	
SX GREEN		✓	✓	✓	✓	✓			
GK GREEN								✓	
N GREEN		✓	✓	✓	✓	✓			
GB GREEN					✓				
FID GREEN									✓
FIS GREEN		✓	✓	✓	✓	✓			



## The nylon plug for all building materials

2  
greenline



### BUILDING MATERIALS

- Concrete
- Gypsum plasterboard and gypsum fibreboards
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone
- Aerated concrete
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

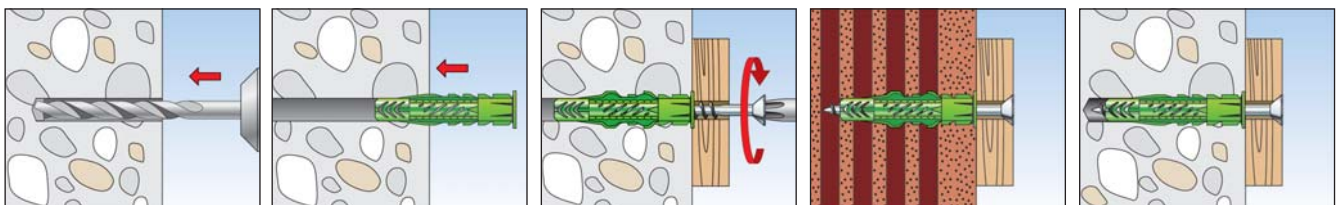
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular UX plugs.
- The universal operating principle (knotting or expanding) allows for use in all solid, hollow and board building materials. Thus the UX GREEN is the correct choice for unknown base materials.
- Plug collar for anti-slip safety and saw tooth sides as turning lock ensure the highest installation safety.

### APPLICATIONS

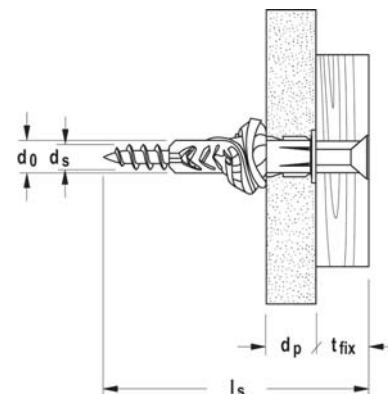
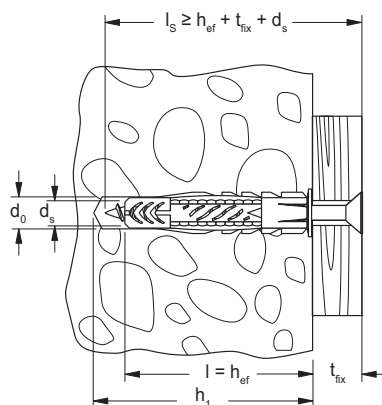
- Pictures
- Lighting
- Skirting
- Light cabinets
- Towel rails
- Mirror cabinets
- Curtain rails
- Wash basin fixings
- TV consoles
- Plumbing and heating fixings

### FUNCTIONING

- The Universal plug UX with rim is suitable for pre-positioned installation; the UX without rim is suitable for push-through installation.
- When screwing in the screw, the UX GREEN expands in solid building materials and knots itself into cavities.
- Suitable for wood and chipboard screws, as well as stud screws.
- The required screw length is given by: the plug length + fixture thickness + 1 x screw diameter.
- In the case of board building materials, the threadless part of the screw must not be longer than the fixture.
- The edge distance must be at least one plug length.



## TECHNICAL DATA



Universal plug **UX GREEN R** - with rim

	With rim	Without rim	Drill hole diameter	Min. drill hole depth	Min. panel thickness	Anchor length	Wood and chip-board screws	Sales unit
	Art.-No.	Art.-No.	$d_0$ [mm]	$h_1$ [mm]	$d_p$ [mm]	$l$ [mm]	$d_s / d_s \times l_s$ [mm]	[pcs]
Item	UX R	UX						
<b>UX GREEN 6 x 35</b>	<b>518885</b>	—	6	45	9,5	35	4 - 5	40
<b>UX GREEN 6 x 50</b>	<b>524855</b>	—	6	60	9,5	50	4 - 5	40
<b>UX GREEN 8 x 50</b>	<b>518886</b>	—	8	60	9,5	50	4,5 - 6	40
<b>UX GREEN 10 x 60</b>	<b>518887</b>	—	10	75	12,5	60	6 - 8	20
<b>UX GREEN 12 x 70</b>	—	<b>524858</b>	12	85	—	70	8 - 10	18

## LOADS

### Universal plug UX GREEN

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for wood screws with the specified diameter.

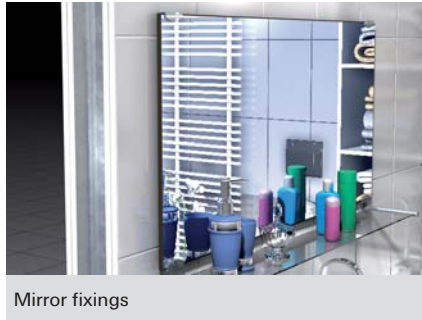
Type		UX GREEN 6 x 35	UX GREEN 6 x 50	UX GREEN 8 x 50	UX GREEN 10 x 60	UX GREEN 12 x 70
Screw diameter	$\emptyset$ [mm]	5	5	6	8	10
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>						
Concrete	≥ C20/25 [kN]	0,40	0,60	0,60	1,00	1,50
Solid brick	≥ Mz 12 [kN]	0,20	0,30	0,30	0,50	0,70
Perforated sand-lime brick	≥ KSL 12 [kN]	0,40	0,40	0,50	0,60	0,80
Vertically perforated brick	≥ Hlz 12 [kN]	0,20	0,20	0,20	0,20	0,30
Aerated concrete	≥ AAC 4 [kN]	0,20	0,20	0,30	0,40	0,60
Gypsum plasterboard	12,5 mm [kN]	0,10	0,10	0,10	0,10	-
Gypsum plasterboard	25 mm [kN]	0,15	0,15	0,15	0,15	-
Gypsum fibreboard	(Fermacell) [kN]	0,20	0,20	0,20	0,25	-
Gypsum block	$\rho \geq 0,9 \text{ kg/dm}^3$ [kN]	-	-	0,15	0,35	0,45

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The powerful nylon plug with 4-way expansion

2  
greenline



### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

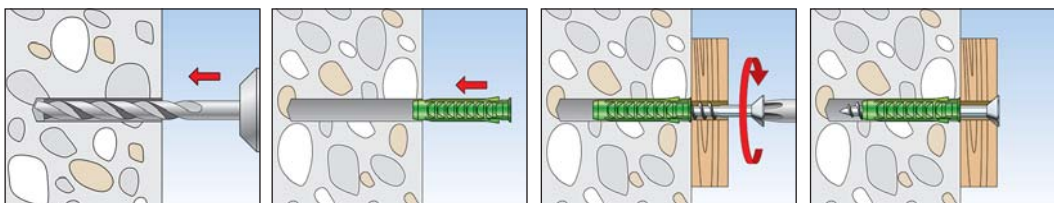
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular SX plugs.
- The powerful 4-way expansion provides optimum force transmission in the building material, thus enabling high load values and security.
- The anti-rotation lock prevents the plug from spinning in the drill hole.
- The expansion-free plug neck prevents the creation of expansion forces on the material whilst screwing in the screw. This helps to prevent damage to tiles and plaster.
- Fast and easy push-through installation reduces installation time.

### APPLICATIONS

- Lighting
- Wardrobes
- Motion detectors
- Skirting
- Light shelves
- Mirror cabinets
- Letter boxes
- TV consoles
- Trellis
- Folding shutters
- Bath and toilet installations

### FUNCTIONING

- The SX GREEN is suitable for pre-positioned and push-through installation.
- When screwing in the screw, the SX GREEN expands in four directions, thus providing a secure anchoring in the building material.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Suitable for wood, chipboard and spacing screws.



## TECHNICAL DATA



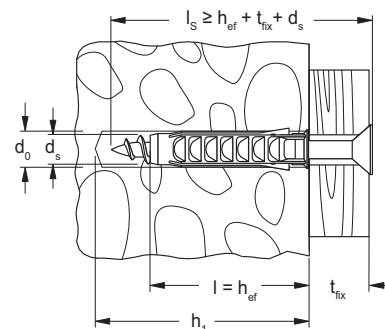
Plug **SX GREEN** - with rim



Plug **SX GREEN** - with greater anchorage depth, without rim



Plug **SX GREEN S** - with rim and screw



	With rim	Without rim and large anchorage depth	With rim and screw	Drill hole diameter $d_0$	Min. drill hole depth $h_1$	Anchor length $l$	Max. fixture thickness $t_{fix}$	Wood and chip-board screws $d_s / d_s \times l_s$	Sales unit
	Art.-No.	Art.-No.	Art.-No.	[mm]	[mm]	[mm]	[mm]	[mm]	[pcs]
Item	SX	SX	SX-S						
<b>SX GREEN 5 x 25</b>	<b>524859</b>	—	—	5	35	25	—	3 - 4	90
<b>SX GREEN 6 x 30</b>	<b>524860</b>	—	—	6	40	30	—	4 - 5	90
<b>SX GREEN 6 x 30</b>	—	—	<b>524866</b>	6	40	30	5	4,5 x 40	45
<b>SX GREEN 6 x 50</b>	—	<b>524861</b>	—	6	60	50	—	4 - 5	90
<b>SX GREEN 8 x 40</b>	<b>524862</b>	—	—	8	50	40	—	4,5 - 6	90
<b>SX GREEN 8 x 40</b>	—	—	<b>524867</b>	8	60	40	15	5 x 60	45
<b>SX GREEN 8 x 65</b>	—	<b>524863</b>	—	8	75	65	—	4,5 - 6	45
<b>SX GREEN 10 x 50</b>	<b>524864</b>	—	—	10	70	50	—	6 - 8	45
<b>SX GREEN 12 x 60</b>	<b>524865</b>	—	—	12	80	60	—	8 - 10	20

## LOADS

### Expansion plug SX GREEN

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type		SX GREEN 5 x 25	SX GREEN 6 x 30 SX GREEN 6 x 50	SX GREEN 8 x 40 SX GREEN 8 x 65	SX GREEN 10 x 50	SX GREEN 12 x 60
Wood screw diameter	$\emptyset$ [mm]	4	5	6	8	10
Min. edge distance concrete	$c_{min}$ [mm]	25	35	40	50	65
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>						
Concrete	$\geq C20/25$ [kN]	0,30	0,65	0,70	1,20	1,70
Solid brick	$\geq Mz 12$ [kN]	0,25	0,30	0,60	0,65	0,70
Solid sand-lime brick	$\geq KS 12$ [kN]	0,30	0,50	0,60	1,20	1,70
Aerated concrete	$\geq AAC 2$ [kN]	0,03	0,03	0,04	0,09	0,14
Aerated concrete	$\geq AAC 4$ [kN]	0,09	0,09	0,14	0,30	0,45
Vertically perforated brick	$\geq Hlz 12$ ( $\rho \geq 1.0 \text{ kg/dm}^3$ ) [kN]	0,07	0,07	0,17	0,17	0,26
Perforated sand-lime brick	$\geq KSL 12$ [kN]	0,17	0,30	0,35	0,30	0,35
Gypsum block	[kN]	-	-	0,26	0,37	1,00

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.



## The fastest installation in gypsum plasterboard

2  
greenline



### BUILDING MATERIALS

- Gypsum plasterboard, single and double-planked

### CERTIFICATES



### ADVANTAGES

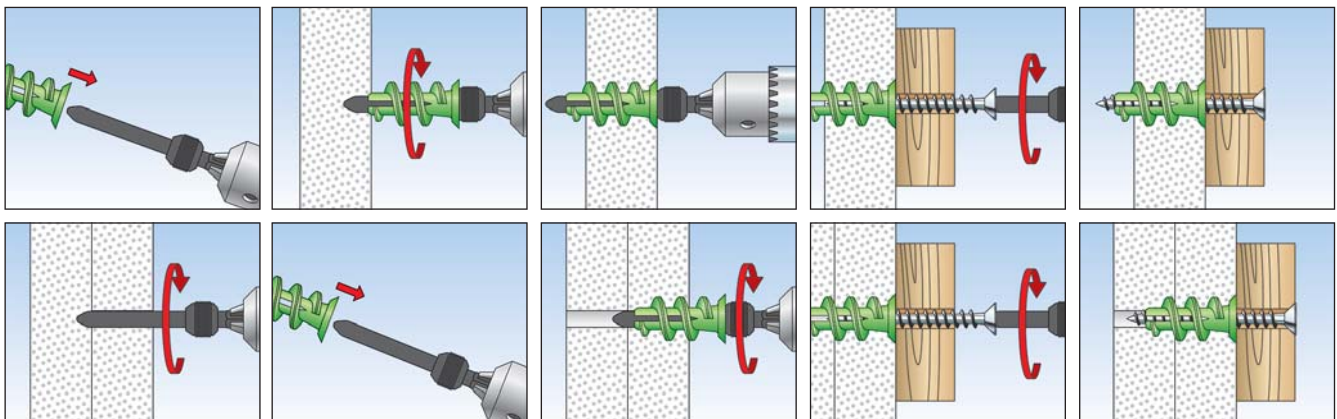
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular GK plugs.
- The included setting tool combine the functions of drilling and setting fixings for direct and easy installation.
- Sharp, self-tapping thread for a positive-fit connection with a high load-bearing capacity.
- The cross-drive recess in the head of the fixing means that the GK GREEN can also easily be screwed out like a screw.
- The GK GREEN can be used with various screws, hooks and eye screws, making it very versatile in its applications.

### APPLICATIONS

- Pictures
- Lighting
- Electrical installations
- Fitting accessories
- Series installations

### FUNCTIONING

- The gypsum plasterboard fixing GK GREEN is suitable for pre-positioned installation.
- The GK GREEN is screwed flush into the gypsum plasterboard using the setting tool provided. Avoid manual and machine-aided overtightening.
- For board thicknesses greater than 15 mm, drill a hole first by using the setting tool.
- Adapted for wood, sheet metal and chipboard screws with a diameter of 4.0 to 5.0 mm.
- Not suitable for gypsum fibreboard and tiled plasterboard.



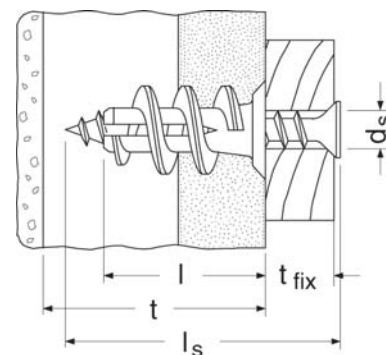
## TECHNICAL DATA



Plasterboard fixing **GK GREEN**



Plasterboard fixing **GK GREEN S**



Item	Art.-No.	Anchor length l [mm]	Min. thickness to first supporting layer t [mm]	Max. fixture thickness t <sub>fix</sub> [mm]	Screw d <sub>s</sub> x l <sub>s</sub> [mm]	Drive	Sales unit [pcs]
<b>GK GREEN</b>	<b>524868</b> 1) 2)	22	25	—	4,0 - 5,0 x L <sub>s</sub>	—	90
<b>GK GREEN S</b>	<b>524869</b> 1) 3)	22	25	13	4,5 x 35	PZ2	45

1) Including installation tool GWK.

2) Min. screw length = length of plug 22 mm + thickness of building component.

3) Supplied with plasterboard screw.

## LOADS

### Plasterboard fixing GK GREEN

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for chipboard screws with the specified diameters.

Type		GK GREEN	
Chipboard screw	Ø [mm]	4,0 - 5,0	
Recommended loads in the respective base material F <sub>rec</sub> <sup>2)</sup>			
Gypsum plasterboard	9,5 mm	[kN]	0,07
Gypsum plasterboard	12,5 mm	[kN]	0,08
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,11

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The hammer-in plug for simple, fast and economic installation

2  
greenline



Timber substructures



Cable fixing

### BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Building brick
- Natural stone
- Solid brick made from lightweight concrete
- Aerated concrete
- Solid panel made from gypsum
- Vertically perforated brick
- Perforated sand-lime brick
- Hollow blocks made from lightweight concrete

### CERTIFICATES



### ADVANTAGES

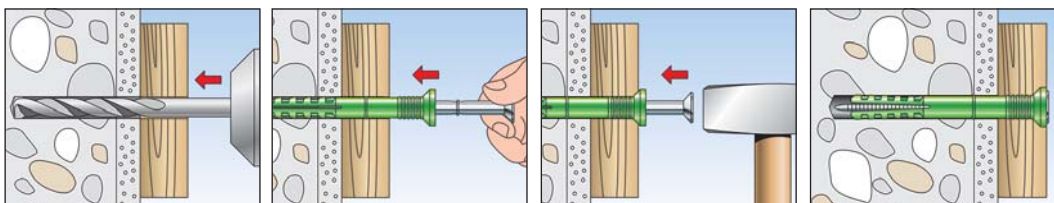
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular hammerfix N plugs.
- The rapid push-through and hammer-set installation reduces the amount of work required and allows for economic series installation.
- The integrated hammer-in stop prevents the plug from expanding prematurely, thus enabling problem-free installation.
- Together with the cross-slot recess, the thread of the nail screw allows the screw to be removed, thus allowing for subsequent dismantling.

### APPLICATIONS

- Substructures made of wood and metal
- Wall connection or plaster profiles
- Slides
- Sheets
- Cable and pipe clips
- Perforated tapes

### FUNCTIONING

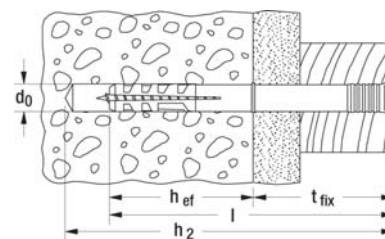
- The hammerfix N GREEN is suitable for push-through installation.
- The easiest installation: drill, knock in and you're done.
- When being hammered in, the nail screw causes the plug to expand in two directions, thus providing a secure anchoring in the building material.



## TECHNICAL DATA



Hammerfix **N GREEN S** with countersunk head and zinc-plated nail



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Drive	Sales unit [pcs]
<b>N GREEN 6 x 40/10 S</b>	<b>524845</b>	6	30	40	55	10	PZ2	45
<b>N GREEN 6 x 60/30 S</b>	<b>524847</b>	6	30	60	75	30	PZ2	45
<b>N GREEN 6 x 80/50 S</b>	<b>524848</b>	6	30	80	95	50	PZ2	45
<b>N GREEN 8 x 80/40 S</b>	<b>524849</b>	8	40	80	95	40	PZ3	45
<b>N GREEN 8 x 100/60 S</b>	<b>524850</b>	8	40	100	115	60	PZ3	45

## LOADS

### Hammerfix N GREEN S

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for screw nails with the specified diameter.

Type	N GREEN 6		N GREEN 8	
Screw nail diameter	$\emptyset$	[mm]	4	5
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>				
Concrete	$\geq C20/25$	[kN]	0,25	0,27
Solid brick	$\geq Mz 12$	[kN]	0,18	0,24
Solid sand-lime brick	$\geq KS 12$	[kN]	0,22	0,24
Solid brick of lightweight aggregate concrete	$\geq V 4$	[kN]	0,12	0,15
Aerated concrete	$\geq AAC 2$	[kN]	0,04	0,05
Aerated concrete	$\geq AAC 4$	[kN]	0,10	0,13

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## Secure in aerated concrete

2  
greenline



Radiators



Suspended ceilings

### BUILDING MATERIALS

#### Suitable for:

- Aerated concrete  $\geq$  AAC 2
- Aerated concrete and ceiling panels of compressive strength  $\geq$  3.3

### CERTIFICATES



### ADVANTAGES

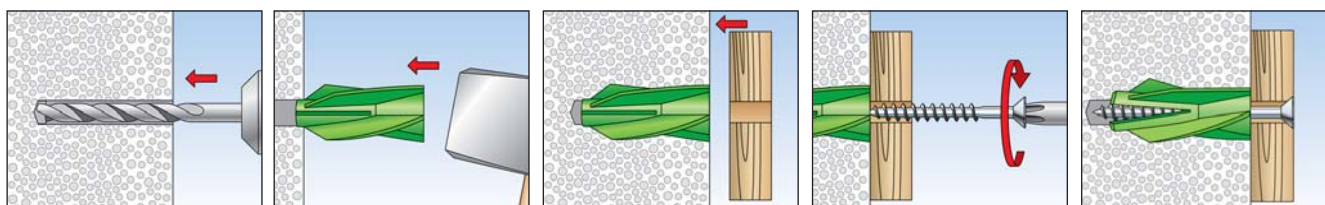
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- The spiral-shaped outer ribs cut a positive fit in the soft building material, thus ensuring best pressure distribution and load-bearing capacity.
- Can be applied with a hammer – there is no need for special tools, thus saving time and money for the installation.

### APPLICATIONS

- Suspended ceilings
- Cable trays
- Pipelines
- Guard rails
- Façade and roof constructions made of wood and metal
- Anopy brackets
- Letter boxes
- Trellis

### FUNCTIONING

- The aircrete anchor GB GREEN is suitable for pre-positioned installation.
- The spiral-shaped outer ribs cut a positive fit into the soft building material when knocked in, thus ensuring optimal pressure distribution and load-bearing capacity.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Rotary drilling of the hole is required.
- Can be used in unplastered aerated concrete.

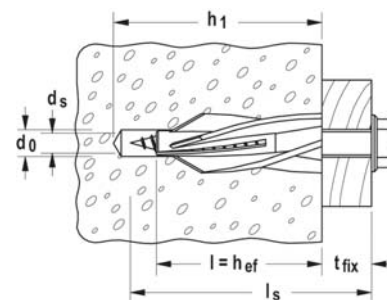




## TECHNICAL DATA



Aircrete anchor **GB GREEN**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Plug length = min. anchorage depth $l = h_{ef}$ [mm]	fischer safety screw $d_s \times l_s$ [mm]	Sales unit [pcs]
<b>GB GREEN 8</b>	<b>524870</b>	8	60	50	5	20
<b>GB GREEN 10</b>	<b>524871</b>	10	65	55	7	18

## LOADS

### Aircrete anchor GB GREEN

Highest recommended loads<sup>1)</sup> for a single anchor in aerated concrete.

The given loads are valid for fischer safety screws<sup>4)</sup> acc. attached table.

Type			GB GREEN 8	GB GREEN 10
Diameter fischer safety screw	$\emptyset$	[mm]	5	7
Min. spacing <sup>6)</sup>	$s_{min}$	[mm]	150 (100) <sup>7)</sup>	100
Min. edge distance <sup>2)</sup>	$c_{min}$	[mm]	100 (75) <sup>7)</sup>	100
Minimum member thickness	$h_{min}$	[mm]	75	120
Anchorage depth	$h_{ef} (h_v)$	[mm]	50	55
<b>Recommended load in the respective base material <math>F_{rec}</math><sup>3)</sup></b>				
Aerated concrete	AAC 2	[kN]	0,20	0,21
Aerated concrete	AAC 3	[kN]	0,30	0,32 (0,43) <sup>5)</sup>
Aerated concrete	AAC 4	[kN]	0,40	0,54 (0,71) <sup>5)</sup>

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Minimum possible edge distance.

<sup>3)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>4)</sup> Galvanised steel (gvz) and stainless steel A4.

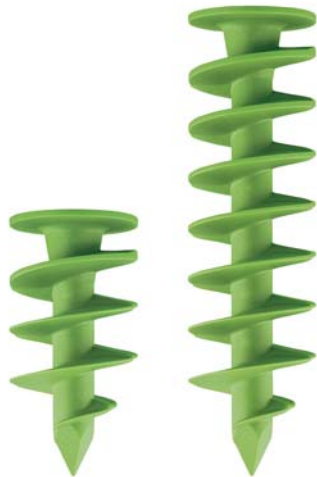
<sup>5)</sup> The values in brackets are decisive for member thickness  $\geq 150$  mm.

<sup>6)</sup> Minimum possible axial spacing while reducing the recommended load.

<sup>7)</sup> Values in brackets apply to AAC 2.

## Thermal bridge-free installation in insulation materials

2  
greenline



Fixings in ETICS



Fixings in ETICS

### BUILDING MATERIALS

- Non-plastered, pressure-resistant insulating boards
- Plastered, pressure-resistant insulating boards
- ETICS insulating boards

### CERTIFICATES



### ADVANTAGES

- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular FID plugs. To fix lightweight fixtures in plastered and non-plastered insulating boards.
- Thermal bridge-free mounting when exclusively set in insulation material.
- Installation without pre-drilling even through thin plaster layers, thus saving a work step.
- Easy to set using a standard bit.

### APPLICATIONS

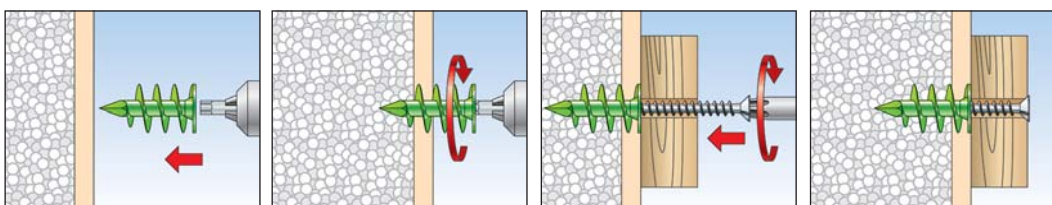
**To fix lightweight fixtures in plastered and non-plastered insulating boards.**

**The areas of application are:**

- Façade construction (ETICS)
- Insulating construction
- Electric construction
- Refrigerated and climate construction
- Acoustic construction

### FUNCTIONING

- The FID GREEN can be set in pre-positioned installation with a cordless screwdriver or by hand.
- With its strong drill tip, the insulation fixing FID GREEN breaks through thin plaster layers and cuts a positive fit into the insulation panel with its specially shaped spiral thread.
- From a plaster thickness of 5 mm, we recommend to create a 6 mm hole. This serves for better guidance of the fastener in the setting process.
- Water ingress in the insulation material can be prevented by sealing the plug collar after successful installation.
- Attachment parts can be easily attached with screws.
- We recommend to predrill an 6 mm hole in ETICS rendering.



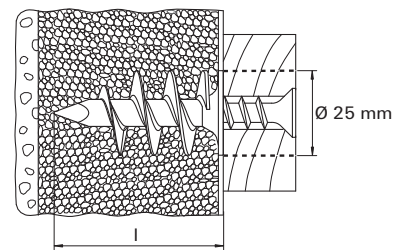
## TECHNICAL DATA



Insulation fixing **FID GREEN 50**



Insulation fixing **FID GREEN 90**



Item	Art.-No.	Anchor length l [mm]	Min. bolt penetration [mm]	Wood and chipboard screws d <sub>s</sub> [mm]	Drive	Sales unit [pcs]
<b>FID GREEN 50</b>	<b>524851</b>	50	50	4,5 - 5	T40	45
<b>FID GREEN 90</b>	<b>524852</b>	90	90	6	Inbus 6 mm	20

## LOADS

### Insulation fixing FID GREEN

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for chipboard screws with maximum diameter.

Type			FID GREEN 50	FID GREEN 90
Screw diameter	Ø	[mm]	4,5 - 5,0	6,0
<b>Recommended loads in the respective base material N<sub>rec</sub><sup>2)</sup></b>				
Polystyrene	PS 15	[kN]	0,07	0,17
Polystyrene	PS 20	[kN]	0,10	0,20

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load.

## The first approved injection mortar made with renewable raw materials

2  
greenline



Building renovation



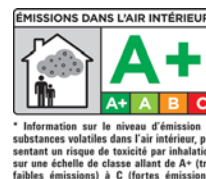
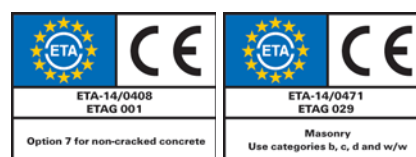
Staircase

### BUILDING MATERIALS

#### Approved for anchorings in:

- Concrete C20/25 to C50/60, non-cracked
- Solid brick
- Vertically perforated brick
- Solid sand-lime brick
- Perforated sand-lime brick
- Aerated concrete

### CERTIFICATES



### ADVANTAGES

- The worldwide first injection mortar with renewable raw materials. The share of renewable raw materials is certified by DIN CERTCO / TÜV Rheinland.
- Because of the European Technical Assessment it is possible to use the injection system in the area of public buildings.
- The low content of volatile organic compounds (VOC) has a positive effect for the evaluation of fixings in „Green Building“-projects.
- Biobased raw materials increase the residential and workplace quality and preserve valuable resources for future generations.
- The injection system is not mandatory for indication and thus reduces risks for installers and the environment.
- FIS GREEN is suitable for the use with the complete fischer injection accessories.

### APPLICATIONS

#### Injection mortar for use with:

- Threaded rods FIS A, see page 144
- Internal threaded anchor RG MI, see page 159
- Rebar anchor FRA, see page 179
- Concrete steel bars, see page 185
- Injection anchor sleeves FIS H, see page 167
- NSF certificate verifies its suitability for applications in drinking water

### FUNCTIONING

- FIS GREEN is a 2-component injection mortar.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- The injection cartridges are quick and easy to use with the fischer dispensers.
- Partially used cartridges can be reused by changing the static mixer.
- Related accessories for the various applications can be found on pages „non-cracked concrete“ and „masonry“.

### SEE ALSO



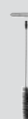
#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

Page 195

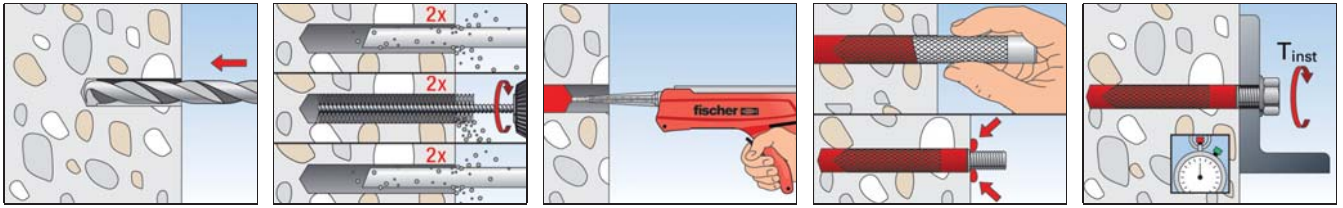


#### ACCESSORIES

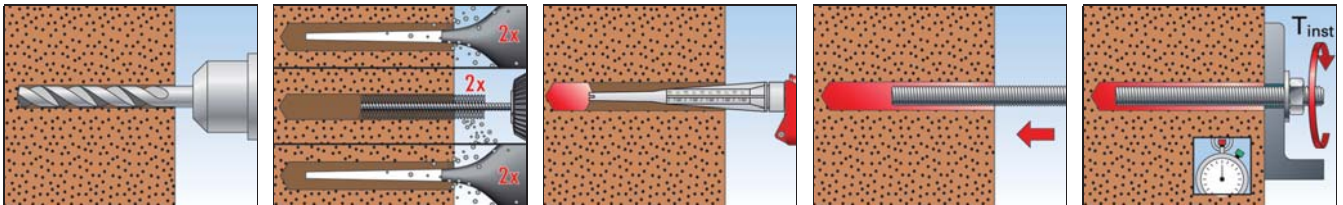
Page 198



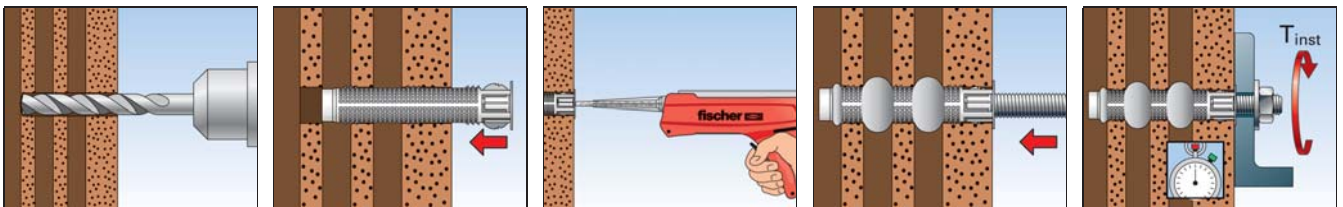
## INSTALLATION WITH FIS EB, FIS GREEN



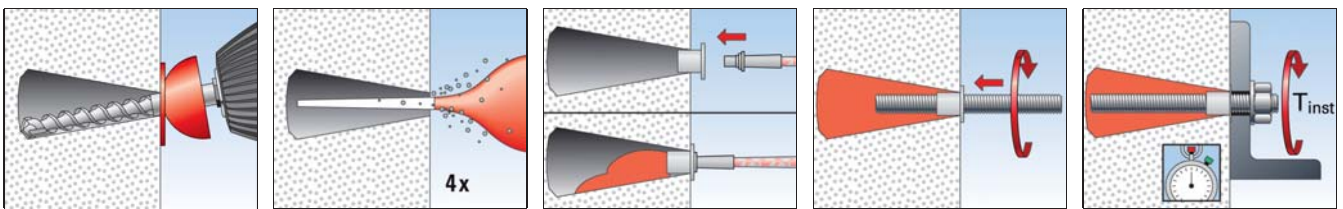
## INSTALLATION



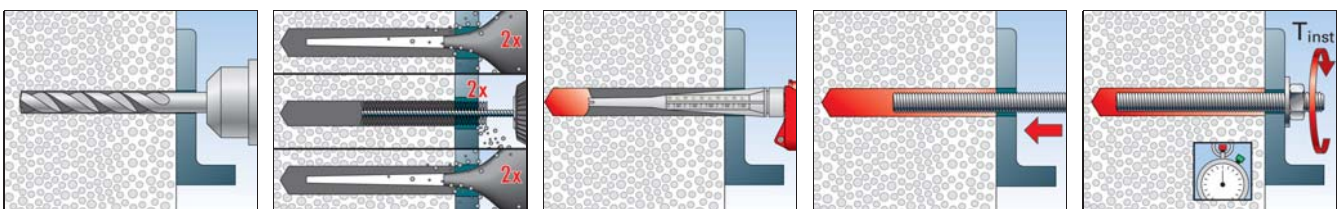
## INSTALLATION



## INSTALLATION - UNDERCUT DRILL HOLE



## INSTALLATION - CYLINDRICAL DRILL HOLE





## TECHNICAL DATA

2



FIS GREEN 300 T



Static mixer FIS MR Plus

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	ETA				[pcs]
FIS GREEN 300 T	522223	■	DE	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS GREEN 300 T K	523244	■	DE	150	1 Cartridge 300 ml, 2 x Static mixer (incl. clip with europerforation)	4
FIS GREEN 300 T	522989	■	FR	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	4
FIS GREEN 300 T	523245	■	IT	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
FIS GREEN 300 T	538219	■	CS, SK	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS GREEN 300 T	532972	■	DA, SV, NO, FI	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
FIS MR Plus	545853	—	—	—	10 static mixer FIS MR Plus	10

## LOADS

Injection system FIS GREEN: Injection mortar FIS GREEN with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
M8	5.8	100	60	10	5,7	5,1	90	70	180	40	40
		110	80		7,6				240		
		190	160		9,0				480		
	8.8	100	60		5,7	8,6	90	130	180		
		110	80		7,6				240		
		190	160		14,3				480		
	A4-70	100	60		5,7	6,0	90	85	180		
		110	80		7,6				240		
		190	160		9,9				480		
	C-70	100	60		5,7	7,4	90	110	180		
		110	80		7,6				240		
		190	160		12,4				480		
M10	5.8	100	60	20	6,7	8,6	90	125	180	45	45
		120	90		10,1		110	105	270		
		230	200		13,8		55	85	600		
	8.8	100	60		6,7	13,1	90	200	180		
		120	90		10,1		110	170	270		
		230	200		22,4			115	600		
	A4-70	100	60		6,7	9,2	90	135	180		
		120	90		10,1		110	110	270		
		230	200		15,7			65	600		
	C-70	100	60		6,7	11,4	90	170	180		
		120	90		10,1		110	145	270		
		230	200		19,5			105	600		

## LOADS

### Injection system FIS GREEN: Injection mortar FIS GREEN with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
M12	5.8	100	70	40	8,9	12,0	105	175	210	55	55
		140	110		14,0		130	130	330		
		270	240		20,5		70	100	720		
	8.8	100	70		8,9	19,4	105	295	210		
		140	110		14,0		130	230	330		
		270	240		30,5			150	720		
	A4-70	100	70		8,9	13,7	105	200	210		
		140	110		14,0		130	155	330		
		270	240		22,5		85	115	720		
	C-70	100	70		8,9	17,1	105	260	210		
		140	110		14,0		130	200	330		
		270	240		28,1		115	135	720		
M16	5.8	120	80	60	12,0	22,3	125	305	240	65	65
		170	125		18,7		160	235	375		
		360	320		37,6		115	150	960		
	8.8	120	80		12,0	28,7	125	405	240		
		170	125		18,7		160	220	960		
		360	320		47,9			220	960		
	A4-70	120	80		12,0	25,2	125	350	240		
		170	125		18,7		160	270	375		
		360	320		42,0		135	165	960		
	C-70	120	80		12,0	28,7	125	405	240		
		170	125		18,7		160	350	375		
		360	320		47,9			195	960		
M20	5.8	140	90	120	14,6	34,9	135	435	270	85	85
		220	170		27,6		190	300	510		
		450	400		58,6		165	195	1200		
	8.8	140	90		14,6	35,0	135	440	270		
		220	170		27,6		190	525	510		
		450	400		64,8			290	1200		
	A4-70	140	90		14,6	35,0	135	440	270		
		220	170		27,6		190	350	510		
		450	400		64,8			215	1200		
	C-70	140	90		14,6	35,0	135	440	270		
		220	170		27,6		190	455	510		
		450	400		64,8			260	1200		

For the design the complete assessment ETA-14/0408 has to be considered. <sup>10)</sup>

<sup>1)</sup> Also valid for anchor rod RG M in the same property class.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-14/0408 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-14/0408.

<sup>3)</sup> The given loads are valid for injection mortar FIS GREEN for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-14/0408.

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>5)</sup> Drill method hammer drilling.

<sup>6)</sup> For the sizes M8 - M20 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

<sup>7)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-14/0408.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-14/0408.

<sup>10)</sup> The given loads refer to the European Technical Assessment ETA-14/0408, issue date 19/12/2014. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Injection system FIS GREEN: Injection resin FIS GREEN with Internal threaded anchor RGMI

zinc plated steel / stainless steel A4

2

greenline

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	95	65	270	55	55
	8.8				11,9	8,3	135	95			
	A4-70				9,9	5,9	110	70			
RG M10 I	5.8	130	90	20	13,8	8,3	145	90	270	65	65
	8.8				13,9	13,3		155			
	A4-70					9,3		100			
RG M12 I	5.8	170	125	40	20,2	12,1	190	110	375	75	75
	8.8					19,3		190			
	A4-70					13,5		125			
RG M16 I	5.8	210	160	80	27,8	22,4	240	180	480	95	95
	8.8					30,9		265			
	A4-70					25,1		205			

For the design the complete assessment ETA-14/0408 has to be considered. <sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-14/0408 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-14/0408.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-14/0408.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-14/0408, issue date 19/12/2014. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>4)</sup>

Highest permissible loads <sup>1) 5)</sup> for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type	Compressive brick-strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characteristic spacing parallel to bed joint	Characteristic spacing perpendicular to bed joint	Min. spacing <sup>2)</sup>	Characteristic resp. min. edge distance <sup>2)</sup>
	f <sub>b</sub> [N/mm <sup>2</sup> ]	ρ [kg/dm <sup>3</sup> ]	(L x W x H) [mm]	h <sub>ef</sub> [mm]	h <sub>min</sub> [mm]	T <sub>inst,max</sub> [Nm]	N <sub>perm</sub> [kN]	V <sub>perm</sub> [kN]	s <sub>cr</sub>    [mm]	s <sub>cr</sub> ⊥ [mm]	s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	c <sub>cr</sub> = c <sub>min</sub> [mm]
Solid brick Mz, NF acc. to EN 771-1												
M8	≥10	≥1,8	240x115x71 (NF)	50	80	10	0,71	0,71	150	150	150	100
M10				50	80		0,86	1,14	150	150	150	100
M10				80	110		1,29	1,14	240	240	240	100
M10				200	230		3,14	2,43	300	300	300	150
M12				50	80		0,86	1,14	150	150	150	100
M12				80	110		1,43	1,14	240	240	240	100
M12				200	230		2,00	3,29	300	300	300	150
M8	≥20			50	80		0,71	1,14	150	150	150	100
M10				50	80		1,29	1,71	150	150	150	100
M10				80	110		1,71	1,71	240	240	240	100
M10				200	230		3,43	3,43	300	300	300	150
M12				50	80		1,14	1,57	150	150	150	100
M12				80	110		2,00	1,57	240	240	240	100
M12				200	230		2,86	3,43	300	300	300	150

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type	Compressive- brick- strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characte- ristic spacing parallel to bed joint	Characte- ristic spa- cing perpen- dicular to bed joint	Min. spacing <sup>2)</sup>	Characte- ristic respo- nse min. edge distance <sup>2)</sup>
	f <sub>b</sub> [N/mm <sup>2</sup> ]	ρ [kg/dm <sup>3</sup> ]	(L x W x H) [mm]	h <sub>ef</sub> [mm]	h <sub>min</sub> [mm]	T <sub>inst,max</sub> [Nm]	N <sub>perm</sub> [kN]	V <sub>perm</sub> [kN]	s <sub>cr</sub>    [mm]	s <sub>cr</sub> ⊥ [mm]	s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	c <sub>cr</sub> = c <sub>min</sub> [mm]
Solid sand-lime brick KS acc. to EN 771												
M8	≥10	≥1,8	240x115x71 (NF)	50	80	10	0,71	1,14	150	150	150	100
M10				50	80		0,71	1,14	150	150	150	100
M10				80	110		0,86	1,14	240	240	240	100
M10				200	230		2,57	1,14	300	300	300	150
M12				50	80		0,57	1,43	150	150	150	100
M12				80	110		0,86	1,43	240	240	240	100
M12				200	230		2,57	1,43	300	300	300	150
M8	≥20			50	80		0,71	1,57	150	150	150	100
M10				50	80		0,86	1,57	150	150	150	100
M10				80	110		1,14	1,57	240	240	240	100
M10				200	230		3,43	1,57	300	300	300	150
M12				50	80		0,86	2,00	150	150	150	100
M12				80	110		1,29	2,00	240	240	240	100
M12				200	230		3,43	2,00	300	300	300	150

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>6)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H..K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in solid brick masonry (with injection anchor sleeve) for pre-positioned installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type of anchor sleeve with anchor rod	Compressive-brick-strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective anchorage depth <sup>4)</sup>	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characteristic spacing parallel to bed joint	Characteristic spacing perpendicular to bed joint	Min. spacing <sup>2)</sup>	Characteristic resp. min. edge distance <sup>2)</sup>		
	f <sub>b</sub>	ρ	(L x W x H)	h <sub>ef</sub>	h <sub>min</sub>	T <sub>inst,max</sub>	N <sub>perm</sub>	V <sub>perm</sub>	s <sub>cr</sub>	s <sub>cr</sub> ⊥	s <sub>min</sub>    / s <sub>min</sub> ⊥	c <sub>cr</sub> = c <sub>min</sub>		
	[N/mm <sup>2</sup> ]	[kg/dm <sup>3</sup> ]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]		
Solid sand-lime brick KS acc. to EN 771														
12x85 M8	≥ 10	≥ 1,8	240x115x113	85	115	2	0,86	0,86	255	255	255	100		
16x85 M10						4	0,57	1,00						
20x85 M12						4	1,57	1,00						
12x85 M8	≥ 20			85	115	2	1,29	1,29						
16x85 M10						4	0,86	1,57						
20x85 M12						4	2,29	1,57						

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H..K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation. For the design the complete assessment ETA-14/0471 has to be considered.

Type of anchor sleeve with anchor rod	Compressive brick-strength  f <sub>b</sub> [N/mm <sup>2</sup> ]	Brick raw density  ρ [kg/dm <sup>3</sup> ]	Minimum brick-dimensions <sup>7)</sup>  (L x W x H) [mm]	Min. effective-anchorage depth <sup>4)</sup>  h <sub>ef</sub> [mm]	Min. member thickness  h <sub>min</sub> [mm]	Maximum torque  T <sub>inst,max</sub> [Nm]	Permissible tensile load <sup>3)</sup>  N <sub>perm</sub> [kN]	Permissible shear load <sup>3)</sup>  V <sub>perm</sub> [kN]	Characteristic spacing parallel to bed joint  s <sub>cr</sub>    [mm]	Characteristic spacing perpendicular to bed joint  s <sub>cr</sub> ⊥ [mm]	Min. spacing <sup>2)</sup>  s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  c <sub>cr</sub> = c <sub>min</sub> [mm]
Vertically perforated brick Hz, acc. to EN 771-1												
12x85 M6/M8	≥ 8	≥ 1,4	230x108x55	85	115	2,0	0,57	0,71	230	55	230 / 55	100
16x85 M8/M10												
20x85 M12/M16												
12x85 M6/M8	≥ 10	≥ 0,9	240x175x113	85	175	2,0	0,57	1,14	240	115	240 / 115	120
16x85 M8/M10							0,57	1,57				
20x85 M12/M16							0,71	1,71				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x85 M6/M8	≥ 12	≥ 1,4	240x175x113	85	175	2,0	0,34	0,71	240	115	240 / 115	100
16x85 M8/M10							0,57	1,57				
20x85 M12/M16							0,57	1,29				
12x85 M6/M8	≥ 20	≥ 1,4	240x175x113	85	175	2,0	0,57	1,29	240	115	240 / 115	100
16x85 M8/M10							1,00	2,29				
20x85 M12/M16							1,00	2,14				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in aerated concrete.

For the design the complete assessment ETA-14/0471 has to be considered.

Type anchor rod	Compressive brick-strength $f_b$ [N/mm <sup>2</sup> ]	Brick raw density $\rho$ [kg/dm <sup>3</sup> ]	Minimum brick dimensions (L x W x H) [mm]	Min. effective-anchorage depth $h_{ef}$ [mm]	Min. member thickness $h_{min}$ [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load <sup>3)</sup> $N_{perm}$ [kN]	Permissible shear load <sup>3)</sup> $V_{perm}$ [kN]	Characteristic spacing parallel to bed joint $s_{cr \parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr \perp}$ [mm]	Min. spacing <sup>2)</sup> $s_{min \parallel} / s_{min \perp}$ [mm]	Characteristic resp. min. edge distance <sup>2)</sup> $c_{cr} = c_{min}$ [mm]
<b>Aerated concrete acc. to EN 771-4</b>												
M8	≥ 2	≥ 0,35		100	130	1	0,71	0,32				
M10						2	0,71	0,32				
M12						2	0,89	0,32				
M16						2	0,89	0,43				
M8	≥ 4	≥ 0,50		100	130	1	0,89	0,54				
M10						2	1,07	0,54				
M12						2	1,07	0,54				
M16						2	1,07	0,54				
M8	≥ 6	≥ 0,65		100	130	1	1,25	0,89				
M10						2	1,43	0,89				
M12						2	1,43	0,89				
M16						2	1,43	0,71				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.




















<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.




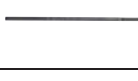
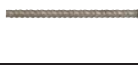

























# 3 Chemical fixings

	Page
<b>MORTARS AND CAPSULES FOR GENERAL APPLICATIONS</b>	
Introduction	48
Highbond-System FHB II 	52
Highbond-System FHB II Inject 	59
Superbond-System FSB 	64
Resin anchor RM II 	79
Epoxy mortar FIS EM Plus 	86
Epoxy mortar FIS EB 	95
Injection mortar FIS V 	101
Injection mortar FIS VL 	117
Injection mortar FIS GREEN 	126
Injection mortar FIS P Plus 	133
Injection mortar FIS P 	140
<b>ANCHOR RODS</b>	
Introduction	144
Threaded rod FIS A 	146
Threaded rod RG M 	154
Internal threaded anchor RG M I 	159
Internal threaded anchor FIS E 	161
Accessories for push-trough installation 	164
Anchor sleeve FIS H K 	167
Anchor sleeve FIS H L 	167
Anchor sleeve FIS H N 	167

	Page
<b>SPECIAL APPLICATIONS</b>	
Introduction	169
Highbond anchor dynamic FHB dyn 	170
Dynamic-Anchor FDA 	174
UMV multicone dynamic bonded anchor 	176
Rebar connections 	179
Concrete-Concrete Shear Connector FCC 	185
Remedial wall tie VBS 8 	187
Weather facing reconstruction system FWS II 	189
Can System FCS 	191
Fill & Fix injection fixing 	193
<b>DISPENSERS</b> 	196
<b>ACCESSORIES</b> 	198












# Mortars and Applications

Positioning	Approved Substrates (ETA)					Approved Features										Page
						Post-installed Rebar Connection	ICC	Fire Resistance R120	Seismic Approval	Waterfilled drill hole	Diamond drilling	Hollow drilling	Dynamic loads	Others		
 Highbond-System FHB II	The best performance in cracked concrete	■	■					■				■	■	ZTV 1200 °C, BZS shock tested	52	
 Superbond-System FSB	The concrete all-rounder	■	■				■	■	■	C1, C2			■	Under-water applications	64	
 Epoxy mortar FIS EM Plus	The powerful injection mortar for rebar connections and cracked concrete	■	■				■	■	■	C1, C2	■	■	■		86	
 Epoxy mortar FIS EB	The basic epoxy mortar for applications in concrete	■	■				■		■	C1, C2	■	■	■		95	
 Injection mortar FIS V	The versatile injection mortar for anchorings in masonry und cracked concrete	■	■	■	■	■	■	■	■	C1, C2	■		■		101	
 Injection mortar FIS VL	The solid injection mortar for standard applications in cracked concrete and masonry	■	■	■	■	■	■		■		■		■		117	
 Injection mortar FIS GREEN	The first approved mortar made with renewable raw materials		■	■	■	■		■						Biobased, EPD, Émission Dans L'Air Intérieur, NSF	126	
 Injection mortar FIS P Plus	The approved injection mortar for anchorings in masonry		■	■	■	■		■			■		■		133	
 Injection mortar FIS P	The reliable injection mortar for anchorings in masonry			(■)	(■)	(■)									140	



















■ = approved  
 (■) = recommendation

## Mortars and Applications

Positioning	Approved Substrates (ETA)					Approved Features									Page
	 Cracked Concrete	 Non-cracked Concrete	 Solid Masonry	 Perforated Masonry	 Aerated Concrete	Post installed Rebar Connection	ICC	Fire Resistance R120	Seismic Approval	Waterfilled drill hole	Diamond drilling	Hollow drilling	Dynamic loads	Others	
Mortar Capsules															
 Resin capsules FHB II-P, FHB II-PF High Speed	The best performance in cracked concrete	■	■					■		■		■			53
 Resin capsules RSB	The concrete all-rounder	■	■					■	C1	■	■	■			73
 Resin capsules RM II	Bonded anchor for cracked concrete without drill hole cleaning	■	■					■		■		■			80
 UMV-P	The capsule system for the anchoring of dynamic loads	■	■										■		176
















## Mortars and Anchors

										Page
Mortar Cartridges	FIS HB	FIS SB	FIS EM Plus	FIS EB	FIS V	FIS VL	FIS GREEN	FIS P Plus	FIS P	
Positioning	Best performance in concrete	Concrete all-rounder	Powerful rebar connections + cracked concrete	Basic Epoxy mortar for concrete	Versatile mortar for masonry und cracked concrete	Solid mortar for standard anchorings in masonry and cracked concrete	First approved mortar made with renewable raw materials	Approved for Masonry	Reliable in masonry	
 Threaded Rod FIS A		■	■	■	■	■	■	■	(■)	146
 Threaded Rod RG M		■	■	■	■	■	■	■	(■)	154
 Internal Threaded Anchor RG M I		■	■		■	■	■			159
 Internal Threaded Socket FIS E					■	■	■	■	(■)	161
 Highbond Anchor FHB II-A L / FHB II-AS	■									26
 Highbond Anchor FHB II-A L Inject / FHB II-A S Inject	■									59
 FHB dyn	■									170
 FDA	■									174
 UMV-A dyn										176

■ = approved · (■) = recommendation

## Mortars and Anchors

					Page
<b>Mortar Capsules</b>	<b>FHB II-P, FHB II-PF High Speed</b>	<b>RSB</b>	<b>RM II</b>	<b>UMV-P</b>	
<b>Positioning</b>	<b>Best performance in concrete</b>	<b>Concrete all-rounder</b>	<b>Bonded anchor for cracked concrete without drill hole cleaning</b>	<b>Capsule system for dynamic loads</b>	
 <b>Threaded Rod FIS A</b>					140
 <b>Threaded Rod RG M</b>		■	■		154
 <b>Internal Threaded Anchor RG M I</b>		■	■		159
 <b>Internal Threaded Socket FIS E</b>					161
 <b>Highbond Anchor FHB II-A L / FHB II-AS</b>	■				26
 <b>Highbond Anchor FHB II-A L Inject / FHB II-A S Inject</b>					59
 <b>FHB dyn</b>					170
 <b>FDA</b>					174
 <b>UMV-A dyn</b>				■	176

## The best performance in cracked concrete



Banisters



Steel girders

### VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

#### Also suitable for:

- Concrete C12/15

### CERTIFICATES



Shock-tested: BZS approval for shockproof fixings in civilian shelters.



### ADVANTAGES

- The Highbond system FHB II achieves the highest load values in cracked concrete. Thus fewer fixing points and smaller anchor plates are required.
- The injection mortar FIS HB and the capsules FHB II-P/PF offer the same performance and can be used with the FHB II-A S (short version) or L (long version) anchor rods. Thus, you can select the most economical solution based on requirements.
- The large cartridge size of the injection mortar FIS HB is ideally suited for serial installation.
- The pre-portioned resin capsule FHB II-P / PF HIGH SPEED is the economical solution for single applications or under water. A cleaning of the bore-hole during processing with capsule is not required.
- The special formulation used in the capsule FHB II-PF HIGH SPEED ensures especially fast curing and allows installation without waiting times.

### APPLICATIONS

- Guard rails
- Façades
- Staircases
- Steel brackets
- Machines
- Silo installations
- Masts
- Rash protection
- Steelwork constructions
- Timber constructions

### FUNCTIONING

- The FHB II is a bonded anchor with torque-controlled expansion for pre-positioned and push-through installation.
- The anchor rod can be set either with injection mortar FIS HB or with the capsule FHB II-P / FHB II-PF HIGH SPEED, and is fully bonded in the drill hole.
- When tightening the hexagon nut, the anchor rod cones are pulled into the mortar shell, which expands against the drill hole wall.
- The styrene-free vinyl ester mortar fully seals the drill hole.
- When using the resin capsule, set the anchor rod through rotating and hitting motions with a hammer drill. The RA-SDS setting tool, item no. 62420 is used.

### SEE ALSO



#### DISPENSER

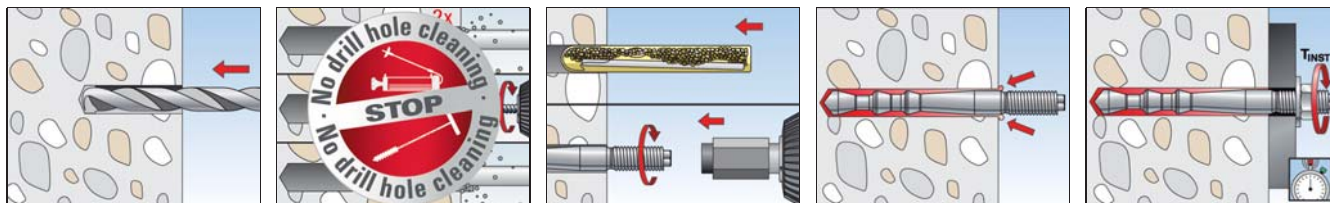
Page 195



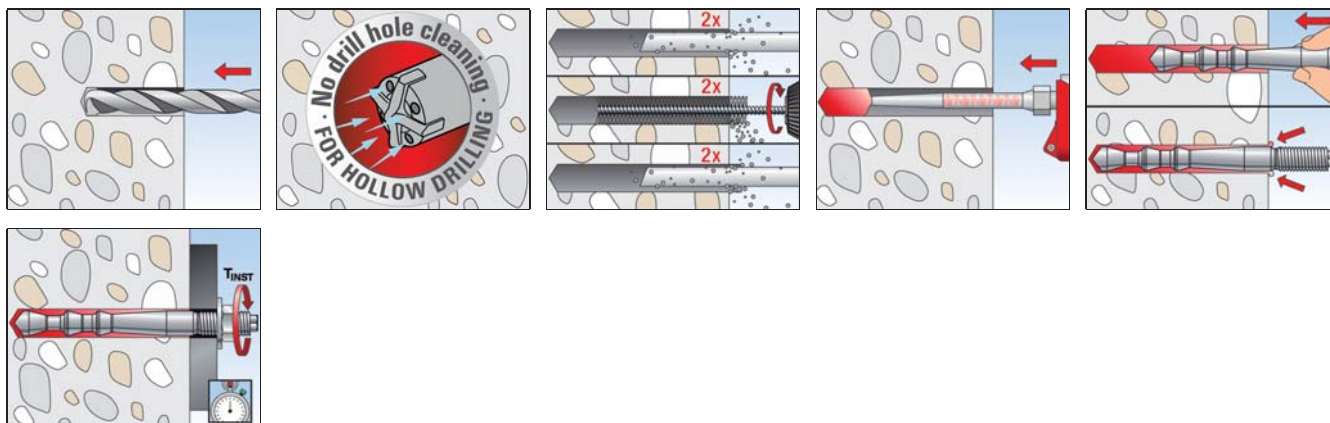
#### ACCESSORIES

Page 198

## INSTALLATION IN CONCRETE WITH CAPSULE FHB II-P



## INSTALLATION IN CONCRETE WITH FIS HB



## TECHNICAL DATA



Injection mortar **FIS HB 345 S**  
+ static mixer **FIS MR Plus**



Injection mortar **FIS HB 150 C**

Item	Art.-No.	Approval ETA	Languages on the cartridge	Scale unit	Contents	Sales unit [pcs]
<b>FIS HB 345 S</b>	<b>033211</b>	■	DE, GB, FR, ES, NL, CS	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS HB 150 C</b>	<b>519665</b>	■	DE, FR, NL	70	1 cartridge 145 ml, 2 x FIS MR Plus	6
<b>FIS MR Plus</b>	<b>545853</b>	—	—	—	10 static mixer FIS MR Plus	10

## TECHNICAL DATA



Resin capsule **FHB II-P** (standard)

Item	Art.-No.	Approval ETA	Drill hole diameter $d_0$ [mm]	Drill hole depth $h_0$ [mm]	Anchorage depth $h_{ef}$ [mm]	Match	Sales unit [pcs]
<b>FHB II-P 8 x 60</b>	<b>096824</b>	■	10	75	60	FHB II-A L M 8 x 60	10
<b>FHB II-P 10 x 60</b>	<b>096847</b>	■	10	75	60	FHB II-S M 10 x 60	10
<b>FHB II-P 10 x 75</b>	<b>508016</b>	■	10	90	75	FHB II-A S M 10 x 75	10
<b>FHB II-P 10 x 95</b>	<b>096843</b>	■	12	110	95	FHB II-A L M 10 x 95	10
<b>FHB II-P 12 x 75</b>	<b>096848</b>	■	12	90	75	FHB II-A S M 12 x 75	10
<b>FHB II-P 12 x 100</b>	<b>507922</b>	■	14	115	100	FHB II-A L M 12 x 100	10
<b>FHB II-P 12 x 120</b>	<b>096844</b>	■	14	135	120	FHB II-A L M 12 x 120	10
<b>FHB II-P 16 x 95</b>	<b>096849</b>	■	16	110	95	FHB II-A S M 16 x 95	10
<b>FHB II-P 16 x 125</b>	<b>507923</b>	■	18	145	125	FHB II-A L M 16 x 125	10
<b>FHB II-P 16 x 145</b>	<b>507924</b>	■	18	165	145	FHB II-A L M 16 x 145	10
<b>FHB II-P 16 x 160</b>	<b>096845</b>	■	18	175	160	FHB II-A L M 16 x 160	10
<b>FHB II-P 20 x 170</b>	<b>507925</b>	■	25	190	170	FHB II-A S M 20 x 170	4
<b>FHB II-P 20 x 210</b>	<b>096846</b>	■	25	235	210	FHB II-A L M 20 x 210	4
<b>FHB II-P 24 x 170</b>	<b>096851</b>	■	25	190	170	FHB II-A S M 24 x 170	4
<b>FHB II-P 24 x 210</b>	<b>507926</b>	■	25	235	210	FHB II-A L M 24 x 210	4

## TECHNICAL DATA



Resin capsule **FHB II-PF HIGH SPEED**  
(quick version)

Item	Art.-No.	Approval ETA	Drill hole diameter d <sub>0</sub> [mm]	Drill hole depth h <sub>0</sub> [mm]	Anchorage depth h <sub>ef</sub> [mm]	Match	Sales unit [pcs]
<b>FHB II-PF 8 x 60</b>	<b>500542</b>	■	10	75	60	FHB II-A L M 8 x 60	10
<b>FHB II-PF 10 x 60</b>	<b>500547</b>	■	10	75	60	FHB II-S M 10 x 60	10
<b>FHB II-PF 10 x 75</b>	<b>507999</b>	■	10	90	75	FHB II-A S M 10 x 75	10
<b>FHB II-PF 10 x 95</b>	<b>500543</b>	■	12	110	95	FHB II-A L M 10 x 95	10
<b>FHB II-PF 12 x 75</b>	<b>500548</b>	■	12	90	75	FHB II-A S M 12 x 75	10
<b>FHB II-PF 12 x 100</b>	<b>508000</b>	■	14	115	100	FHB II-A L M 12 x 100	10
<b>FHB II-PF 12 x 120</b>	<b>500544</b>	■	14	135	120	FHB II-A L M 12 x 120	10
<b>FHB II-PF 16 x 95</b>	<b>500549</b>	■	16	110	95	FHB II-A S M 16 x 95	10
<b>FHB II-PF 16 x 125</b>	<b>508001</b>	■	18	145	125	FHB II-A L M 16 x 125	10
<b>FHB II-PF 16 x 145</b>	<b>508002</b>	■	18	165	145	FHB II-A L M 16 x 145	10
<b>FHB II-PF 16 x 160</b>	<b>500545</b>	■	18	175	160	FHB II-A L M 16 x 160	10
<b>FHB II-PF 20 x 170</b>	<b>508003</b>	■	25	190	170	FHB II-A S M 20 x 170	4
<b>FHB II-PF 20 x 210</b>	<b>500546</b>	■	25	235	210	FHB II-A L M 20 x 210	4
<b>FHB II-PF 24 x 170</b>	<b>500550</b>	■	25	190	170	FHB II-A S M 24 x 170	4
<b>FHB II-PF 24 x 210</b>	<b>508004</b>	■	25	235	210	FHB II-A L M 24 x 210	4

## CURING TIME - FIS HB

Cartridge temperature FIS HB (minimum + 5°C)	Gelling time FIS HB	Temperature at anchoring base	Curing time FIS HB
		- 5°C - ± 0°C	360 min.
		± 0°C - + 5°C	180 min.
+ 5°C - +20°C	15 min.	+ 5°C - +20°C	90 min.
+20°C - +30°C	6 min.	+20°C - +30°C	35 min.
+30°C - +40°C	4 min.	+30°C - +40°C	20 min.
> +40°C	2 min.	> +40°C	12 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled. Remove water from drill hole.

## CURING TIME - FHB II P / FHB II-PF HIGH SPEED

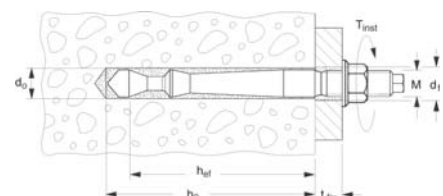
Temperature at anchoring base	Curing time	
	FHB II-P	FHB II-PF HIGH SPEED
- 5°C - ± 0°C	240 min.	8 min.
± 0°C - +10°C	45 min.	6 min.
+10°C - + 20°C	20 min.	4 min.
≥ + 20°C	10 min.	2 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled.

## TECHNICAL DATA



Highbond anchor **FHB II-A S** (short version)



	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter d <sub>0</sub> [mm]	Drill hole depth h <sub>0</sub> [mm]	Anchorage depth h <sub>ef</sub> [mm]	Usable length t <sub>fix</sub> [mm]	Thread M	Width across nut ○ SW [mm]	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA							[pcs]
Item	gvz	A4	C								
<b>FHB II-A S M10 x 60/10</b>	<b>097072</b>	<b>097630</b>	<b>097704</b> 1)	■	10	75	60	10	M 10	17	10
<b>FHB II-A S M10 x 60/20</b>	<b>097073</b>	<b>097631</b>	—	■	10	75	60	20	M 10	17	10
<b>FHB II-A S M10 x 60/40</b>	—	<b>097632</b>	—	■	10	75	60	40	M 10	17	10

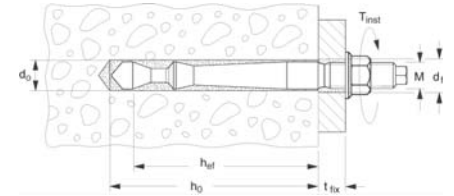
1) Delivery time on request.



## TECHNICAL DATA



Highbond anchor **FHB II-A S** (short version)



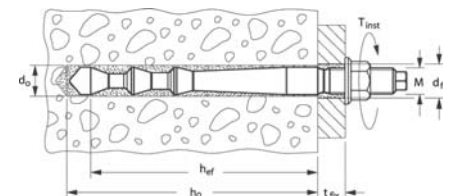
	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Usable length	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	t <sub>fix</sub> [mm]	M	○ SW [mm]	[pcs]
Item	gvz	A4	C								
FHB II-A S M10 x 60/60	097074	097633	—	■	10	75	60	60	M 10	17	10
FHB II-A S M10 x 60/100	097206	097634	—	■	10	75	60	100	M 10	17	10
FHB II-A S M10 x 75/10	506884	506888	—	■	10	90	75	10	M 10	17	10
FHB II-A S M10 x 75/20	506885	506889	—	■	10	90	75	20	M 10	17	10
FHB II-A S M10 x 75/40	—	506890	—	■	10	90	75	40	M 10	17	10
FHB II-A S M10 x 75/60	506886	506891	—	■	10	90	75	60	M 10	17	10
FHB II-A S M10 x 75/100	506887	506892	—	■	10	90	75	100	M 10	17	10
FHB II-A S M12 x 75/10	097257	097635	—	■	12	90	75	10	M 12	19	10
FHB II-A S M12 x 75/25	097268	097636	097706 1)	■	12	90	75	25	M 12	19	10
FHB II-A S M12 x 75/40	—	097637	—	■	12	90	75	40	M 12	19	10
FHB II-A S M12 x 75/60	097274	097638	—	■	12	90	75	60	M 12	19	10
FHB II-A S M12 x 75/100	097275	097639	—	■	12	90	75	100	M 12	19	10
FHB II-A S M12 x 75/165	097280	097640	—	■	12	90	75	165	M 12	19	10
FHB II-A S M16 x 95/30	097281	097641	097708 1)	■	16	110	95	30	M 16	24	10
FHB II-A S M16 x 95/60	097286	097642	—	■	16	110	95	60	M 16	24	10
FHB II-A S M16 x 95/100	097295	097643	—	■	16	110	95	100	M 16	24	10
FHB II-A S M16 x 95/165	097296	097644	—	■	16	110	95	165	M 16	24	10
FHB II-A S M20 x 170/50	506917	506919	—	■	25	190	170	50	M 20	30	4
FHB II-A S M24 x 170/50	097297	097645	—	■	25	190	170	50	M 24	36	4

1) Delivery time on request.

## TECHNICAL DATA



Highbond anchor **FHB II-A L** (long version)



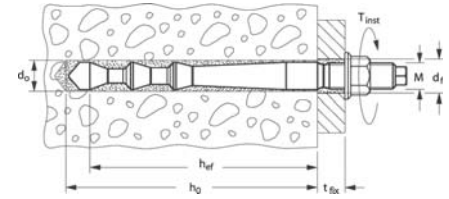
	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Usable length	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	t <sub>fix</sub> [mm]	M	○ SW [mm]	[pcs]
Item	gvz	A4	C								
FHB II-A L M8 x 60/10	097032	097298	097696 1)	■	10	75	60	10	M 8	13	10
FHB II-A L M8 x 60/30	097033	097299	—	■	10	75	60	30	M 8	13	10
FHB II-A L M8 x 60/50	097034	097440	—	■	10	75	60	50	M 8	13	10
FHB II-A L M10 x 95/10	096907	097616	—	■	12	110	95	10	M 10	17	10
FHB II-A L M10 x 95/20	096940	097617	097699 1)	■	12	110	95	20	M 10	17	10
FHB II-A L M10 x 95/40	—	097618	—	■	12	110	95	40	M 10	17	10
FHB II-A L M10 x 95/60	096941	097619	—	■	12	110	95	60	M 10	17	10
FHB II-A L M10 x 95/100	096942	097620	—	■	12	110	95	100	M 10	17	10
FHB II-A L M12 x 100/10	506893	506897	—	■	14	115	100	10	M 12	19	10
FHB II-A L M12 x 100/25	506894	506898	—	■	14	115	100	25	M 12	19	10
FHB II-A L M12 x 100/40	—	506899	—	■	14	115	100	40	M 12	19	10
FHB II-A L M12 x 100/50 GS A4	—	537065	—	■	14	115	100	50	M 12	19	10
FHB II-A L M12 x 100/60	506895	506901	—	■	14	115	100	60	M 12	19	10
FHB II-A L M12 x 100/100	506896	506902	—	■	14	115	100	100	M 12	19	10
FHB II-A L M12 x 120/10	096943	097621	—	■	14	135	120	10	M 12	19	10

1) Delivery time on request.

## TECHNICAL DATA



Highbond anchor **FHB II-A L** (long version)



	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Usable length	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	t <sub>fix</sub> [mm]	M	○ SW [mm]	[pcs]
Item	gvz	A4	C								
FHB II-A L M12 x 120/25	096944	097622	097700 1)	■	14	135	120	25	M 12	19	10
FHB II-A L M12 x 120/40	—	097623	—	■	14	135	120	40	M 12	19	10
FHB II-A L M12 x 120/60	097014	097624	—	■	14	135	120	60	M 12	19	10
FHB II-A L M12 x 120/100	097031	097625	—	■	14	135	120	100	M 12	19	10
FHB II-A L M16 x 125/30	506903	506906	—	■	18	140	125	30	M 16	24	10
FHB II-A L M16 x 125/60	506904	506909	—	■	18	140	125	60	M 16	24	10
FHB II-A L M16 x 125/100	506905	506910	—	■	18	140	125	100	M 16	24	10
FHB II-A L M16 x 145/30	506911	506914	—	■	18	160	145	30	M 16	24	10
FHB II-A L M16 x 145/60	506912	506915	—	■	18	160	145	60	M 16	24	10
FHB II-A L M16 x 145/100	506913	506916	—	■	18	160	145	100	M 16	24	10
FHB II-A L M16 x 160/30	097035	097626	097702 1)	■	18	175	160	30	M 16	24	10
FHB II-A L M16 x 160/60	097038	097627	—	■	18	175	160	60	M 16	24	10
FHB II-A L M16 x 160/100	097070	097628	—	■	18	175	160	100	M 16	24	10
FHB II-A L M20 x 210/50	097071	097629	097703 1)	■	25	235	210	50	M 20	30	4
FHB II-A L M20 x 210/150	052370	—	—	■	25	235	210	150	M 20	30	8
FHB II-A L M24 x 210/50	506920	506921	—	■	25	235	210	50	M 24	36	4

1) Delivery time on request.

## FILLING QUANTITIES

Type	Drill hole diameter	Min. drill hole depth	Mortar volume in scale units shown on the cartridge labels' corresponding scale	Anchor per cartridge FIS HB 345 S *)
	[mm]	[mm]		
FHB II-A S M10 x 60	10	75	3	56
FHB II-A S M10 x 75	10	90	4	42
FHB II-A S M12 x 75	12	90	4	42
FHB II-A S M16 x 95	16	110	8	21
FHB II-A S M20 x 170	25	190	26	6
FHB II-A S M24 x 170	25	190	26	6

\*) max. number with one static mixer

## FILLING QUANTITIES

Type	Drill hole diameter	Min. drill hole depth	Mortar volume in scale units shown on the cartridge labels' corresponding scale	Anchor per cartridge FIS HB 345 S *)
	[mm]	[mm]		
FHB II-A L M8 x 60	10	75	3	56
FHB II-A L M10 x 95	12	110	5	34
FHB II-A L M12 x 100	14	115	7	24
FHB II-A L M12 x 120	14	135	7	24
FHB II-A L M16 x 125	18	140	11	15
FHB II-A L M16 x 145	18	160	13	13
FHB II-A L M16 x 160	18	175	13	13
FHB II-A L M20 x 210	25	235	33	5
FHB II-A L M24 x 210	25	235	33	5

\*) max. number with one static mixer

## LOADS

### Highbond anchor FHB II <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 <sup>2) 3) 4)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
<b>FHB II-A L M8 x 60</b>	gvz	100	60	15	8,0 <sup>1)</sup>	7,8	150	163	180	40	40
	A4-70					8,7		183			
	C-70										
<b>FHB II-A S M10 x 60</b>	gvz	100	60	15	8,0 <sup>1)</sup>	11,3	150	245	180	40	40
	A4-70					13,8		306			
	C-70										
<b>FHB II-A S M10 x 75</b>	gvz	120	75	15	11,1	11,3	150	215	225	40	40
	A4-70					13,8		269			
<b>FHB II-A L M10 x 95</b>	gvz	140	95	20	15,9	11,9	238	197	285	40	40
	A4-70					13,3		224			
	C-70										
<b>FHB II-A S M12 x 75</b>	gvz	120	75	30	11,1	15,6	150	304	225	40	40
	A4-70					19,3		384			
	C-70										
<b>FHB II-A L M12 x 100</b>	gvz	140	100	40	17,1	17,3	190	296	300	50	50
	A4-70					19,3		334			
<b>FHB II-A L M12 x 120</b>	gvz	170	120	40	22,5	17,3	300	259	360	50	50
	A4-70					19,3		292			
	C-70										
<b>FHB II-A S M16 x 95</b>	gvz	150	95	50	15,9	29,0	170	506	285	50	50
	A4-70					31,7		559			
	C-70										
<b>FHB II-A L M16 x 125</b>	gvz	170	125	60	24,0	32,2	188	505	375	55	55
	A4-70					35,8		570			
<b>FHB II-A L M16 x 145</b>	gvz	190	145	60	29,9	32,2	250	464	435	60	60
	A4-70					35,8		525			
<b>FHB II-A L M16 x 160</b>	gvz	220	160	60	34,7	32,2	290	423	480	70	70
	A4-70					35,8		479			
	C-70										
<b>FHB II-A S M20 x 170</b>	gvz	240	170	100	38,0	45,9	255	571	510	80	80
	A4-70					55,9		719			
<b>FHB II-A L M20 x 210</b>	gvz	280	210	100	52,2	50,2	315	563	630	90	90
	A4-70					55,9		639			
	C-70										
<b>FHB II-A S M24 x 170</b>	gvz	240	170	100	38,0	65,3	255	857	510	80	80
	A4-70					71,1		946			
	C-70					76,0		1019			
<b>FHB II-A L M24 x 210</b>	gvz	280	210	100	52,2	72,5	315	863	630	90	90
	A4-70					80,6		974			

For the design the complete assessment ETA-05/0164 has to be considered. <sup>7)</sup>

<sup>1)</sup> Valid for injection mortar FIS HB. For using the glass capsule FHB II-P or FHB II-PF see ETA-05/0164.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-05/0164 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-05/0164.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method Hammer drilling.

<sup>5)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-05/0164.

<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the assessment ETA-05/0164, issue date 14/12/2017. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## LOADS

### Highbond anchor FHB II <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 <sup>2) 3) 4)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
<b>FHB II-A L M8 x 60</b>	gvz	100	60	15	11,2 <sup>1)</sup>	7,8	150	110	180	40	40
	A4-70					8,7		124			
	C-70										
<b>FHB II-A S M10 x 60</b>	gvz	100	60	15	11,2 <sup>1)</sup>	11,3	150	166	180	40	40
	A4-70					13,8		209			
	C-70										
<b>FHB II-A S M10 x 75</b>	gvz	120	75	15	12,0	11,3	103	145	225	40	40
	A4-70					13,8		183			
	C-70										
<b>FHB II-A L M10 x 95</b>	gvz	140	95	20	16,4	11,9	139	131	285	40	40
	A4-70					13,3		150			
	C-70										
<b>FHB II-A S M12 x 75</b>	gvz	120	75	30	15,6	15,6	150	206	225	40	40
	A4-70					19,3		261			
	C-70										
<b>FHB II-A L M12 x 100</b>	gvz	140	100	40	23,7	17,3	187	198	300	50	50
	A4-70					19,3		225			
	C-70										
<b>FHB II-A L M12 x 120</b>	gvz	170	120	40	23,7	17,3	179	172	360	50	50
	A4-70					19,3		195			
	C-70										
<b>FHB II-A S M16 x 95</b>	gvz	150	95	50	22,3	29,0	170	343	285	50	50
	A4-70					35,8		435			
	C-70										
<b>FHB II-A L M16 x 125</b>	gvz	170	125	60	33,6	32,2	188	339	375	55	55
	A4-70					35,8		384			
	C-70										
<b>FHB II-A L M16 x 145</b>	gvz	190	145	60	42,0	32,2	250	310	435	60	60
	A4-70					35,8		352			
	C-70										
<b>FHB II-A L M16 x 160</b>	gvz	220	160	60	46,0	32,2	270	282	480	70	70
	A4-70					35,8		321			
	C-70										
<b>FHB II-A S M20 x 170</b>	gvz	240	170	100	53,3	45,9	255	380	510	80	80
	A4-70					55,9		481			
	C-70										
<b>FHB II-A L M20 x 210</b>	gvz	280	210	100	65,5	50,2	273	372	630	90	90
	A4-70					55,9		424			
	C-70										
<b>FHB II-A S M24 x 170</b>	gvz	240	170	100	53,3	65,3	255	576	510	80	80
	A4-70					71,1		637			
	C-70					80,6		735			
<b>FHB II-A L M24 x 210</b>	gvz	280	210	100	65,5	72,5	273	578	630	90	90
	A4-70					80,6		654			
	C-70										

For the design the complete assessment ETA-05/0164 has to be considered. <sup>7)</sup>

<sup>1)</sup> Valid for injection mortar FIS HB. For using the glass capsule FHB II-P or FHB II-PF see ETA-05/0164.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-05/0164 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-05/0164.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method Hammer drilling.

<sup>5)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-05/0164.

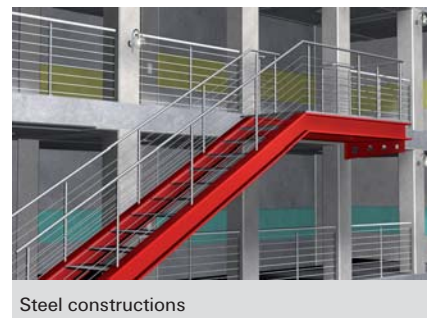
<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the assessment ETA-05/0164, issue date 14/12/2017. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## The economical solution in cracked concrete



Bridge railings



Steel constructions

### VERSIONS

- Stainless steel A4

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

#### Also suitable for:

- Concrete C12/15

### CERTIFICATES



### ADVANTAGES

- The Highbond system FHB II Inject achieves high load values in cracked concrete.
- The combination of injection mortar FIS HB and anchor rod FHB II-AS Inject A4 (short version) or FHB II-AL Inject A4 (long version) is ideally suited for serial installation outdoors.
- The low drill hole depth minimizes the drilling effort, which saves time and ensures economical installation.
- When using hollow drills with extraction, no drill hole cleaning is required.

### APPLICATIONS

- Bridge railings
- Façades
- Staircases
- Steel constructions
- Masts

### FUNCTIONING

- The FHB II Inject is a bonded anchor with torque-controlled expansion for pre-positioned and push-through installation.
- For FHB II-AL Inject, the annular gap must be filled with Highbond special mortar FIS HB in case of push-through installation.
- The anchor rod is set with the Highbond special motor FIS HB and is fully bonded in the drill hole.
- When tightening the hexagon nut, the anchor rod cones are pulled in the motor shell, which expands against the drill hole wall.

### SEE ALSO



#### DISPENSER

Page 195

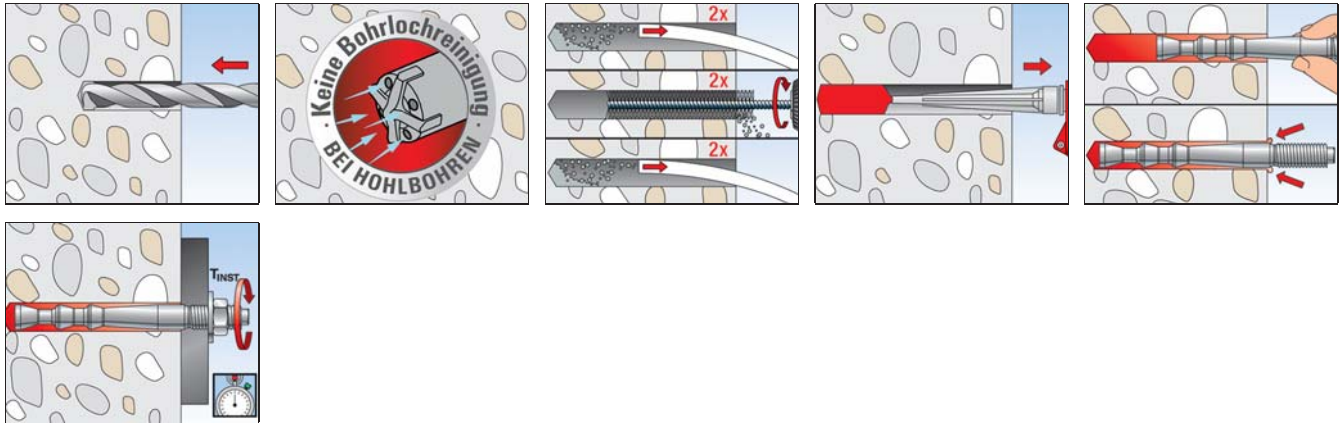


#### ACCESSORIES

Page 198



## INSTALLATION IN CONCRETE WITH FIS HB



## TECHNICAL DATA



Injection mortar **FIS HB 345 S**  
+ static mixer **FIS MR Plus**



Injection mortar **FIS HB 150 C**

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	ETA				[pcs]
<b>FIS HB 345 S</b>	<b>033211</b>	■	DE, GB, FR, ES, NL, CS	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS HB 150 C</b>	<b>519665</b>	■	DE, FR, NL	70	1 cartridge 145 ml, 2 x FIS MR Plus	6
<b>FIS MR Plus</b>	<b>545853</b>	—	—	—	10 static mixer FIS MR Plus	10

## CURING TIME - FIS HB

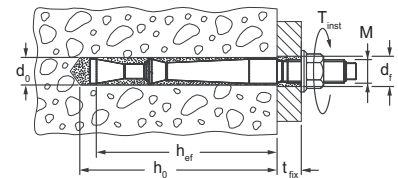
Cartridge temperature FIS HB (minimum + 5°C)	Gelling time FIS HB	Temperature at anchoring base	Curing time FIS HB
		- 5°C - ± 0°C	360 min.
		± 0°C - + 5°C	180 min.
+ 5°C - +20°C	15 min.	+ 5°C - +20°C	90 min.
+20°C - +30°C	6 min.	+20°C - +30°C	35 min.
+30°C - +40°C	4 min.	+30°C - +40°C	20 min.
> +40°C	2 min.	> +40°C	12 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled. Remove water from drill hole.

## TECHNICAL DATA



Highbond anchor **FHB II-A S Inject**  
(short version)

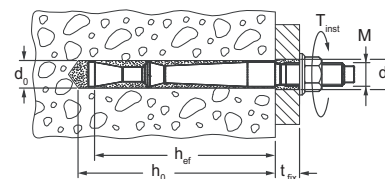


	Stainless steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Total length	Usable length	Width across nut	Sales unit
	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	○ SW [mm]	[pcs]
Item	A4								
<b>FHB II-A S Inject M10 x 60/10</b>	<b>539911</b>	■	10	66	60	90	10	17	10
<b>FHB II-A S Inject M10 x 60/20</b>	<b>539912</b>	■	10	66	60	100	20	17	10
<b>FHB II-A S Inject M10 x 60/30</b>	<b>539927</b>	■	10	66	60	110	30	17	10
<b>FHB II-A S Inject M10 x 60/40</b>	<b>539913</b>	■	10	66	60	120	40	17	10
<b>FHB II-A S Inject M10 x 60/100</b>	<b>539914</b>	■	10	66	60	180	100	17	10
<b>FHB II-A S Inject M12 x 75/25</b>	<b>539928</b>	■	12	81	75	123	25	19	10
<b>FHB II-A S Inject M12 x 75/50</b>	<b>539929</b>	■	12	81	75	148	50	19	10

## TECHNICAL DATA



Highbond anchor **FHB II-A S Inject**  
(short version)

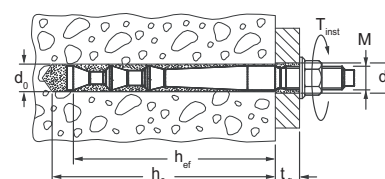


	Stainless steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Total length	Usable length	Width across nut	Sales unit
	Art.-No.	ETA	$d_0$ [mm]	$h_0$ [mm]	$h_{ef}$ [mm]	$l$ [mm]	$t_{fix}$ [mm]	○ SW [mm]	[pcs]
Item	A4								
<b>FHB II-A S Inject M16 x 95/30</b>	<b>539920</b>	■	16	101	95	150	30	24	10
<b>FHB II-A S Inject M16 x 95/60</b>	<b>539921</b>	■	16	101	95	180	60	24	10

## TECHNICAL DATA



Highbond anchor **FHB II-A L Inject**  
(long version)



	Stainless steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Total length	Usable length	Width across nut	Sales unit
	Art.-No.	ETA	$d_0$ [mm]	$h_0$ [mm]	$h_{ef}$ [mm]	$l$ [mm]	$t_{fix}$ [mm]	○ SW [mm]	[pcs]
Item	A4								
<b>FHB II-A L Inject M10 x 95/10</b>	<b>539916</b>	■	12	101	95	125	10	17	10
<b>FHB II-A L Inject M10 x 95/20</b>	<b>539917</b>	■	12	101	95	135	20	17	10
<b>FHB II-A L Inject M12 x 100/25</b>	<b>539918</b>	■	14	106	100	148	25	19	10
<b>FHB II-A L Inject M12 x 120/25</b>	<b>539919</b>	■	14	126	120	160	25	19	10
<b>FHB II-A L Inject M16 x 125/30</b>	<b>539922</b>	■	18	131	125	180	30	24	10
<b>FHB II-A L Inject M16 x 125/60</b>	<b>539923</b>	■	18	131	125	210	60	24	10
<b>FHB II-A L Inject M16 x 160/30</b>	<b>539925</b>	■	18	166	160	215	30	24	10
<b>FHB II-A L Inject M16 x 160/60</b>	<b>539926</b>	■	18	166	160	245	60	24	10

## FILLING QUANTITIES FHB II-A S INJECT

Type	Drill hole diameter	Min. drill hole depth	Mortar volume in scale units shown on the cartridge labels' corresponding scale	Anchor per cartridge FIS HB 345 S *)
	[mm]	[mm]		
<b>FHB II-A S Inject M10 x 60</b>	10	75	3	56
<b>FHB II-A S Inject M12 x 75</b>	12	90	4	42
<b>FHB II-A S Inject M16 x 95</b>	16	110	8	21

\*) max. number with one static mixer

## FILLING QUANTITIES FHB II-A L INJECT

Type	Drill hole diameter	Min. drill hole depth	Mortar volume in scale units shown on the cartridge labels' corresponding scale	Anchor per cartridge FIS HB 345 S *)
	[mm]	[mm]		
<b>FHB II-A L Inject M10 x 95</b>	12	110	5	34
<b>FHB II-A L Inject M12 x 100</b>	14	115	6	24
<b>FHB II-A L Inject M12 x 120</b>	14	135	7	24
<b>FHB II-A L Inject M16 x 125</b>	18	140	11	15
<b>FHB II-A L Inject M16 x 160</b>	18	175	13	13

\*) max. number with one static mixer

## LOADS

**Highbond anchor FHB II Inject: Injection mortar FIS HB with Anchor rod FHB II-A Inject**  
stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 7)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
<b>FHB II-A S Inject M10 x 60</b>	A4	100	60	15	8,0	13,8	90	310	180	40	40
<b>FHB II-A L Inject M10 x 95</b>	A4	140	95	20	15,9	13,3	145	225	285	40	40
<b>FHB II-A S Inject M12 x 75</b>	A4	120	75	30	11,1	19,3	115	385	225	40	40
<b>FHB II-A L Inject M12 x 100</b>	A4	140	100	40	17,1	19,3	150	335	300	50	50
<b>FHB II-A L Inject M12 x 120</b>	A4	170	120	40	22,5	19,3	180	295	360	50	50
<b>FHB II-A S Inject M16 x 95</b>	A4	150	95	50	15,9	31,7	145	560	285	50	50
<b>FHB II-A L Inject M16 x 125</b>	A4	170	125	60	24,0	35,8	190	570	375	55	55
<b>FHB II-A L Inject M16 x 160</b>	A4	220	160	60	34,7	35,8	240	480	480	70	70

For the design the complete assessment ETA-16/0637 has to be considered. <sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-16/0637 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-16/0637.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-16/0637, issue date 14/12/2017. Design of the loads according to ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>7)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

**Highbond anchor FHB II Inject: Injection mortar FIS HB with Anchor rod FHB II-A Inject**  
stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
<b>FHB II-A S Inject M10 x 60</b>	A4	100	60	15	11,2	13,8	150	210	180	40	40
<b>FHB II-A L Inject M10 x 95</b>	A4	140	95	20	16,4	13,3	140	150	285	40	40
<b>FHB II-A S Inject M12 x 75</b>	A4	120	75	30	15,6	19,3	150	265	225	40	40
<b>FHB II-A L Inject M12 x 100</b>	A4	140	100	40	23,7	19,3	190	225	300	50	50
<b>FHB II-A L Inject M12 x 120</b>	A4	170	120	40	23,7	19,3	180	195	360	50	50
<b>FHB II-A S Inject M16 x 95</b>	A4	150	95	50	22,3	35,8	170	435	285	50	50
<b>FHB II-A L Inject M16 x 125</b>	A4	170	125	60	33,6	35,8	190	385	375	55	55
<b>FHB II-A L Inject M16 x 160</b>	A4	220	160	60	46,0	35,8	270	325	480	70	70

For the design the complete assessment ETA-16/0637 has to be considered. <sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-16/0637 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-16/0637.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-16/0637, issue date 14/12/2017. Design of the loads according to ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## The concrete all-rounder



### BUILDING MATERIALS

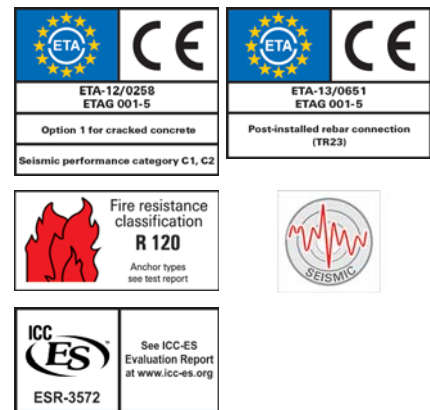
#### Approved for anchorings in:

- Concrete C20/25 to C50/60, cracked and non-cracked

#### Also suitable for:

- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

- The Superbond system is a combined capsule and injection system for cracked and non-cracked concrete. The injection mortar FIS SB and resin capsule RSB perform the same as each other at the same anchorage depth. This gives the installer maximum flexibility.
- Variable anchorage depths from  $4 \times d_s$  to  $20 \times d_s$  enable ideal adaptation to the load to be applied, and thus ensure an optimised installation time and use of materials.
- Maximum application temperatures of up to  $+150^\circ\text{C}$  open up new areas of use for bonded anchors.
- Superbond is even approved for installation at frosty temperatures of  $-30^\circ\text{C}$ .
- The approval-compliant use for seismic applications (performance category C1, C2) as well as in waterfilled and diamond drill holes ensures safety even in extreme conditions.

### APPLICATIONS

- Heavy steel constructions
- Silo installations
- Tall shelving
- Sound barriers
- Guard rails
- Staircases
- Reinforcing steel (only FIS SB)
- Overhead installations
- Water-filled drill holes
- Diamond drilled holes

### FUNCTIONING

- Superbond is a bonded anchor system based on a vinyl ester hybrid with silane technology.
- The threaded rod FIS A can only be set with injection mortar FIS SB (Standard and HIGH SPEED); the threaded rod RG M with oblique edge can be optionally set with injection mortar FIS SB (Standard and HIGH SPEED) or resin capsule RSB.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the injection cartridge in the static mixer or destruction of the capsule during the setting procedure.
- The mortar bonds the entire surface of the fastening element with the drill hole wall and seals the drill hole.

### SEE ALSO

#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

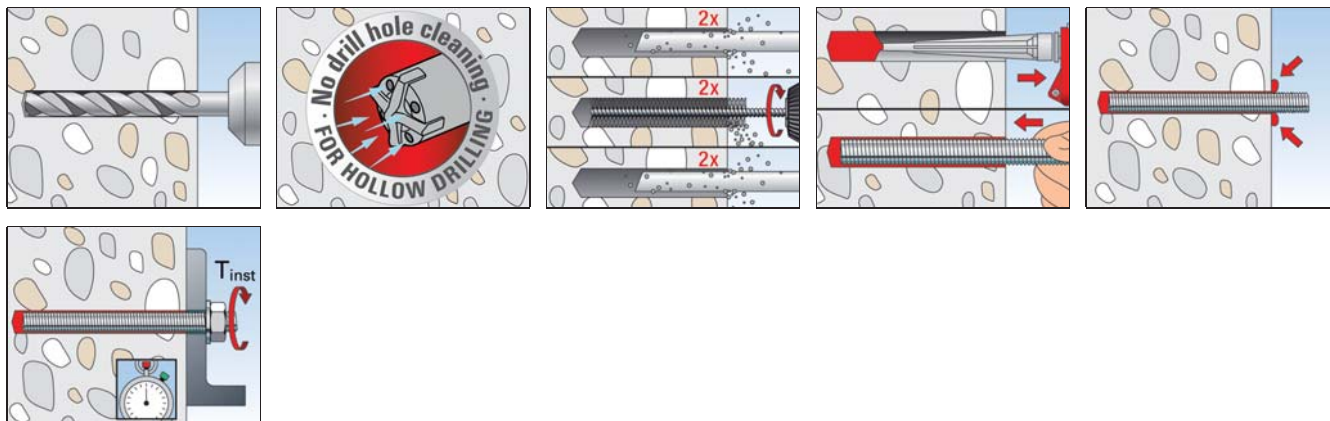
Page 195

#### ACCESSORIES

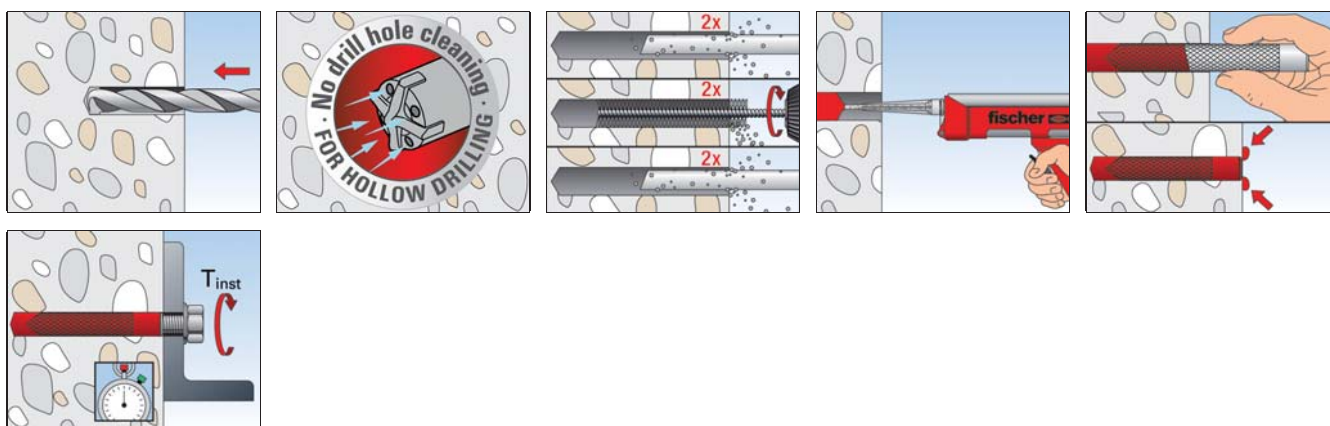
Page 198



## INSTALLATION IN CONCRETE WITH FIS SB AND FIS A / RG M



## INSTALLATION IN CONCRETE WITH FIS SB AND RG M I



## TECHNICAL DATA



Superbond mortar  
**FIS SB 390 S**



Static mixer **FIS MR Plus**

Item	Art.-No.	Approval		Languages on the cartridge	Scale unit	Contents	Sales unit
		ETA	ICC				[pcs]
<b>FIS SB 390 S</b>	<b>519451</b>	■	▲	DE, FR, NL	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS SB 390 S</b>	<b>520557</b>	■	▲	DE, SL, SR, BG	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS SB 390 S</b>	<b>518831</b>	■	▲	EN, ES, PT	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS SB 390 S</b>	<b>519450</b>	■	▲	IT, EN, DE	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS SB 390 S</b>	<b>520559</b>	■	▲	DA, SV, NO, FI	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS SB 390 S</b>	<b>520555</b>	■	▲	CS, SK, RO	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS SB 390 S</b>	<b>520595</b>	■	▲	PL, RU, HU	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS SB 585 S</b>	<b>519452</b>	■	▲	EN, ES, PT	270	1 cartridge 585 ml + 2 x FIS UMR	6
<b>FIS SB 585 S</b>	<b>520526</b>	■	▲	IT, EN, DE	270	1 cartridge 585 ml + 2 x FIS UMR	6
<b>FIS SB HIGH SPEED 390 S</b>	<b>523303</b>	■	—	PL, RUS, HU	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS MR Plus</b>	<b>545853</b>	—	—	—	—	10 static mixer FIS MR Plus	10
<b>FIS UMR</b>	<b>520593</b>	—	—	—	—	10 static mixer FIS UMR for 585 ml and 1500 ml cartridges	10



FIS SB 390 S HWK big



FIS SB 390 S in bucket

		Approval		Languages on the cartridge	Contents	Sales unit
Item	Art.-No.	ETA	ICC			[pcs]
FIS SB 390 S HWK big	540252	■	▲	EN, ES, PT	20 cartridges 390 ml, 40 x FIS MR Plus	1
FIS SB 390 S HWK big	520573	■	▲	IT, EN, DE	20 cartridges 390 ml, 20 x FIS MR Plus	1
FIS SB 390 S in bucket	540750	■	▲	EN, ES, PT	18 cartridges 390 ml, 36 x FIS MR Plus	1

## GELLING AND CURING TIME

Temperature at anchoring base	Gelling time		Curing time	
	FIS SB Standard	FIS SB HIGH SPEED	FIS SB Standard	FIS SB HIGH SPEED
> -20°C - -15°C	–	60 min.	–	24 hrs.
> -15°C - -10°C	60 min.	30 min.	36 hrs.	8 hrs.
> -10°C - -5°C	30 min.	15 min.	24 hrs.	180 min.
> -5°C - ±0°C	20 min.	10 min.	8 hrs.	120 min.
> ±0°C - +5°C	13 min.	5 min.	4 hrs.	60 min.
> +5°C - +10°C	9 min.	3 min.	120 min.	45 min.
> +10°C - +20°C	5 min.	2 min.	60 min.	30 min.
> +20°C - +30°C	4 min.	1 min.	45 min.	15 min.
> +30°C - +40°C	2 min.	–	30 min.	–

## LOADS

### Superbond-System: Injection mortar FIS SB with Threaded rod FIS A <sup>1) 2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>3) 4) 5) 6) 11)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{7)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{8)}$ [kN]	$V_{perm}^{8)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{9)}$ [mm]	$c_{min}^{9)}$ [mm]
FIS A M 8	5.8	100	60	10	4,3	5,1	90	105	180	40	40
		110	80		5,7		105	95	240		
		190	160		9,0		75	80	480		
	8.8	100	60		4,3	8,6	90	185	180		
		110	80		5,7		105	170	240		
		190	160		11,5		105	115	480		
	A4-70	100	60		4,3	6,0	90	125	180		
		110	80		5,7		105	115	240		
		190	160		9,9		85	90	480		
	C-70	100	60		4,3	7,4	90	160	180		
		110	80		5,7		105	145	240		
		190	160		11,5		105	105	480		

## LOADS

### Superbond-System: Injection mortar FIS SB with Threaded rod FIS A <sup>1) 2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>3) 4) 5) 6) 11)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{7)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{8)}$ [kN]	$V_{perm}^{8)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{9)}$ [mm]	$c_{min}^{9)}$ [mm]
FIS A M 10	5.8	100	60	20	5,8	8,6	90	185	180	45	45
		120	90		8,8		130	155	270		
		230	200		13,8		80	110	600		
	8.8	100	60		5,8	11,7	90	255	180		
		120	90		8,8		130	250	270		
		230	200		19,4			150	600		
	A4-70	100	60		5,8	9,2	90	195	180		
		120	90		8,8		130	165	270		
		230	200		15,7		95	115	600		
	C-70	100	60		5,8	11,4	90	250	180		
		120	90		8,8		130	215	270		
		230	200		19,4			135	600		
FIS A M 12	5.8	100	70	40	9,4	12,0	105	255	210	55	55
		140	110		14,8		155	195	330		
		270	240		20,5		75	135	720		
	8.8	100	70		9,4	18,8	105	420	210		
		140	110		14,8		155	340	330		
		270	240		32,3			200	720		
	A4-70	100	70		9,4	13,7	105	295	210		
		140	110		14,8		155	230	330		
		270	240		22,5		90	150	720		
	C-70	100	70		9,4	17,1	105	380	210		
		140	110		14,8		155	295	330		
		270	240		28,1		130	175	720		
FIS A M 16	5.8	120	80	60	12,3	22,3	120	445	240	65	65
		170	125		22,4		190	350	375		
		360	320		37,6		115	195	960		
	8.8	120	80		12,3	24,5	120	495	240		
		170	125		22,4		190	600	375		
		360	320		57,4		210	320	960		
	A4-70	120	80		12,3	24,5	120	495	240		
		170	125		22,4		190	400	375		
		360	320		42,0		135	215	960		
	C-70	120	80		12,3	24,5	120	495	240		
		170	125		22,4		190	515	375		
		360	320		52,4			270	960		
FIS A M 20	5.8	140	90	120	14,6	29,3	135	530	270	85	85
		220	170		38,0		255	455	510		
		450	400		58,6		140	260	1200		
	8.8	140	90		14,6	29,3	135	530	270		
		220	170		38,0		255	780	510		
		450	400		89,8		320	435	1200		
	A4-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0		255	520	510		
		450	400		65,7		170	285	1200		
	C-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0		255	675	510		
		450	400		81,9		265	370	1200		

3

Chemical fixings

## LOADS

### Superbond-System: Injection mortar FIS SB with Threaded rod FIS A <sup>1) 2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>3) 4) 5) 6) 11)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{7)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{8)}$ [kN]	$V_{perm}^{8)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{9)}$ [mm]	$c_{min}^{9)}$ [mm]
FIS A M 24	5.8	160	96	150	16,1	32,2	145	545	290	105	105
		270	210		52,2	50,9	315	590	630		
		540	480		84,3		160	330	1440		
	8.8	160	96		16,1	32,2	145	545	290		
		270	210		52,2	80,6	315	1005	630		
		540	480		129,3		450	570	1440		
	A4-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	56,8	315	670	630		
		540	480		94,3		230	360	1440		
	C-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	70,9	315	870	630		
		540	480		117,6		380	480	1440		
FIS A M 27	5.8	170	108	200	19,2	38,5	165	610	325	120	120
		310	250		67,8	65,7	375	695	750		
		600	540		109,5		240	390	1620		
	8.8	170	108		19,2	38,5	165	610	325		
		310	250		67,8	105,1	375	1200	750		
		600	540		152,7		495	700	1620		
	A4-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	73,7	375	795	750		
		600	540		123,0		325	445	1620		
	C-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	92,0	375	1030	750		
		600	540		152,7		495	595	1620		
FIS A M 30	5.8	190	120	300	22,5	45,1	180	665	360	140	140
		350	280		80,3	80,6	420	795	840		
		670	600		133,8		300	440	1800		
	8.8	190	120		22,5	45,1	180	665	360		
		350	280		80,3	128,6	420	1375	840		
		670	600		188,5		600	805	1800		
	A4-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	90,2	420	910	840		
		670	600		150,1		395	510	1800		
	C-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	112,6	420	1180	840		
		670	600		187,1		595	680	1800		

For the design the complete assessment ETA-12/0258 has to be considered. <sup>10)</sup>

<sup>1)</sup> Also valid for threaded rod RG M in the same property class.

<sup>2)</sup> Valid for injection mortar FIS SB. For using the glass capsule RSB see separate table resp. ETA-12/0258.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-12/0258.

<sup>4)</sup> The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

<sup>5)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>6)</sup> Drill method hammer drilling.

<sup>7)</sup> For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

<sup>8)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>9)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>10)</sup> The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

<sup>11)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

### Superbond-System: Injection mortar FIS SB with Threaded rod FIS A <sup>1) 2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>3) 4) 5) 6)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{7)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{8)}$ [kN]	$V_{perm}^{8)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{9)}$ [mm]	$c_{min}^{9)}$ [mm]
FIS A M 8	5.8	100	60	10	8,6	5,1	90	70	180	40	40
		110	80		9,0		75		240		
		190	160				40	60	480		
	8.8	100	60		8,6	8,6	90	130	180		
		110	80		11,5		105	115	240		
		190	160		14,3		50	90	480		
	A4-70	100	60		8,6	6,0	90	85	180		
		110	80		9,9		85	75	240		
		190	160				40	70	480		
	C-70	100	60		8,6	7,4	90	110	180		
		110	80		11,5		105	100	240		
		190	160		12,4		40	80	480		
FIS A M 10	5.8	100	60	20	10,8	8,6	95	125	180	45	45
		120	90		13,8		110	105	270		
		230	200				45	85	600		
	8.8	100	60		10,8	13,1	95	200	180		
		120	90		16,2		145	170	270		
		230	200		22,4		60	115	600		
	A4-70	100	60		10,8	9,2	95	135	180		
		120	90		15,7		140	110	270		
		230	200				45	90	600		
	C-70	100	60		10,8	11,4	95	170	180		
		120	90		16,2		145	145	270		
		230	200		19,5		45	105	600		
FIS A M 12	5.8	100	70	40	14,1	12,0	145	175	210	55	55
		140	110		20,5		165	130	330		
		270	240				55	100	720		
	8.8	100	70		14,1	19,4	145	295	210		
		140	110		23,7		205	230	330		
		270	240		32,4		75	150	720		
	A4-70	100	70		14,1	13,7	145	200	210		
		140	110		22,5		190	155	330		
		270	240				55	115	720		
	C-70	100	70		14,1	17,1	145	260	210		
		140	110		23,7		205	200	330		
		270	240		28,1		55	135	720		
FIS A M 16	5.8	120	80	60	17,2	22,3	160	305	240	65	65
		170	125		33,6		285	235	375		
		360	320		37,6		65	150	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		33,6		285	405	375		
		360	320		60,0		120	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		33,6		285	270	375		
		360	320		42,0		65	165	960		
	C-70	120	80		17,2	31,4	160	445	240		
		170	125		33,6		285	350	375		
		360	320		52,4		70	195	960		

3

Chemical fixings



## LOADS

**Superbond-System: Injection mortar FIS SB with Threaded rod FIS A** <sup>1) 2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>3) 4) 5) 6)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{7)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{8)}$ [kN]	$V_{perm}^{8)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{9)}$ [mm]	$c_{min}^{9)}$ [mm]
FIS A M 20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		53,3		385	300	510		
		450	400		58,6		85	195	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		53,3	56,0	385		510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,4	170	500	270		
		220	170		53,3		385	350	510		
		450	400		65,7		85	215	1200		
	C-70	140	90		20,5	41,1	170	525	270		
		220	170		53,3	49,1	385	455	510		
		450	400		81,9		135	260	1200		
FIS A M 24	5.8	160	96	150	22,6	45,2	170	540	290	105	105
		270	210		73,2	50,9	475	390	630		
		540	480		84,3		105	250	1440		
	8.8	160	96		22,6	45,2	170	540	290		
		270	210		73,2	80,6	475	675	630		
		540	480		134,3		360	365	1440		
	A4-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2	56,8	475	445	630		
		540	480		94,3		105	270	1440		
	C-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2	70,9	475	580	630		
		540	480		117,6		235	325	1440		
FIS A M 27	5.8	170	108	200	27,0	54,0	195	605	325	120	120
		310	250		95,1	65,7	565	460	750		
		600	540		109,5		120	295	1620		
	8.8	170	108		27,0	54,0	195	605	325		
		310	250		95,1	105,1	565	805	750		
		600	540		175,2		505	450	1620		
	A4-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1	73,7	565	530	750		
		600	540		123,0		140	320	1620		
	C-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1	92,0	565	690	750		
		600	540		153,3		355	385	1620		
FIS A M 30	5.8	190	120	300	31,6	63,2	210	660	360	140	140
		350	280		112,7	80,6	635	525	840		
		670	600		133,8		140	330	1800		
	8.8	190	120		31,6	63,2	210	660	360		
		350	280		112,7	128,6	635	920	840		
		670	600		213,8		610	515	1800		
	A4-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	90,2	635	605	840		
		670	600		150,1		195	365	1800		
	C-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	112,6	635	785	840		
		670	600		187,1		445	435	1800		

## LOADS

### Superbond-System: Injection mortar FIS SB with Threaded rod FIS A <sup>1) 2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>3) 4) 5) 6)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{7)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{8)}$ [kN]	$V_{perm}^{8)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{9)}$ [mm]	$c_{min}^{9)}$ [mm]

For the design the complete assessment ETA-12/0258 has to be considered. <sup>10)</sup>

1) Also valid for threaded rod RG M in the same property class.

2) Valid for injection mortar FIS SB. For using the glass capsule RSB see separate table resp. ETA-12/0258.

3) The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-12/0258.

4) The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

5) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

6) Drill method hammer drilling.

7) For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

8) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

9) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

10) The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Superbond-System: Injection mortar FIS SB with Internal threaded anchor RG M I <sup>1)</sup>

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) <sup>2) 3) 4) 5) 9)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{7)}$ [mm]	$c_{min}^{7)}$ [mm]
RG M8 I	5.8	120	90	10	8,1	5,3	135	85	270	55	55
	8.8					8,3		145			
	A4-70					5,9		95			
RG M10 I	5.8	130	90	20	10,8	8,3	135	135	270	65	65
	8.8					13,3		235			
	A4-70					9,3		155			
RG M12 I	5.8	170	125	40	16,8	12,1	190	165	375	75	75
	8.8					19,3		285			
	A4-70					13,5		185			
RG M16 I	5.8	210	160	80	26,3	22,4	240	275	480	95	95
	8.8					30,9		405			
	A4-70					25,1		315			
RG M20 I	5.8	270	200	120	41,9	39,4	300	435	600	125	125
	8.8					51,4		595			
	A4-70					39,4		430			

For the design the complete assessment ETA-12/0258 has to be considered. <sup>8)</sup>

1) Valid for injection mortar FIS SB. For using the glass capsule RSB see separate table resp. ETA-12/0258.

2) The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-12/0258.

3) The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

4) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

5) Drill method hammer drilling.

6) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

8) The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

9) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$ .

## LOADS

### Superbond-System: Injection mortar FIS SB with Internal threaded anchor RG M I <sup>1)</sup>

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{7)}$ [mm]	$c_{min}^{7)}$ [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	55	65	270	55	55
	8.8				13,8	8,3	110	95			
	A4-70				9,9	5,9	55	70			
RG M10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				20,5	13,3	190	155			
	A4-70				15,7	9,3	130	100			
RG M12 I	5.8	170	125	40	20,5	12,1	130	110	375	75	75
	8.8				32,4	19,3	265	190			
	A4-70				22,5	13,5	155	125			
RG M16 I	5.8	210	160	80	37,6	22,4	255	180	480	95	95
	8.8				48,7	30,9	365	265			
	A4-70				42,0	25,1	300	205			
RG M20 I	5.8	270	200	120	58,6	39,4	365	285	600	125	125
	8.8				68,0	51,4	445	395			
	A4-70				65,7	39,4	430	285			

For the design the complete assessment ETA-12/0258 has to be considered. <sup>8)</sup>

<sup>1)</sup> Valid for injection mortar FIS SB. F or using the glass capsule RSB see separate table resp. ETA-12/0258.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-12/0258.

<sup>3)</sup> The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

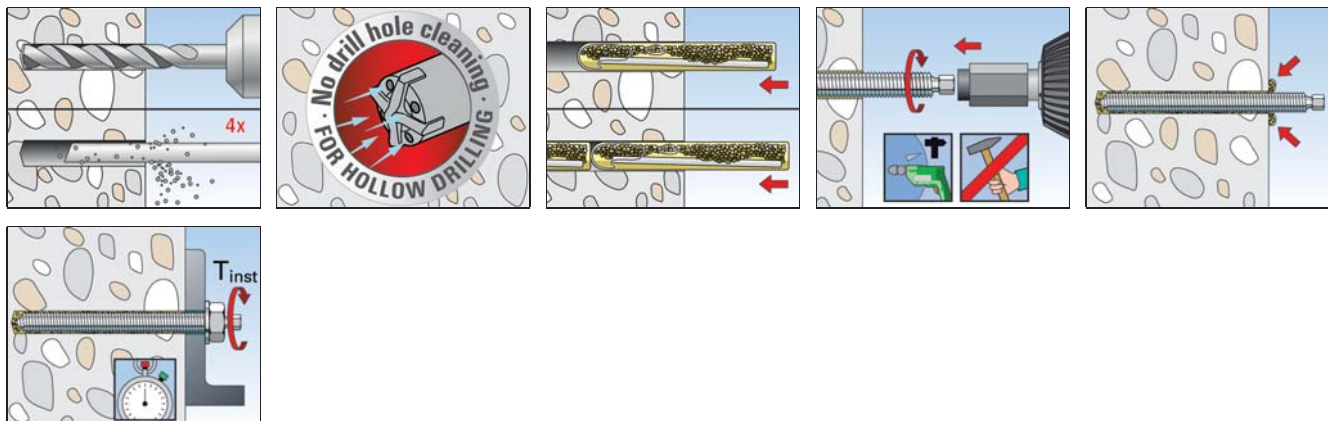
<sup>5)</sup> Drill method hammer drilling.

<sup>6)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

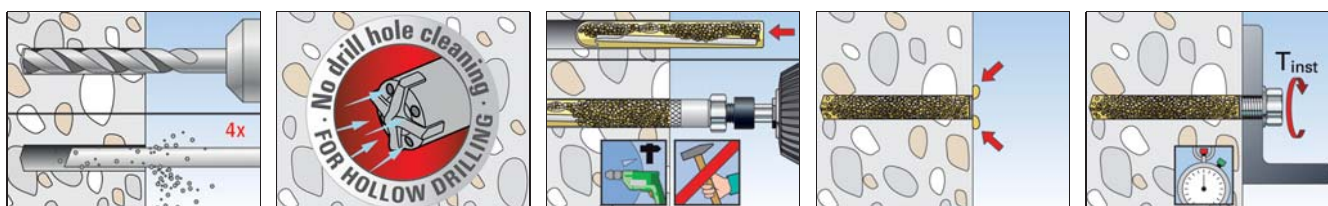
<sup>7)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>8)</sup> The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

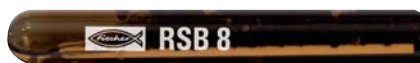
## INSTALLATION IN CONCRETE WITH CAPSULE RSB AND RG M



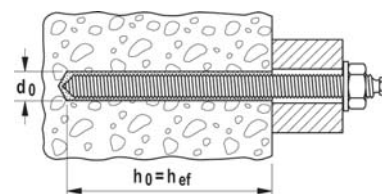
## INSTALLATION IN CONCRETE WITH CAPSULE RSB AND RG M I



## TECHNICAL DATA



Resin capsule **RSB**



Item	Art.-No.	Approval		Drill hole diameter	Drill hole depth	Anchorage depth	Match	Sales unit
		ETA	ICC	$d_0$ [mm]	$h_0$ [mm]	$h_{ef}$ [mm]		[pcs]
<b>RSB 8</b>	<b>518807</b>	■	▲	10	80	80	RG M 8	10
<b>RSB 10 mini</b>	<b>518820</b> <sup>1)</sup>	■	▲	12	75 / 150	75 / 150	RG M 10	10
<b>RSB 10</b>	<b>518821</b> <sup>2)</sup>	■	▲	12 / 14	90	90	RG M 10 / RG M 8 I	10
<b>RSB 12 mini</b>	<b>518822</b> <sup>1)</sup>	■	▲	14	75 / 150	75 / 150	RG M 12	10
<b>RSB 12</b>	<b>518823</b> <sup>2)</sup>	■	▲	14 / 18	110	110	RG M 12 / RG M 10 I	10
<b>RSB 16 mini</b>	<b>518824</b> <sup>1)</sup>	■	▲	18	95 / 190	95 / 190	RG M 16	10
<b>RSB 16</b>	<b>518825</b> <sup>2)</sup>	■	▲	18 / 20	125	125	RG M 16 / RG M 12 I	10
<b>RSB 16 E</b>	<b>518826</b>	■	—	24	160	160	RG M 16 I	10
<b>RSB 20</b>	<b>518827</b>	■	▲	25	170	170	RG M 20	10
<b>RSB 20 E/24</b>	<b>518828</b>	■	▲	25 / 28 / 32	210	210	RG M 20 / RG M 24 / RG M 20 I	5
<b>RSB 30</b>	<b>518829</b>	■	▲	35	280	280	RG M 30	5

1) use 2 x RSB mini in a row for larger anchoring depth

2) / second value "Drill hole diameter" in conjunction with Internal threaded anchor RG M I

## CURING TIME

Temperature in anchoring base	Curing time RSB
- 30°C – - 20°C	120 hrs.
- 19°C – - 15°C	48 hrs.
- 14°C – - 10°C	30 hrs.
- 9°C – - 5°C	16 hrs.
- 4°C – ± 0°C	10 hrs.
+ 1°C – + 5°C	45 min.
+ 6°C – + 10°C	30 min.
+ 11°C – + 20°C	20 min.
+ 21°C – + 30°C	5 min.
+ 31°C – + 40°C	3 min.

## LOADS

**Superbond-System: Resin capsule RSB with Threaded rod RG M <sup>1)</sup>**

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) <sup>2) 3) 4) 9)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		h <sub>min</sub> [mm]	h <sub>ef</sub> [mm]	T <sub>max</sub> [Nm]	N <sub>perm</sub> <sup>6)</sup> [kN]	V <sub>perm</sub> <sup>6)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s <sub>cr</sub> [mm]	s <sub>min</sub> <sup>7)</sup> [mm]	c <sub>min</sub> <sup>7)</sup> [mm]
RG M 8 <sup>5)</sup>	5.8	110	80	10	5,7	5,1	105	95	240	40	40
	8.8					8,6		170			
	A4-70					6,0		115			
	C-70					7,4		145			
RG M 10 <sup>5)</sup>	5.8	110	75	20	7,3	8,6	115	170	225	45	45
	8.8					13,1		280			
	A4-70					9,2		185			
	C-70					11,4		240			
	5.8	120	90		8,8	8,6	130	155	270		
	8.8					13,1		250			
	A4-70					9,2		165			
	C-70					11,4		215			
	5.8	180	150		13,8	8,6	120	115	450		
	8.8				13,1	185					
	A4-70				14,6	9,2	130	120			
RG M 12 <sup>5)</sup>	5.8	110	75	40	10,1	12,0	115	245	225	55	55
	8.8					19,4		420			
	A4-70					13,7		285			
	C-70					17,1		365			
	5.8	140	110		14,8	12,0	155	195	330		
	8.8					19,4		340			
	A4-70					13,7		230			
	C-70					17,1		295			
	5.8	180	150		20,2	12,0		160	450		
	8.8					19,4		280			
	A4-70					13,7		185			
RG M 16	5.8	140	95	60	15,9	22,3	145	410	285	65	65
	8.8					31,7		605			
	A4-70					25,2		470			
	C-70					31,4		600			
	5.8	170	125		22,4	22,3	190	350	375		
	8.8					36,0		600			
	A4-70					25,2		400			
	C-70					31,4		515			
	5.8	230	190		34,1	22,3	210	265	570		
	8.8					36,0		465			
	A4-70					25,2		305			



## LOADS

### Superbond-System: Resin capsule RSB with Threaded rod RG M <sup>1)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) <sup>2) 3) 4) 9)</sup>										Minimum spacings while reducing the load			
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance		
							Max. tension load c	Max. shear load c				Max. Load s <sub>cr</sub>	
		h <sub>min</sub> [mm]	h <sub>ef</sub> [mm]	T <sub>max</sub> [Nm]	N <sub>perm</sub> <sup>6)</sup> [kN]	V <sub>perm</sub> <sup>6)</sup> [kN]				s <sub>min</sub> <sup>7)</sup> [mm]	c <sub>min</sub> <sup>7)</sup> [mm]		
RG M 20	5.8	220	170	120	38,0	34,9	255	450	510	85	85		
	8.8					56,0		780					
	A4-70					39,4		520					
	5.8	260	210		47,1	34,9	280	395	630				
	8.8					56,0		685					
	A4-70					39,4		455					
RG M 24	5.8	270	210	150	52,2	50,9	315	590	630	105	105		
	8.8					80,6		1005					
	A4-70					56,8		670					
RG M 30	5.8	350	280	300	80,3	80,6	420	795	840	140	140		
	A4-70					90,2		910					

For the design the complete assessment ETA-12/0258 has to be considered. <sup>8)</sup>

<sup>1)</sup> Valid for glass capsule RSB. For using the injection mortar FIS SB see separate table resp. ETA-12/0258.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-12/0258.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-12/0258.

<sup>5)</sup> Diamond drilling not permitted.

<sup>6)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>7)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>8)</sup> The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

<sup>9)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

### Superbond-System: Resin capsule RSB with Threaded rod RG M <sup>1)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) <sup>2) 3) 4) 9)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		h <sub>min</sub> [mm]	h <sub>ef</sub> [mm]	T <sub>max</sub> [Nm]	N <sub>perm</sub> <sup>5)</sup> [kN]	V <sub>perm</sub> <sup>5)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s <sub>cr</sub> [mm]	s <sub>min</sub> <sup>6)</sup> [mm]	c <sub>min</sub> <sup>6)</sup> [mm]
RG M 8	5.8	110	80	10	9,0	5,1	75	70	240	40	40
	8.8				11,5	8,6	105	115			
	A4-70				9,9	6,0	85	75			
	C-70				11,5	7,4	105	100			
RG M 10	5.8	110	75	20	13,5	8,6	130	115	225	45	45
	8.8					13,1		190			
	A4-70					9,2		125			
	C-70					11,4		160			
	5.8	120	90		13,8	8,6	110	105	270		
	8.8				16,2	13,1	145	170			
	A4-70				15,7	9,2	140	110			
	C-70				16,2	11,4	145	145			
	5.8	180	150		13,8	8,6	45	90	450		
	8.8				22,4	13,1	100	120			
	A4-70				15,7	9,2	55	95			

## LOADS

### Superbond-System: Resin capsule RSB with Threaded rod RG M <sup>1)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) <sup>2) 3) 4) 9)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		h <sub>min</sub> [mm]	h <sub>ef</sub> [mm]	T <sub>max</sub> [Nm]	N <sub>perm</sub> <sup>5)</sup> [kN]	V <sub>perm</sub> <sup>5)</sup> [kN]					
RG M 12	5.8	110	75	40	15,6	12,0	160	165	225	55	55
	8.8					19,4		285			
	A4-70					13,7		195			
	C-70					17,1		250			
	5.8	140	110		20,5	12,0	165	130	330		
	8.8				23,7	19,4	205	230			
	A4-70				22,5	13,7	190	155			
	C-70				23,7	17,1	205	200			
	5.8	180	150		20,5	12,0	75	110	450		
	8.8				32,3	19,4	220	190			
	A4-70				22,5	13,7	100	125			
RG M 16	5.8	140	95	60	22,3	22,3	205	275	285	65	65
	8.8					36,0		475			
	A4-70					25,2		315			
	C-70					31,4		405			
	5.8	170	125		33,6	22,3	285	235	375		
	8.8					36,0		405			
	A4-70					25,2		270			
	C-70					31,4		350			
	5.8	230	190		37,6	22,3	190	175	570		
	8.8				59,1	36,0	400	310			
	A4-70				42,0	25,2	235	200			
RG M 20	5.8	220	170	120	53,3	34,9	385	300	510	85	85
	8.8					56,0		525			
	A4-70					39,4		345			
	5.8	260	210		58,6	34,9	350	260	630		
	8.8				73,2	56,0	475	460			
	A4-70				65,7	39,4	415	300			
RG M 24	5.8	270	210	150	73,2	50,9	475	390	630	105	105
	8.8					80,6		675			
	A4-70					56,8		445			
RG M 30	5.8	350	280	300	112,7	80,6	635	525	840	140	140
	A4-70					90,2		605			

For the design the complete assessment ETA-12/0258 has to be considered. <sup>7)</sup>

<sup>1)</sup> Valid for glass capsule RSB. For using the injection mortar FIS SB see separate table resp. ETA-12/0258.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-12/0258.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-12/0258.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Superbond-System: Resin capsule RSB with Internal threaded anchor RG M I <sup>1)</sup>

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) <sup>2) 3) 4) 9)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{7)}$ [mm]	$c_{min}^{7)}$ [mm]
RG M8 I <sup>5)</sup>	5.8	120	90	10	8,1	5,3	135	85	270	55	55
	8.8					8,3		145			
	A4-70					5,9		95			
RG M10 I	5.8	130	90	20	10,8	8,3	135	135	270	65	65
	8.8					13,3		235			
	A4-70					9,3		155			
RG M12 I	5.8	170	125	40	16,8	12,1	190	165	375	75	75
	8.8					19,3		285			
	A4-70					13,5		185			
RG M16 I	5.8	210	160	80	26,3	22,4	240	275	480	95	95
	8.8					30,9		405			
	A4-70					25,1		315			
RG M20 I	5.8	270	200	120	41,9	39,4	300	435	600	125	125
	8.8					51,4		595			
	A4-70					39,4					

For the design the complete assessment ETA-12/0258 has to be considered. <sup>7)</sup>

<sup>1)</sup> Valid for glass capsule RSB. For using the injection mortar FIS SB see separate table resp. ETA-12/0258.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-12/0258.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-12/0258.

<sup>5)</sup> Diamond drilling not permitted.

<sup>6)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>7)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

<sup>9)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

### Superbond-System: Resin capsule RSB with Internal threaded anchor RG M I <sup>1)</sup>

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) <sup>2) 3) 4)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	55	65	270	55	55
	8.8				13,8	8,3	110	95			
	A4-70				9,9	5,9	55	70			
RG M10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				20,5	13,3	190	155			
	A4-70				15,7	9,3	130	100			
RG M12 I	5.8	170	125	40	20,5	12,1	130	110	375	75	75
	8.8				32,4	19,3	265	190			
	A4-70				22,5	13,5	155	125			
RG M16 I	5.8	210	160	80	37,6	22,4	255	180	480	95	95
	8.8				48,7	30,9	365	265			
	A4-70				42,0	25,1	300	205			
RG M20 I	5.8	270	200	120	58,6	39,4	365	285	600	125	125
	8.8				68,0	51,4	445	395			
	A4-70				65,7	39,4	430	285			

For the design the complete assessment ETA-12/0258 has to be considered. <sup>7)</sup>

<sup>1)</sup> Valid for glass capsule RSB. For using the injection mortar FIS SB see separate table resp. ETA-12/0258.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-12/0258.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-12/0258.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## The bonded anchor for cracked concrete with threaded rod RG M without drill hole cleaning



Crash barriers



Collision protection

### VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel
- Hot-dip galvanised steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

#### Also suitable for:

- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

- RM II is the first bonded anchor with threaded rod RG M for cracked and non-cracked concrete that does not require drill hole cleaning. This allows for a rapid working progress and an economic installation.
- Moreover, there is a reduced exposition to drill dust on the building site. This increases the safety for the user.
- The pre-portioned resin capsule is easy to install and especially suitable for individual applications and overhead installations.

### APPLICATIONS

- Steel constructions
  - Guard rails
  - Staircases
  - Column bases
  - Machines
  - Masts
- Ideal for:**
- Overhead installations
  - Water-filled drill holes

### FUNCTIONING

- The resin anchor RM II is suitable for pre-positioned installation when combined with the threaded rod RG M.
- The 2-component resin capsule RM II contains styrene-free vinyl ester resin and hardener.
- The threaded rod RG M is set using a hammer drill and the accompanying setting tool in rotating and hitting motions.
- During setting, the oblique edge of the RG M destroys the capsule, and mixes and activates the mortar.
- The mortar bonds the entire surface of the threaded rod with the drill hole wall and seals the drill hole.

### SEE ALSO



#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

Page 195

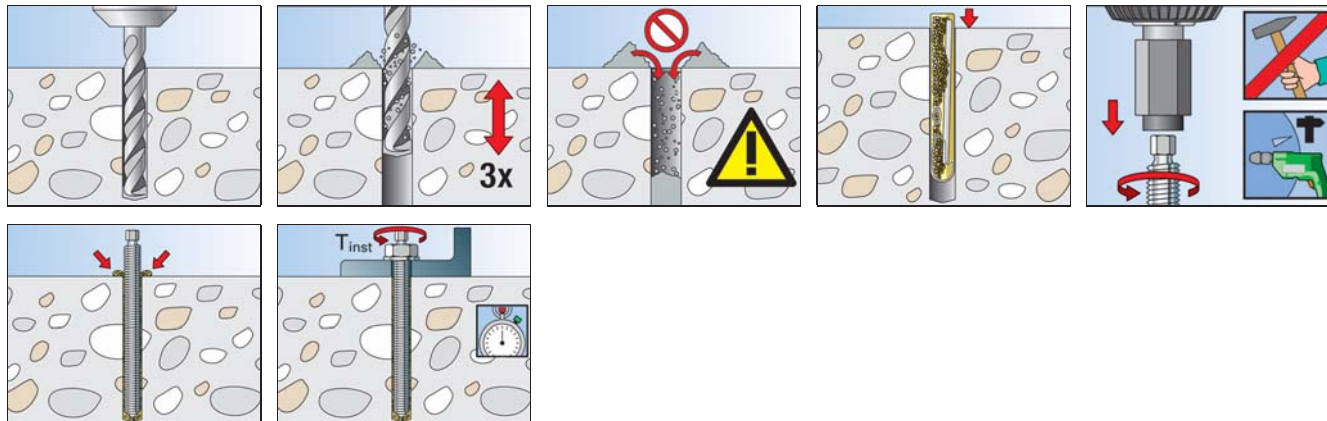


#### ACCESSORIES

Page 198



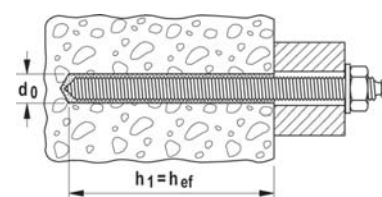
## INSTALLATION IN CONCRETE WITH CAPSULE RM II AND RG M



## TECHNICAL DATA



Resin capsule **RM II**



		Approval ETA	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Suitable for threaded rod	Sales unit [pcs]
Item	Art.-No.						
<b>RM II 8</b>	<b>539796</b>	■	10	80	80	RG M 8	10
<b>RM II 10</b>	<b>539797</b>	■	12	90	90	RG M10	10
<b>RM II 12</b>	<b>539798</b>	■	14	110	110	RG M 12	10
<b>RM II 14</b>	<b>539799</b>	—	16	120	120	RG M 14	10
<b>RM II 16</b>	<b>539800</b>	■	18	125	125	RG M 16	10
<b>RM II 20/22</b>	<b>539802</b> <sup>1)</sup>	■	25	170 / 190	170 / 190	RG M 20 / RG M 22	10
<b>RM II 24</b>	<b>539803</b>	■	28	210	210	RG M 24	5

<sup>1)</sup> RM II 20/22 in combination with RG M 22 and effect. anchorage depth of 190 mm is not part of the assessment.

## CURING TIME

Temperature at anchoring base	Curing time
-15 °C - -11 °C	30 hrs.
- 10 °C - - 6 °C	16 hrs.
- 5 °C - - 1 °C	10 hrs.
+ 0 °C - + 4 °C	45 min.
+ 5 °C - + 9 °C	30 min.
+10 °C - +19 °C	20 min.
+20 °C - +29 °C	5 min.
+30 °C - +40 °C	3 min.

## LOADS

### Resin anchor RM II: Resin capsule RM II with Threaded rod RG M

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 4) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		h <sub>min</sub> [mm]	h <sub>ef</sub> [mm]	T <sub>max</sub> [Nm]	N <sub>perm</sub> <sup>5)</sup> [kN]	V <sub>perm</sub> <sup>5)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s <sub>cr</sub> [mm]	s <sub>min</sub> <sup>6)</sup> [mm]	c <sub>min</sub> <sup>6)</sup> [mm]
RG M 10	5.8	120	90	20	3,9	8,6	120	155	270	45	45
	8.8					9,4		175			
	A4-70					9,2		165			
	C-70					9,4		175			
RG M 12	5.8	140	110	40	5,8	12,0	145	195	330	55	55
	8.8					13,8		230			
	A4-70					13,7					
	C-70					13,8					
RG M 16	5.8	170	125	60	8,7	20,9	190	325	375	65	65
	8.8										
	A4-70										
	C-70										
RG M 20	5.8	220	170	120	14,8	34,9	240	450	510	85	85
	8.8					35,6		460			
	A4-70										
RG M 24	5.8	270	210	150	22,0	50,9	285	590	630	105	105
	8.8					52,8		615			
	A4-70										

For the design the complete assessment ETA-16/0340 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-16/0340 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-16/0340.

<sup>2)</sup> The given loads are valid for RM II for fixations in dry and humid concrete for temperatures in the substrate up to 72 °C (resp. short term up to 120 °C in accordance with ETA-16/0340).

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-16/0340.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-16/0340, issue date 06.10.2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

### Resin anchor RM II: Resin capsule RM II with Threaded rod RG M

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 4)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
RG M 8	5.8	110	80	10	8,4	5,1	95	70	240	40	40
	8.8							115			
	A4-70							75			
	C-70							100			
RG M 10	5.8	120	90	20	11,8	8,6	120	105	270	45	45
	8.8							170			
	A4-70							110			
	C-70							145			
RG M 12	5.8	140	110	40	17,3	12,0	165	130	330	55	55
	8.8							230			
	A4-70							155			
	C-70							200			
RG M 16	5.8	170	125	60	26,2	22,3	260	235	375	65	65
	8.8							405			
	A4-70							270			
	C-70							350			
RG M 20	5.8	220	170	120	44,4	34,9	385	300	510	85	85
	8.8					56,0		525			
	A4-70					39,4		345			
RG M 24	5.8	270	210	150	61,0	50,9	475	390	630	105	105
	8.8					80,6		675			
	A4-70					56,8		445			

For the design the complete assessment ETA-16/0340 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-16/0340 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-16/0340.

<sup>2)</sup> The given loads are valid for RM II for fixations in dry and humid concrete for temperatures in the substrate up to 72 °C (resp. short term up to 120 °C in accordance with ETA-16/0340.

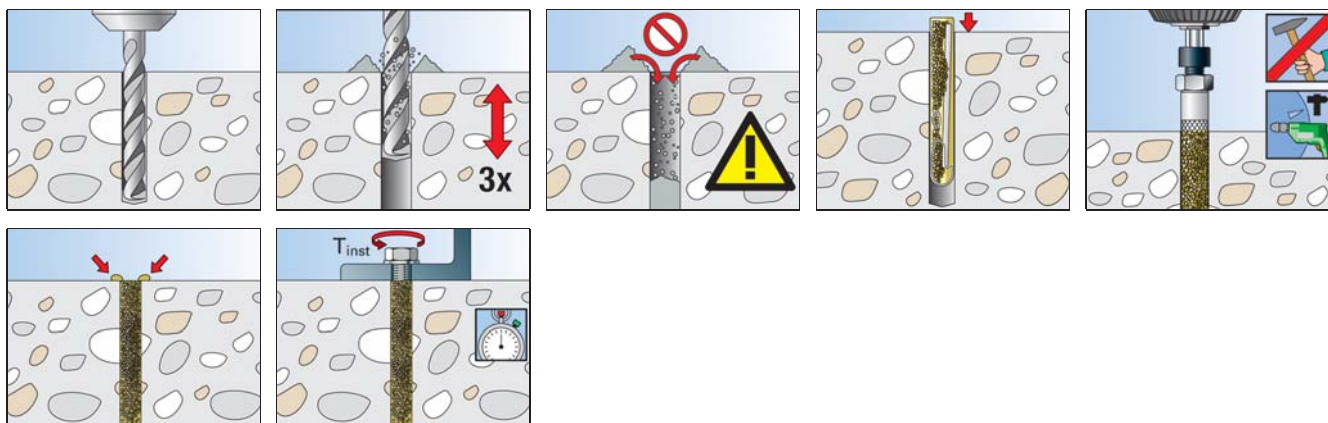
<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-16/0340.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-16/0340, issue date 06.10.2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

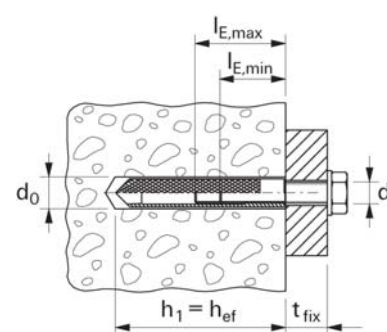
## INSTALLATION IN CONCRETE WITH CAPSULE RM II AND RG M I



## TECHNICAL DATA



Resin capsule RM II



		Approval ETA	Drill diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Suitable for internal- threaded anchor	Sales unit [pcs]
Item	Art.-No.						
RM II 10	539797	■	14	90	90	RG M8 I	10
RM II 12	539798	■	18	90	90	RG M10 I	10
RM II 16	539800	■	20	125	125	RG M12 I	10
RM II 16 E	539801	■	24	160	160	RG M16 I	10
RM II 24	539803	■	32	200	200	RG M20 I	5

## CURING TIME

Temperature at anchoring base	Curing time
-15 °C - -11 °C	30 hrs.
- 10 °C - - 6 °C	16 hrs.
- 5 °C - - 1 °C	10 hrs.
+ 0 °C - + 4 °C	45 min.
+ 5 °C - + 9 °C	30 min.
+10 °C - +19 °C	20 min.
+20 °C - +29 °C	5 min.
+30 °C - +40 °C	3 min.

## LOADS

### Resin anchor RM II: Resin capsule RM II with Internal threaded anchor RG M I

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 4) 7)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
RG M 8 I	5.8	120	90	10	4,7	5,3	135	85	270	55	55
	8.8					8,3		145			
	A4-70					5,9		95			
RG M 10 I	5.8	130	90	20	6,3	8,3	135	135	270	65	65
	8.8					13,3		235			
	A4-70					9,3		155			
RG M 12 I	5.8	170	125	40	9,8	12,1	190	165	375	75	75
	8.8					19,3		285			
	A4-70					13,5		185			
RG M 16 I	5.8	210	160	80	15,4	22,4	240	275	480	95	95
	8.8					30,9		405			
	A4-70					25,1		315			
RG M 20 I	5.8	270	200	120	24,4	35,4	300	385	600	125	125
	8.8					51,4		600			
	A4-70					39,4		435			

For the design the complete assessment ETA-16/0340 has to be considered. <sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-16/0340 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-16/0340.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-16/0340.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-16/0340, issue date 06.10.2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

<sup>7)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.



## LOADS

### Resin anchor RM II: Resin capsule RM II with Internal threaded anchor RG M I

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>									Minimum spacings while reducing the load		
Type	Screw steel property/ surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		h <sub>min</sub> [mm]	h <sub>ef</sub> [mm]	T <sub>max</sub> [Nm]	N <sub>perm</sub> <sup>4)</sup> [kN]	V <sub>perm</sub> <sup>4)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s <sub>cr</sub> [mm]	s <sub>min</sub> <sup>5)</sup> [mm]	c <sub>min</sub> <sup>5)</sup> [mm]
RG M 8 I	5.8	120	90	10	9,0	5,3	85	65	270	55	55
	8.8				12,8	8,3	135	95			
	A4-70				9,9	5,9	95	70			
RG M 10 I	5.8	130	90	20	13,8	8,3	140	90	270	65	65
	8.8				17,1	13,3	190	155			
	A4-70				15,7	9,3	170	100			
RG M 12 I	5.8	170	125	40	20,5	12,1	180	110	375	75	75
	8.8				26,6	19,3	265	190			
	A4-70				22,5	13,5	210	125			
RG M 16 I	5.8	210	160	80	37,6	22,4	330	180	480	95	95
	8.8				40,6	30,9	365	265			
	A4-70					25,1		205			
RG M 20 I	5.8	270	200	120	56,7	35,4	445	250	600	125	125
	8.8					51,4		400			
	A4-70					39,4		285			

For the design the complete assessment ETA-16/0340 has to be considered. <sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-16/0340 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-16/0340.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

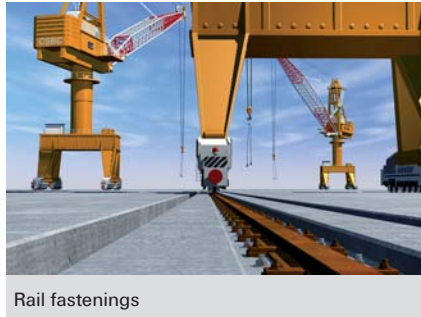
<sup>3)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-16/0340.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-16/0340, issue date 06.10.2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## The powerful injection mortar for rebar connections and cracked concrete



Rail fastenings



Rebar connections

### BUILDING MATERIALS

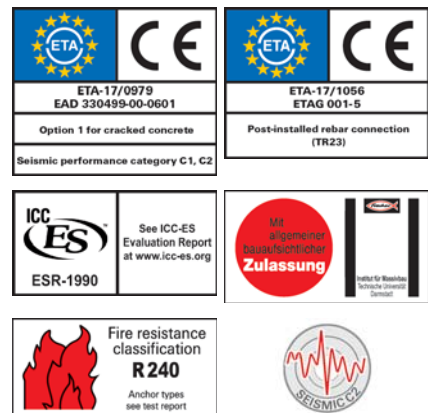
#### Approved for anchorings in:

- Concrete C20/25 to C50/60, cracked and non-cracked

#### Also suitable for:

- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

- The optimised formulation of the epoxy resin mortar FIS EM Plus leads to improved load values in cracked and non-cracked concrete.
- The mortar can be used for rebar connections from diameter 8 to 40 mm.
- With the threaded rod FIS A, the loads to be applied can be designed variably by selecting the anchorage depth.
- Temporary and detachable fixing points are possible with the internal threaded anchor RG M I.
- For practical use on the building site, FIS EM Plus can be processed at low temperatures down to -5 °C.
- The mortar is approved for diamond-drilled and water-filled drill holes as well as seismic applications of performance categories C1, C2 and thus offers safety under extreme conditions.

### APPLICATIONS

- Post-installed rebar connections
- Jointers for concrete layers
- Rim beam anchorings
- Seismic applications
- Anchorings in diamond-drilled or in waterfilled drill holes
- Heavy steel constructions
- Silo installations
- Tall shelving
- Sound barriers
- Temporary or removable fixings (with internal threaded anchor RG M I)

### FUNCTIONING

- The epoxy mortar FIS EM Plus combined with the FIS A threaded rod, is suitable for pre-positioned and push-through installation and with the internal threaded anchor RG M I for pre-positioned installation.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the injection capsule in the static mixer.
- The mortar is injected bubble-free from the drill hole base.
- The mortar bonds the entire surface of the anchor with the drill hole wall and seals off the drill hole.
- The anchor is set manually by lightly rotating it until it reaches the drill hole base.
- During push-through installation, the annular gap between the threaded rod and attachment is filled with FIS EM Plus.

### SEE ALSO



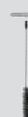
#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

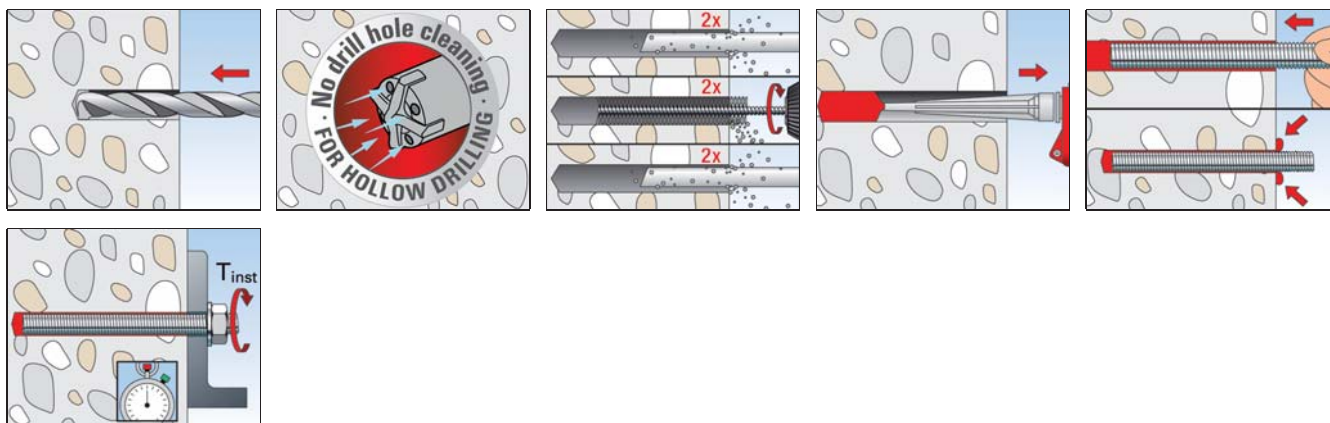
Page 195



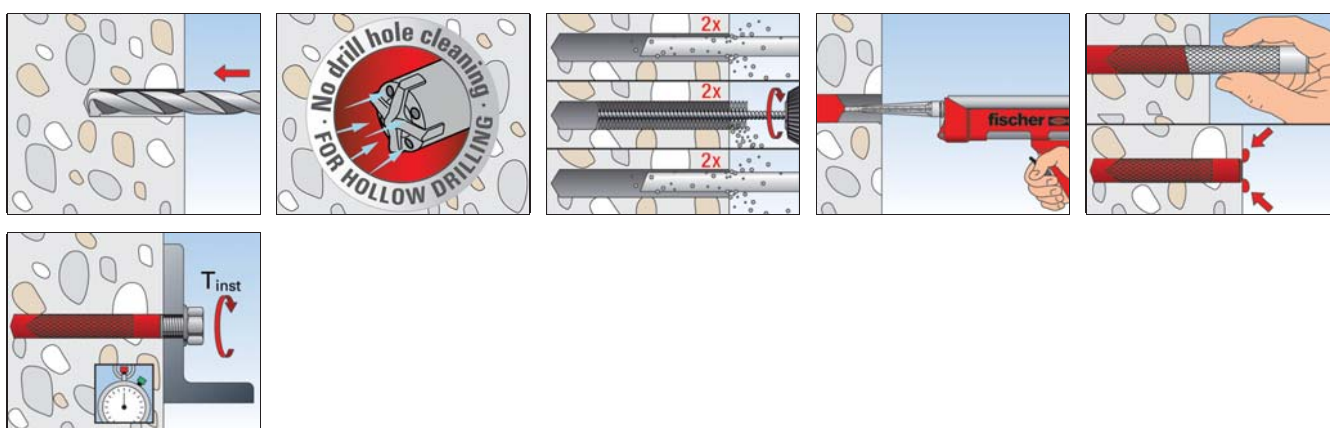
#### ACCESSORIES

Page 198

## INSTALLATION IN CONCRETE WITH FIS EM PLUS AND FIS A / RG M



## INSTALLATION IN CONCRETE WITH FIS EM PLUS AND RG M I



## TECHNICAL DATA



Epoxy mortar  
**FIS EM Plus 390 S**



Epoxy mortar  
**FIS EM Plus 585 S**



Epoxy mortar  
**FIS EM Plus 1500 S**

Item	Art.-No.	Approval			Languages on the cartridge	Scale unit	Contents	Sales unit
		DIBt	ETA	ICC				
<b>FIS EM Plus 390 S</b>	<b>544154</b>	●	■	▲	DE, EN, FR, NL, ES, PT	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS EM Plus 390 S</b>	<b>544155</b>	●	■	▲	EN, ZH, EL, KO, HU, PL	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS EM Plus 390 S</b>	<b>544176</b>	●	■	▲	CS, SK, RO, AR, FR, EN	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS EM Plus 390 S</b>	<b>544159</b>	●	■	▲	LT, LV, ET, UK, RU, KK	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS EM Plus 585 S</b>	<b>544166</b>	●	■	▲	DE, EN, FR, NL, ES, PT	270	1 cartridge 585 ml + 2 x FIS UMR	6
<b>FIS EM Plus 585 S</b>	<b>544165</b>	●	■	▲	EN, ZH, RU, KO, CS, PL	270	1 cartridge 585 ml + 2 x FIS UMR	6
<b>FIS EM Plus 585 S</b>	<b>544175</b>	●	■	▲	EN, ZH, RU, KO, CS, PL	270	1 cartridge 585 ml, 1 x FIS UMR, 1 x extension tube Ø 9x250 mm	6
<b>FIS EM Plus 1500 S</b>	<b>544167</b>	●	■	▲	DE, IT, FR, NL, CS, SK	700	1 cartridge 1500 ml, 2 x FIS UMR	4
<b>FIS EM Plus 1500 S</b>	<b>544173</b>	●	■	▲	EN, ES, PT, ZH, RU, PL	700	1 cartridge 1500 ml, 2 x FIS UMR	4

## TECHNICAL DATA



Static mixer **FIS MR Plus**



Static mixer **FIS UMR**

3

Chemical fixings

					Contents	Sales unit
Item	Art.-No.					[pcs]
<b>FIS MR Plus</b>	<b>545853</b>				10 static mixer FIS MR Plus	10
<b>FIS UMR</b>	<b>520593</b>				10 static mixer FIS UMR for 585 ml and 1500 ml cartridges	10



**FIS EM Plus 390 S HWK big**



**FIS EM Plus 390 S in bucket**

		Approval			Languages on the cartridge	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC			[pcs]
<b>FIS EM Plus 390 S HWK big</b>	<b>544156</b>	●	■	▲	EN, ZH, EL, KO, HU, PL	20 cartridges 390 ml, 20 x FIS MR Plus	1
<b>FIS EM Plus 390 S in bucket</b>	<b>544172</b>	●	■	▲	DE, EN, FR, NL, ES, PT	20 cartridges 390 ml, 20 x FIS MR Plus	1

## GELLING AND CURING TIME

Temperature at anchoring base	Gelling time	Curing time
- 5 °C to - 1 °C	180 min.	200 hrs.
0 °C to + 4 °C	150 min.	90 hrs.
+ 5 °C to + 9 °C	120 min.	40 hrs.
+ 10 °C to + 19 °C	30 min.	18 hrs.
+ 20 °C to + 29 °C	14 min.	10 hrs.
+ 30 °C to + 40 °C	7 min.	5 hrs.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

## LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A<sup>2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength clas C20/25 (~B25) <sup>1) 3) 4) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FIS A M 8	5.8	100	60	10	5,4	5,1	90	105	180	40	40
		110	80		7,2		120	95	240		
		190	160		9,0		65	80	480		
	8.8	100	60		5,4	8,6	90	185	180		
		110	80		7,2		120	170	240		
		190	160		13,8			115	480		
	A4-70	100	60		5,4	6,0	90	125	180		
		110	80		7,2		120	115	240		
		190	160		9,9		75	90	480		
	C-70	100	60		5,4	7,4	90	160	180		
		110	80		7,2		120	145	240		
		190	160		12,4		105	105	480		
FIS A M 10	5.8	100	60	20	6,7	8,6	90	185	180	45	45
		120	90		10,1		135	155	270		
		230	200		13,8		70	110	600		
	8.8	100	60		6,7	13,1	90	295	180		
		120	90		10,1		135	250	270		
		230	200		22,4		150	150	600		
	A4-70	100	60		6,7	9,2	90	195	180		
		120	90		10,1		135	165	270		
		230	200		15,7			115	600		
	C-70	100	60		6,7	11,4	90	250	180		
		120	90		10,1		135	215	270		
		230	200		19,5		125	135	600		
FIS A M 12	5.8	100	70	40	10,0	12,0	105	255	210	55	45
		140	110		17,8		165	195	330		
		270	240		20,5		60	135	720		
	8.8	100	70		10,0	19,4	105	435	210		
		140	110		17,8		165	340	330		
		270	240		32,4		145	200	720		
	A4-70	100	70		10,0	13,7	105	295	210		
		140	110		17,8		165	230	330		
		270	240		22,5		75	150	720		
	C-70	100	70		10,0	17,1	105	380	210		
		140	110		17,8		165	295	330		
		270	240		28,1		115	175	720		
FIS A M 16	5.8	120	80	60	12,3	22,3	120	445	240	65	50
		170	125		24,0		190	350	375		
		360	320		37,6		95	195	960		
	8.8	120	80		12,3	24,5	120	495	240		
		170	125		24,0		190	600	375		
		360	320		60,0		225	320	960		
	A4-70	120	80		12,3	24,5	120	495	240		
		170	125		24,0		190	400	375		
		360	320		42,0			215	960		
	C-70	120	80		12,3	24,5	120	495	240		
		170	125		24,0		190	515	375		
		360	320		52,4		175	270	960		

3

Chemical fixings



## LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A<sup>2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 3) 4) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FIS A M 20	5.8	140	90	120	14,6	29,3	135	530	270	85	55
		220	170		38,0	34,9	255	455	510		
		450	400		58,6		115	260	1200		
	8.8	140	90		14,6	29,3	135	530	270		
		220	170		38,0	56,0	255	780	510		
		450	400		93,3		340	435	1200		
	A4-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0	39,4	255	520	510		
		450	400		65,7		145	285	1200		
	C-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0	49,1	255	675	510		
		450	400		81,9		265	370	1200		
FIS A M 24	5.8	160	96	150	16,1	32,2	145	545	290	105	60
		270	210		52,2	50,9	315	590	630		
		540	480		84,3		160	330	1440		
	8.8	160	96		16,1	32,2	145	545	290		
		270	210		52,2	80,6	315	1005	630		
		540	480		134,3		475	570	1440		
	A4-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	56,8	315	670	630		
		540	480		94,3		230	360	1440		
	C-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	70,9	315	870	630		
		540	480		117,6		380	480	1440		
FIS A M 27	5.8	170	108	200	19,2	38,5	165	610	325	120	75
		310	250		67,8	65,7	375	695	750		
		600	540		109,5		240	390	1620		
	8.8	170	108		19,2	38,5	165	610	325		
		310	250		67,8	105,1	375	1200	750		
		600	540		175,2		615	700	1620		
	A4-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	73,7	375	795	750		
		600	540		123,0		325	445	1620		
	C-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	92,0	375	1030	750		
		600	540		153,3		500	595	1620		
FIS A M 30	5.8	190	120	300	22,5	45,1	180	665	360	140	80
		350	280		80,3	80,6	420	795	840		
		670	600		133,8		300	440	1800		
	8.8	190	120		22,5	45,1	180	665	360		
		350	280		80,3	128,6	420	1375	840		
		670	600		213,8		725	805	1800		
	A4-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	90,2	420	910	840		
		670	600		150,1		395	510	1800		
	C-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	112,6	420	1180	840		
		670	600		187,1		595	680	1800		

For the design the complete assessment ETA-17/0979 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-17/0979 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-17/0979.

<sup>2)</sup> Also valid for threaded rod RG M in the same property class.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-17/0979.

## LOADS

### Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A<sup>2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 3) 4) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-17/0979, issue date 06/04/2018. Design of the loads according to FprEN 1992-4:2017 and TR 055 (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$ .

## LOADS

### Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A<sup>2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 3) 4)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FIS A M 8	5.8	100	60	10	9,0	5,1	75	70	180	40	40
		110	80				55		240		
		190	160				40		480		
	8.8	100	60		11,2	8,6	100	130	180		
		110	80				130		240		
		190	160				40		480		
	A4-70	100	60		9,9	6,0	85	85	180		
		110	80				70		240		
		190	160				40		480		
	C-70	100	60		11,2	7,4	100	110	180		
		110	80				110		240		
		190	160				40		480		
FIS A M 10	5.8	100	60	20	11,2	8,6	100	125	180	45	45
		120	90				110		270		
		230	200				45		600		
	8.8	100	60		11,2	13,1	100	200	180		
		120	90				200		270		
		230	200				45		600		
	A4-70	100	60		11,2	9,2	100	135	180		
		120	90				140		270		
		230	200				45		600		
	C-70	100	60		11,2	11,4	100	170	180		
		120	90				190		270		
		230	200				45		600		
FIS A M 12	5.8	100	70	40	14,1	12,0	145	175	210	55	45
		140	110				165		330		
		270	240				45		720		
	8.8	100	70		14,1	19,4	145	295	210		
		140	110				250		330		
		270	240				45		720		
	A4-70	100	70		14,1	13,7	145	200	210		
		140	110				190		330		
		270	240				45		720		
	C-70	100	70		14,1	17,1	145	260	210		
		140	110				250		330		
		270	240				45		720		
	C-70	100	70		27,7	17,1	145	260	210		
		140	110				250		330		
		270	240				45		720		

## LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A<sup>2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 3) 4)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FIS A M 16	5.8	120	80	60	17,2	22,3	160	305	240	65	50
		170	125		33,6		285	235	375		
		360	320		37,6		50	150	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		33,6		285	405	375		
		360	320		60,0		120	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		33,6		285	270	375		
		360	320		42,0		50	165	960		
	C-70	120	80		17,2	31,4	160	445	240		
		170	125		33,6		285	350	375		
		360	320		52,4		50	195	960		
FIS A M 20	5.8	140	90	120	20,5	34,9	170	435	270	85	55
		220	170		53,3		385	300	510		
		450	400		58,6		55	195	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		53,3		385	510	510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,4	170	500	270		
		220	170		53,3		385	350	510		
		450	400		65,7		55	215	1200		
	C-70	140	90		20,5	41,1	170	525	270		
		220	170		53,3		385	455	510		
		450	400		81,9		135	260	1200		
FIS A M 24	5.8	160	96	150	22,6	45,2	170	540	290	105	60
		270	210		73,2		475	390	630		
		540	480		84,3		60	250	1440		
	8.8	160	96		22,6	45,2	170	540	290		
		270	210		73,2		475	675	630		
		540	480		134,3		360	365	1440		
	A4-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2		475	445	630		
		540	480		94,3		60	270	1440		
	C-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2		475	580	630		
		540	480		117,6		235	325	1440		
FIS A M 27	5.8	170	108	200	27,0	54,0	195	605	325	120	75
		310	250		95,1		565	460	750		
		600	540		109,5		75	295	1620		
	8.8	170	108		27,0	54,0	195	605	325		
		310	250		95,1		565	805	750		
		600	540		175,2		505	450	1620		
	A4-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1		565	530	750		
		600	540		123,0		140	320	1620		
	C-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1		565	690	750		
		600	540		153,3		355	385	1620		

## LOADS

### Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A<sup>2)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 3) 4)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FIS A M 30	5.8	190	120	300	31,6	63,2	210	660	360	140	80
		350	280		112,7	80,6	635	525	840		
		670	600		133,8		80	330	1800		
	8.8	190	120		31,6	63,2	210	660	360		
		350	280		112,7	128,6	635	920	840		
		670	600		213,8		610	515	1800		
	A4-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	90,2	635	605	840		
		670	600		150,1		195	365	1800		
	C-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	112,6	635	785	840		
		670	600		187,1		445	435	1800		

For the design the complete assessment ETA-17/0979 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-17/0979 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-17/0979.

<sup>2)</sup> Also valid for threaded rod RG M in the same property class.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-17/0979.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-17/0979, issue date 06/04/2018. Design of the loads according to FprEN 1992-4:2017 and TR 055 (for static resp. quasi-static loads).

## LOADS

### Injection system FIS EM Plus: Injection resin FIS EM Plus with Internal threaded anchor RG M I

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) <sup>1) 2) 3) 7)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	100	85	270	55	55
	8.8				11,3	8,3	135	145			
	A4-70				9,9	5,9	115	95			
RG M10 I	5.8	130	90	20	12,9	8,3	135	135	270	65	65
	8.8					13,3		235			
	A4-70					9,3		155			
RG M12 I	5.8	170	125	40	20,2	12,1	190	165	375	75	75
	8.8					19,3		285			
	A4-70					13,5		185			
RG M16 I	5.8	210	160	80	34,7	22,4	240	275	480	95	95
	8.8					30,9		405			
	A4-70					25,1		315			
RG M20 I	5.8	270	200	120	48,5	35,4	300	380	600	125	125
	8.8					42,9		480			
	A4-70					39,4		430			

## LOADS

### Injection system FIS EM Plus: Injection resin FIS EM Plus with Internal threaded anchor RG M I

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) <sup>1) 2) 3) 7)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]

For the design the complete assessment ETA-17/0979 has to be considered. <sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-17/0979 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-17/0979.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-17/0979.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-17/0979, issue date 06/04/2018. Design of the loads according to FprEN 1992-4:2017 and TR 055 (for static resp. quasi-static loads).

<sup>7)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

### Injection system FIS EM Plus: Injection resin FIS EM Plus with Internal threaded anchor RG M I

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	55	65	270	55	55
	8.8				13,8	8,3	110	95			
	A4-70				9,9	5,9	55	70			
RG M10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				20,5	13,3	190	155			
	A4-70				15,7	9,3	130	100			
RG M12 I	5.8	170	125	40	20,5	12,1	130	110	375	75	75
	8.8				32,4	19,3	265	190			
	A4-70				22,5	13,5	155	125			
RG M16 I	5.8	210	160	80	37,6	22,4	255	180	480	95	95
	8.8				48,7	30,9	365	265			
	A4-70				42,0	25,1	300	205			
RG M20 I	5.8	270	200	120	58,6	35,4	365	245	600	125	125
	8.8				68,0	42,9	445	315			
	A4-70				65,7	39,4	430	285			

For the design the complete assessment ETA-17/0979 has to be considered. <sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-17/0979 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-17/0979.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-17/0979.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-17/0979, issue date 06/04/2018. Design of the loads according to FprEN 1992-4:2017 and TR 055 (for static resp. quasi-static loads).



## The basic epoxy mortar for applications in concrete



Crash barriers and sound insulation walls



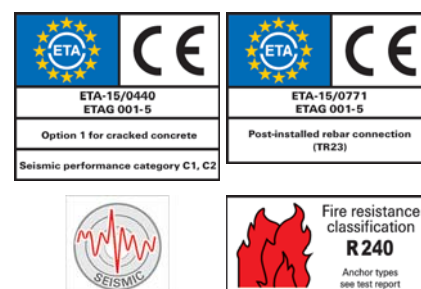
Rebar connections

### BUILDING MATERIALS

#### Approved for anchorings in:

- Concrete C20/25, cracked and non-cracked

### CERTIFICATES



### ADVANTAGES

- FIS EB is approved for use in cracked concrete and for rebar applications and achieves a good performance in these applications which enables an economical use of injection mortar.
- Variable anchorage depths from 4xd to 20xd allow for ideal adaptation to the load to be applied.
- FIS EB can be used in various conditions (dry/wet concrete, flooded hole), thus working in almost all situations on the building site and making it a safe and reliable system.

### APPLICATIONS

- Heavy steel constructions
- Consoles
- Silo installations
- Tall shelving
- Post-installed rebar connections

### FUNCTIONING

- The epoxy mortar FIS EB combined with the threaded rod FIS A is suitable for pre-positioned and push-through installation.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the injection capsule in the static mixer.
- The mortar is injected bubble-free from the drill hole base.
- The mortar bonds the entire surface of the threaded rod with the drill hole wall and seals off the drill hole.
- The threaded rod is set manually by slightly rotating it until it reached the drill hole base.
- During push-through installation, the annular gap between the threaded rod and the attachment is filled with FIS EB.

### SEE ALSO



#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

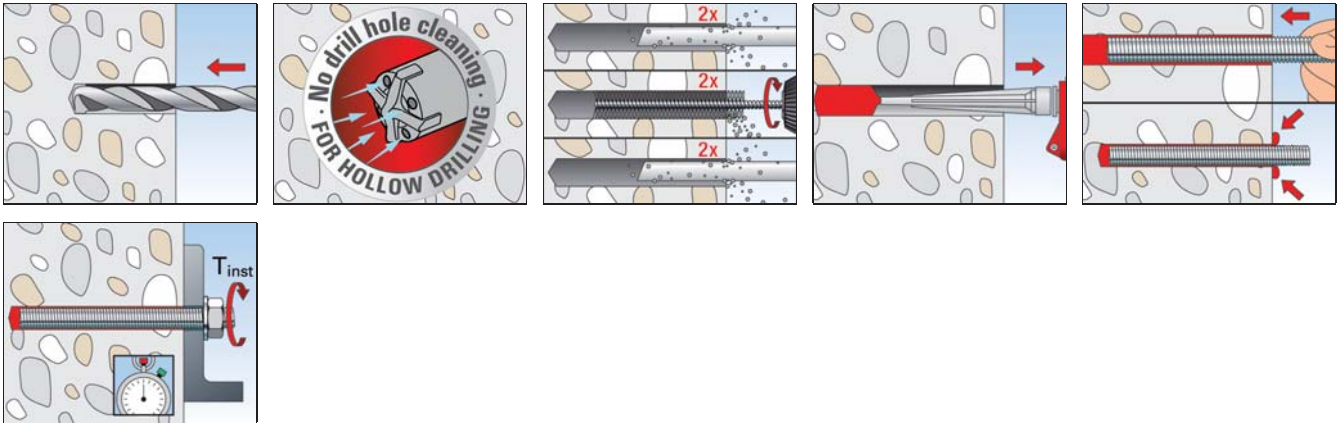
Page 195



#### ACCESSORIES

Page 198

## INSTALLATION IN CONCRETE WITH FIS EB AND FIS A / RG M



## TECHNICAL DATA



Epoxy mortar **FIS EB**



Static mixer **FIS MR Plus**

Item	Art.-No.	Approval ETA	Languages on the cartridge	Scale unit	Contents	Sales unit
<b>FIS EB 390 S</b>	<b>534984</b>	■	EN, ES, PT	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS EB 390 S</b>	<b>534985</b>	■	TR, RU, KO	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS EB 390 S in bucket</b>	<b>543652</b>	■	EN, ES, PT	180	20 cartridges 390 ml, 20 x FIS MR Plus	1
<b>FIS EB 390 S in bucket</b>	<b>538547</b>	■	TR, RU, KO	180	20 cartridges 390 ml, 20 x FIS MR Plus	1
<b>FIS EB 585 S</b>	<b>534986</b>	■	EN, ES, PT, NL	270	1 cartridge 585 ml + 2 x FIS UMR	6
<b>FIS MR Plus</b>	<b>545853</b>	—	—	—	10 static mixer FIS MR Plus	10

## LOADS

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A <sup>1)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 9)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{5)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{7)}$ [mm]	$c_{min}^{7)}$ [mm]
<b>FIS A M8</b>	5.8	100	60	10	3,6	5,1	90	105	180	40	40
		110	80		4,8		100	100	240		
		190	160		9,0		90	90	480		
	8.8	100	60		3,6	7,2	90	155	180		
		110	80		4,8		100	170	240		
		190	160		9,6		100	115	480		
	A4-70	100	60		3,6	6,0	90	125	180		
		110	80		4,8		100	115	240		
		190	160		9,6		100	90	480		
<b>FIS A M10</b>	5.8	100	60	20	4,5	8,6	90	185	180	45	45
		120	90		6,7		115	160	270		
		230	200		13,8		105	125	600		
	8.8	100	60		4,5	9,0	90	190	180		
		120	90		6,7		115	250	270		
		230	200		15,0		150	150	600		
	A4-70	100	60		4,5	9,0	90	190	180		
		120	90		6,7		115	165	270		
		230	200		15,0		115	115	600		

## LOADS

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A <sup>1)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 9)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{\min}$ [mm]	$h_{ef}^{5)}$ [mm]	$T_{\max}$ [Nm]	$N_{\text{perm}}^{6)}$ [kN]	$V_{\text{perm}}^{6)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{\min}^{7)}$ [mm]	$c_{\min}^{7)}$ [mm]
FIS A M12	5.8	100	70	40	6,3	12,0	105	255	210	55	55
		140	110		9,9		140	200	330		
		270	240		20,5		130	150	720		
	8.8	100	70		6,3	12,6	105	270	210		
		140	110		9,9		140	340	330		
		270	240		21,5			200	720		
	A4-70	100	70		6,3	12,6	105	270	210		
		140	110		9,9		140	230	330		
		270	240		21,5			150	720		
FIS A M14	5.8	110	75	50	7,9	15,7	115	325	225	60	60
		160	120		12,6		155	265	360		
		320	280		27,6		145	185	840		
	8.8	110	75		7,9	15,7	115	325	225		
		160	120		12,6		155	420	360		
		320	280		29,3			250	840		
	A4-70	110	75		7,9	15,7	115	325	225		
		160	120		12,6		155	295	360		
		320	280		29,3			175	840		
FIS A M16	5.8	120	80	60	7,7	15,3	120	295	240	65	65
		170	125		12,0		175	350	375		
		360	320		30,6			225	960		
	8.8	120	80		7,7	15,3	120	295	240		
		170	125		12,0		175	380	375		
		360	320		30,6			320	960		
	A4-70	120	80		7,7	15,3	120	295	240		
		170	125		12,0		175	380	375		
		360	320		30,6			215	960		
FIS A M20	5.8	140	90	120	10,8	21,5	135	375	270	85	85
		220	170		20,3		210	460	510		
		450	400		47,9			300	1200		
	8.8	140	90		10,8	21,5	135	375	270		
		220	170		20,3		210	540	510		
		450	400		47,9			435	1200		
	A4-70	140	90		10,8	21,5	135	375	270		
		220	170		20,3		210	520	510		
		450	400		47,9			285	1200		
FIS A M24	5.8	160	96	150	13,4	32,2	145	545	290	105	105
		270	210		31,4		250	600	630		
		540	480		71,8			395	1440		
	8.8	160	96		13,4	32,2	145	545	290		
		270	210		31,4		250	930	630		
		540	480		71,8			570	1440		
	A4-70	160	96		13,4	32,2	145	545	290		
		270	210		31,4		250	670	630		
		540	480		71,8			360	1440		

## LOADS

### Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A <sup>1)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 9)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ <sup>5)</sup> [mm]	$T_{max}$ [Nm]	$N_{perm}$ <sup>6)</sup> [kN]	$V_{perm}$ <sup>6)</sup> [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}$ <sup>7)</sup> [mm]	$c_{min}$ <sup>7)</sup> [mm]
FIS A M27	5.8	170	108	200	16,0	38,5	165	610	325	120	120
		310	250		42,1	65,7	270	715	750		
		600	540		90,9			485	1620		
	8.8	170	108		16,0	38,5	165	610	325		
		310	250		42,1	101,0	270	1150	750		
		600	540		90,9	105,1		700	1620		
	A4-70	170	108		16,0	38,5	165	610	325		
		310	250		42,1	73,7	270	795	750		
		600	540		90,9			445	1620		
FIS A M30	5.8	190	120	300	18,8	45,1	180	665	360	140	140
		350	280		52,4	80,6	300	820	840		
		670	600		112,2		305	555	1800		
	8.8	190	120		18,8	45,1	180	665	360		
		350	280		52,4	125,7	300	1340	840		
		670	600		112,2	128,6	305	805	1800		
	A4-70	190	120		18,8	45,1	180	665	360		
		350	280		52,4	90,2	300	910	840		
		670	600		112,2		305	510	1800		

For the design the complete assessment ETA-15/0440 has to be considered. <sup>8)</sup>

<sup>1)</sup> Also valid for threaded rod RG M in the same property class.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-15/0440 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  bare considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-15/0440.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-15/0440.

<sup>5)</sup> For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

<sup>6)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>7)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>8)</sup> The given loads refer to the European Technical Assessment ETA-15/0440, issue date 06/07/2015. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

<sup>9)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A <sup>1)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{5)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{7)}$ [mm]	$c_{min}^{7)}$ [mm]
FIS A M8	5.8	100	60	10	7,9	5,1	90	70	180	40	40
		110	80		9,0		80		240		
		190	160				40		480		
	8.8	100	60		7,9	8,6	90	130	180		
		110	80		10,5		100	115	240		
		190	160		13,8		50	90	480		
	A4-70	100	60		7,9	6,0	90	85	180		
		110	80					75	240		
		190	160		9,9		40	70	480		
FIS A M10	5.8	100	60	20	9,0	8,6	90	125	180	45	45
		120	90		13,5		115	105	270		
		230	200		13,8		45	95	600		
	8.8	100	60		9,0	13,1	90	200	180		
		120	90		13,5		115	170	270		
		230	200		22,4		80	115	600		
	A4-70	100	60		9,0	9,2	90	135	180		
		120	90		13,5		115	110	270		
		230	200		15,7		45	90	600		
FIS A M12	5.8	100	70	40	12,6	12,0	125	175	210	55	55
		140	110		19,7		155	135	330		
		270	240		20,5		55	120	720		
	8.8	100	70		12,6	19,4	125	295	210		
		140	110		19,7		155	230	330		
		270	240		32,4		95	150	720		
	A4-70	100	70		12,6	13,7	125	200	210		
		140	110		19,7		155	155	330		
		270	240		22,5		55	115	720		
FIS A M14	5.8	110	75	50	14,1	16,6	135	235	225	60	60
		160	120		22,6		170	180	360		
		320	280		27,6		60	145	840		
	8.8	110	75		14,1	26,3	135	390	225		
		160	120		22,6		170	300	360		
		320	280		43,8		120	180	840		
	A4-70	110	75		14,1	18,3	135	260	225		
		160	120		22,6		170	195	360		
		320	280		30,9		65	135	840		
FIS A M16	5.8	120	80	60	17,2	22,3	160	305	240	65	65
		170	125		26,9		210	235	375		
		360	320		37,6		65	175	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		26,9		210	405	375		
		360	320		60,0		150	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		26,9		210	270	375		
		360	320		42,0		80	165	960		

## LOADS

### Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A <sup>1)</sup>

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ <sup>5)</sup> [mm]	$T_{max}$ [Nm]	$N_{perm}$ <sup>6)</sup> [kN]	$V_{perm}$ <sup>6)</sup> [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}$ <sup>7)</sup> [mm]	$c_{min}$ <sup>7)</sup> [mm]
FIS A M20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		40,7		265	305	510		
		450	400		58,6		95	230	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		40,7		265		510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,4	170	500	270		
		220	170		40,7		265	350	510		
		450	400		65,7		120	215	1200		
FIS A M24	5.8	160	96	150	18,8	45,2	170	540	290	105	105
		270	210		50,3		370	400	630		
		540	480		84,3		160	295	1440		
	8.8	160	96		18,8	45,2	170	540	290		
		270	210		50,3		370	675	630		
		540	480		114,9		385	365	1440		
	A4-70	160	96		18,8	45,2	170	540	290		
		270	210		50,3		370	445	630		
		540	480		94,3		205	270	1440		
FIS A M27	5.8	170	108	200	22,5	54,0	195	605	325	120	120
		310	250		63,1		415	475	750		
		600	540		109,5		200	345	1620		
	8.8	170	108		22,5	54,0	195	605	325		
		310	250		63,1		415	805	750		
		600	540		136,3		425	450	1620		
	A4-70	170	108		22,5	54,0	195	605	325		
		310	250		63,1		415	530	750		
		600	540		123,0		315	320	1620		
FIS A M30	5.8	190	120	300	26,3	63,2	210	660	360	140	140
		350	280		78,5		500	545	840		
		670	600		133,8		270	395	1800		
	8.8	190	120		26,3	63,2	210	660	360		
		350	280		78,5		500	920	840		
		670	600		168,3		540	515	1800		
	A4-70	190	120		26,3	63,2	210	660	360		
		350	280		78,5		500	605	840		
		670	600		150,1		400	365	1800		

For the design the complete assessment ETA-15/0440 has to be considered. <sup>8)</sup>

<sup>1)</sup> Also valid for threaded rod RG M in the same property class.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-15/0440 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  bare considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-15/0440.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-15/0440.

<sup>5)</sup> For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

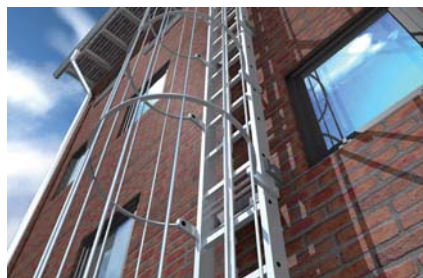
<sup>6)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>7)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>8)</sup> The given loads refer to the European Technical Assessment ETA-15/0440, issue date 06/07/2015. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).



## The versatile injection mortar for anchorings in masonry and cracked concrete



Rescue ladders



Column bases

### BUILDING MATERIALS

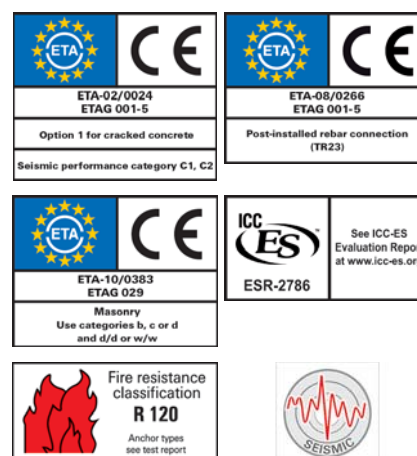
#### Approved for anchorings in:

- Concrete C20/25 to C50/60, cracked and non-cracked
- Hollow blocks made from lightweight concrete
- Hollow blocks made from concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid brick

#### Approved for:

- Rebar connections
- Remedial wall tie VBS 8
- Weather facing reconstruction system FWS II
- Stand-off installation Thermax

### CERTIFICATES



### ADVANTAGES

- The FIS V injection mortar has numerous system approvals, such as in cracked and non-cracked concrete, masonry and for special applications. FIS V is thus the universal injection mortar family with guaranteed reliability for practically all areas of application.
- FIS VW HIGH SPEED has a significantly shorter curing time than FIS V, thus also ensuring swift work progress even at low temperatures.
- FIS VS LOW SPEED with extended gelling time prevents premature curing of the mortar at higher temperatures and is ideally suited to large drill hole depths.
- The extensive range of accessories is ideally suited to the FIS V injection mortar family, increases the great flexibility of the system and thus allows for a broad range of applications.

### APPLICATIONS

#### Injection mortar for use with:

- Threaded rods FIS A, see page 146
- Internal threaded anchor RG MI, see page 159
- Rebar anchor FRA, see page 179
- Concrete steel bars, see page 185
- Injection anchor sleeves FIS H, see page 167
- Aerated concrete centring sleeve PBZ, see page PL
- Remedial wall tie VBS 8, see page 187
- Weather facing reconstruction system FWS II, see page 189
- Anchorings in waterfilled drill holes (only FIS V 4 10 C)

### FUNCTIONING

- The FIS V is a 2-component injection mortar based on vinyl ester hybrid.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- The injection cartridges are quick and easy to use with the fischer dispensers.
- Partially used cartridges can be reused, simply by changing the static mixer.

### SEE ALSO



#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

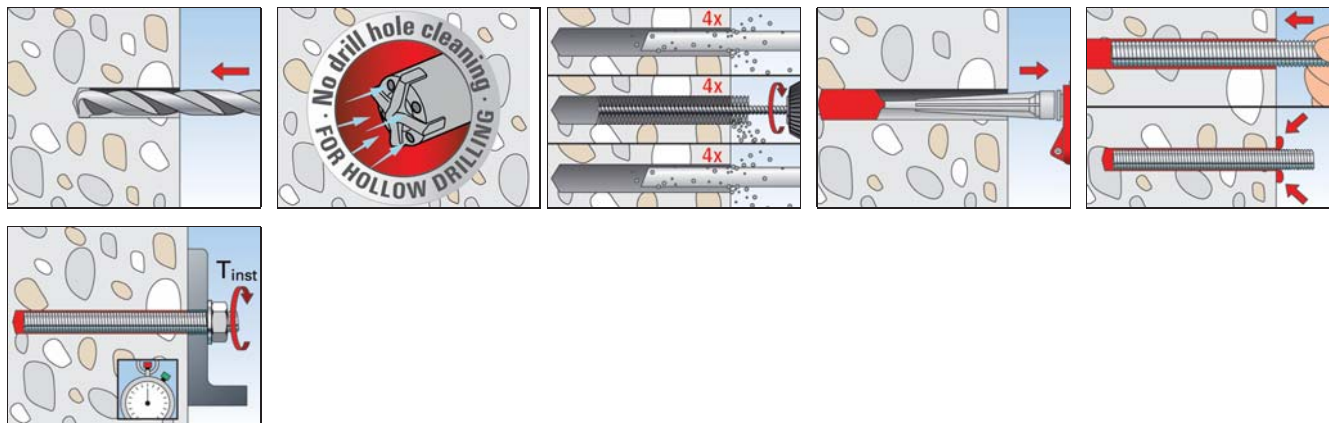
Page 195



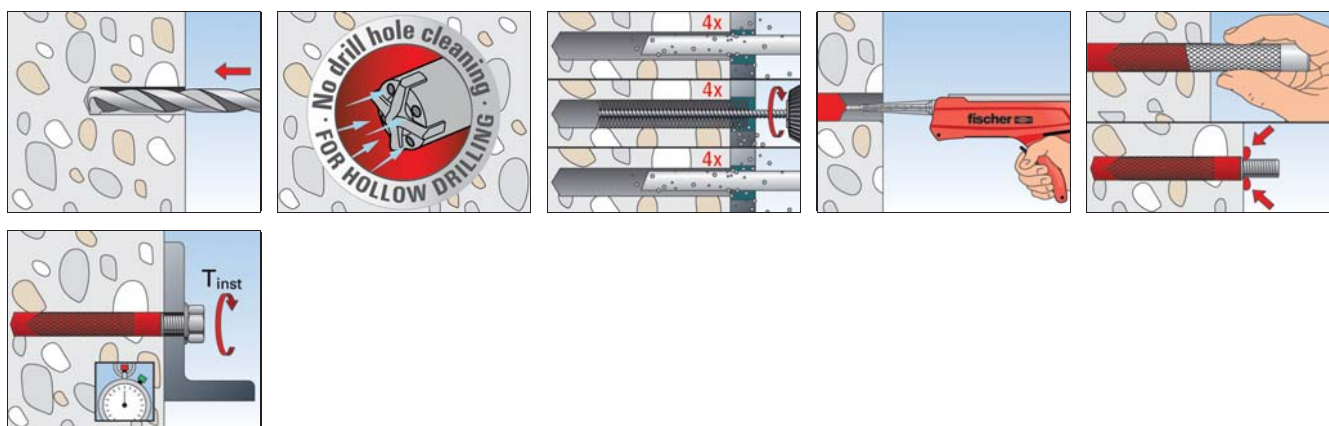
#### ACCESSORIES

Page 198

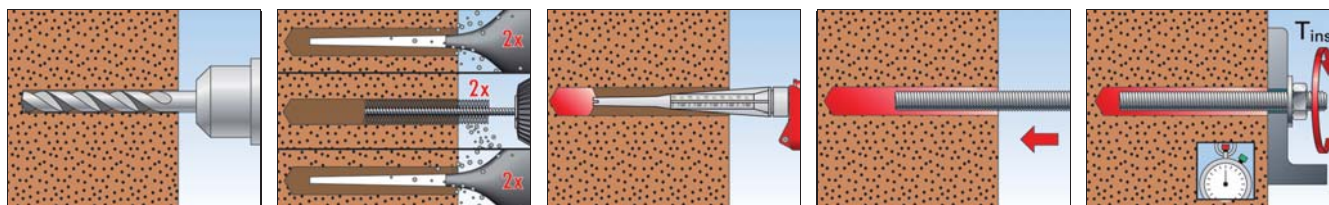
## INSTALLATION IN CONCRETE WITH FIS V AND FIS A / RG M



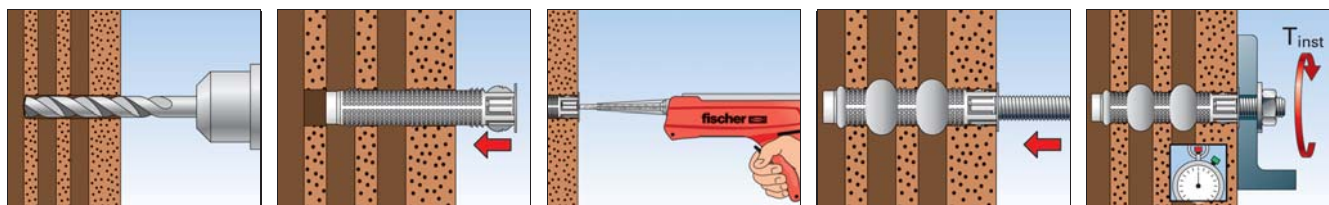
## INSTALLATION IN CONCRETE WITH FIS V AND RG M I



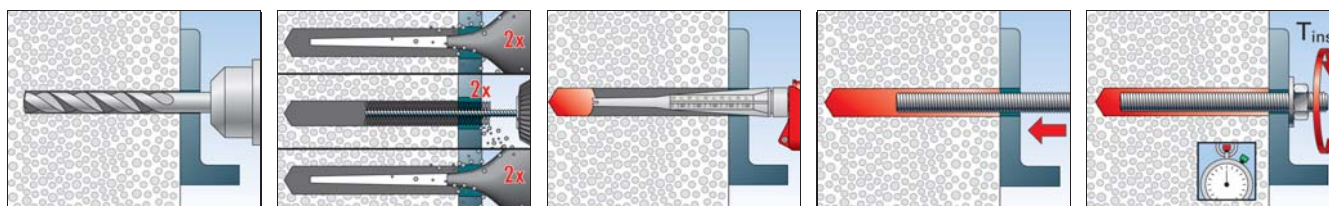
## INSTALLATION IN SOLID BRICK WITH FIS V AND FIS A



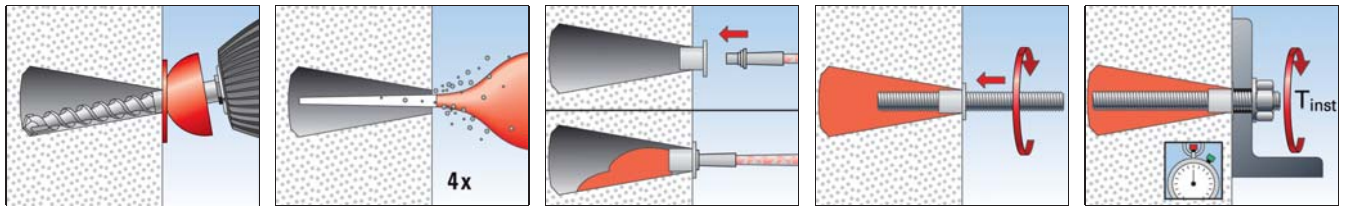
## INSTALLATION IN HOLLOW BLOCKS WITH FIS V AND FIS HK + FIS A



## INSTALLATION IN AERATED CONCRETE WITH FIS V AND FIS A / RG M



## INSTALLATION IN UNDERCUT DRILL HOLE IN AERATED CONCRETE WITH FIS V AND FIS A / RG M



### TECHNICAL DATA



Injection mortar **FIS V 300 T**



Injection mortar **FIS V 360 S**



Injection mortar **FIS V 410 C**



Static mixer **FIS MR Plus**

Item	Art.-No.	Approval			Languages on the cartridge	Scale unit	Contents	Sales unit
		DIBt	ETA	ICC				
<b>FIS V 300 T</b>	<b>531573</b>	●	■	▲	USA, RA, BR, MEX	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
<b>FIS V 360 S</b>	<b>094404</b>	●	■	▲	DE, FR, NL, TR, HU, AR	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS V 360 S</b>	<b>094405</b>	●	■	▲	EN, IT, PT, ES, ZH, JA	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS V 360 S</b>	<b>068435</b>	●	■	▲	DA, SV, NO, FI, PL, EL	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS V 360 S</b>	<b>502283</b>	●	■	▲	LT, LV, ET, UK, RU, KK	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS V 360 S</b>	<b>043994</b>	●	■	▲	CS, SK, PL, HU, RO, RU	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS V 410 C</b>	<b>521431</b>	●	■	▲	IT, EN, DE	200	1 cartridge 410 ml, 2 x FIS MR Plus	16
<b>FIS V 410 C</b>	<b>534880</b>	●	■	▲	PL, LT, LV, ET, RU	200	1 cartridge 410 ml, 2 x FIS MR Plus	12
<b>FIS V 410 C</b>	<b>538131</b>	●	■	▲	USA, RA, BR, MEX	200	1 cartridge 410 ml, 2 x FIS MR Plus	12
<b>FIS MR Plus</b>	<b>545853</b>	—	—	—	—	—	10 static mixer FIS MR Plus	10

### TECHNICAL DATA



Injection mortar **FIS VW 300 T**



Injection mortar **FIS VW 360 S**



Injection mortar **FIS VW 380 C**



Static mixer **FIS MR Plus**

Item	Art.-No.	Approval		Languages on the cartridge	Scale unit	Contents	Sales unit
		DIBt	ETA				
<b>FIS VW 300 T</b>	<b>507793</b>	●	■	DE, EN, HR, SL, SR, BG	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
<b>FIS VW 300 T</b>	<b>507795</b>	●	■	SV, DA, NO, CS, SK, PL, RU	150	1 cartridge 360 ml, 2 x FIS MR Plus	12
<b>FIS VW 360 S</b>	<b>090753</b>	●	■	DE, EN, FR, IT, NL, ES	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS VW 360 S</b>	<b>043997</b>	●	■	CS, SK, PL, HU, RO, RU	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS VW 360 S</b>	<b>502284</b>	●	■	RU, LT, LV, ET, UK, KK	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS VW 380 C</b>	<b>519328</b>	●	■	CS, SK, PL	190	1 cartridge 380 ml, 2 x FIS MR Plus	12
<b>FIS MR Plus</b>	<b>545853</b>	—	—	—	—	10 static mixer FIS MR Plus	10



## TECHNICAL DATA



Injection mortar  
**FIS VS 100 P**



Injection mortar  
**FIS VS 150 C**



Injection mortar  
**FIS VS 300 T**



Injection mortar  
**FIS VS 360 S**



Static mixer **FIS MR Plus**

		Approval			Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC				[pcs]
<b>FIS VS 100 P</b>	<b>072525</b>	●	■	▲	DE, EN, FR, IT, NL, ES	50	1 cartridge 100 ml, 2 x FIS MR Plus	6
<b>FIS VS 150 C</b>	<b>045302</b>	●	■	▲	DE, EN, FR, IT, NL, ES	70	1 cartridge 145 ml, 1 x FIS MR Plus	6
<b>FIS VS 150 C Set</b>	<b>045303</b>	●	■	▲	DE, EN, FR, IT, NL, ES	70	Set for hollow bricks: 1 cartridge 145 ml, 2 x FIS MR Plus, 6 x FIS H 16 x 85 K	6
<b>FIS VS 300 T</b>	<b>093180</b>	●	■	▲	DE, EN, FR, NL, ES, PT	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
<b>FIS VS 300 T</b>	<b>502285</b>	●	■	▲	RU, LT, LV, ET, UK, KK	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
<b>FIS VS 300 T</b>	<b>044102</b>	●	■	▲	CS, SK, PL, HU, RO, RU, EL	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
<b>FIS VS 300 T</b>	<b>093226</b>	●	■	▲	PL, CS, DA, NO, SV, FI	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
<b>FIS VS 360 S</b>	<b>078664</b>	●	■	▲	EN, ZH, ES, PT, JA	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS MR Plus</b>	<b>545853</b>	—	—	—	—	—	10 static mixer FIS MR Plus	10



**FIS V 360 S HWK small**



**FIS V 360 S HWK big**



**FIS V 360 S HWK big** with  
dispenser **FIS DM S**

		Approval			Languages on the cartridge	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC			[pcs]
<b>FIS V 360 S HWK small</b>	<b>092430</b>	●	■	▲	DE, FR, NL, TR, HU, AR	10 cartridges 360 ml, 20 x FIS MR Plus	1
<b>FIS V 360 S HWK big</b>	<b>091936</b>	●	■	▲	DE, FR, NL, TR, HU, AR	20 cartridges 360 ml, 40 x FIS MR Plus	1
<b>FIS V 360 S HWK big</b>	<b>096554</b>	●	■	▲	EN, IT, PT, ES, ZH, JA	20 cartridges 360 ml, 40 x FIS MR Plus	1
<b>FIS V 360 S HWK big</b>	<b>503027</b>	●	■	▲	CS, SK, PL, HU, RO, RU	12 cartridges 360 ml, 24 x FIS MR Plus, 1 x dispenser FIS DM S	1



FIS VS 300 T in bucket



FIS V 360 S in bucket



FIS V 410 in bucket

		Approval			Languages on the cartridge	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC			[pcs]
<b>FIS VS 300 T in bucket</b>	<b>512062</b>	●	■	▲	DE, EN, FR, NL, ES, PT	20 cartridges 300 ml, 20 x FIS MR Plus	1
<b>FIS V 360 S in bucket</b>	<b>503025</b>	●	■	▲	EN, IT, PT, ES, ZH, JA	10 cartridges 360 ml, 20 x FIS MR Plus	1
<b>FIS V 410 in bucket</b>	<b>531504</b>	●	■	▲	EN, TR, RU	16 cartridge 410 ml, 32 x FIS MR Plus	1



FIS VS 300 T in bucket



FIS VS 300 T HWK big



FIS VS 300 T HWK small

		Approval			Languages on the cartridge	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC			[pcs]
<b>FIS VS 300 T in bucket</b>	<b>518539</b>	●	■	▲	CS, SK, PL, HU, RO, EL	20 cartridges 300 ml, 20 x FIS MR Plus	1
<b>FIS VS 300 T HWK big</b>	<b>517645</b>	●	■	▲	DE, EN, FR, NL, ES, PT	20 cartridges 300 ml, 40 x FIS MR Plus	1
<b>FIS VS 300 T HWK small</b>	<b>518832</b>	●	■	▲	DE, EN, FR, NL, ES, PT	10 cartridges 300 ml, 20 x FIS MR Plus	1

## CURING TIME FIS V

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5°C - ± 0°C	24 hrs.
+ 0°C - + 5°C	13 min.	± 0°C - + 5°C	3 hrs.
+ 5°C - +10°C	9 min.	+ 5°C - +10°C	90 min.
+10°C - +20°C	5 min.	+10°C - +20°C	60 min.
+20°C - +30°C	4 min.	+20°C - +30°C	45 min.
+30°C - +40°C	2 min.	+30°C - +40°C	35 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

## CURING TIME FIS VW HIGH SPEED

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		-15°C - -10°C <sup>1)</sup>	12 hrs.
		-10°C - -5°C <sup>1)</sup>	8 hrs.
-5°C - ± 0°C <sup>1)</sup>	5 min.	-5°C - ± 0°C	3 hrs.
0°C - +5°C	5 min.	± 0°C - +5°C	90 min.
+5°C - +10°C	3 min.	+5°C - +10°C	45 min.
+10°C - +20°C	1 min.	+10°C - +20°C	30 min.

<sup>1)</sup> Without approval.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

## CURING TIME FIS VS LOW SPEED

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		± 0°C - +5°C	6 hrs.
+5°C - +10°C	20 min.	+5°C - +10°C	3 hrs.
+10°C - +20°C	10 min.	+10°C - +20°C	2 hrs.
+20°C - +30°C	6 min.	+20°C - +30°C	60 min.
+30°C - +40°C	4 min.	+30°C - +40°C	30 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

## LOADS

### Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5) 11)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
FIS A M 10	5.8	100	60	20	5,4	8,6	90	185	180	45	45
		120	90		8,1		125	155	270		
		230	200		13,8		85	110	600		
	8.8	100	60		5,4	10,8	90	235	180		
		120	90		8,1		125	255	270		
		230	200		18,0		150	150	600		
	A4-70	100	60		5,4	9,3	90	200	180		
		120	90		8,1		125	170	270		
		230	200		15,5		100	115	600		
	C-70	100	60		5,4	10,8	90	235	180		
		120	90		8,1		125	220	270		
		230	200		18,0		140	140	600		
FIS A M 12	5.8	100	70	40	7,5	12,0	105	255	210	55	55
		140	110		11,8		145	195	330		
		270	240		20,5		110	135	720		
	8.8	100	70		7,5	15,1	105	330	210		
		140	110		11,8		145	340	330		
		270	240		25,9		200	200	720		
	A4-70	100	70		7,5	13,5	105	290	210		
		140	110		11,8		145	225	330		
		270	240		22,5		125	145	720		
	C-70	100	70		7,5	15,1	105	330	210		
		140	110		11,8		145	290	330		
		270	240		25,9		175	175	720		



## LOADS

### Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5) 11)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
FIS A M 16	5.8	120	80	60	11,5	22,3	120	445	240	65	65
		170	125		18,0		185	350	375		
		360	320		37,6		145	195	960		
	8.8	120	80		11,5	23,0	120	460	240		
		170	125		18,0		185	600	375		
		360	320		46,0		320	320	960		
	A4-70	120	80		11,5	23,0	120	460	240		
		170	125		18,0		185	400	375		
		360	320		42,0		165	215	960		
	C-70	120	80		11,5	23,0	120	460	240		
		170	125		18,0		185	515	375		
		360	320		46,0		270	270	960		
FIS A M 20	5.8	140	90	120	14,6	29,3	135	530	270	85	85
		220	170		28,0		225	455	510		
		450	400		58,6		195	260	1200		
	8.8	140	90		14,6	29,3	135	530	270		
		220	170		28,0		225	780	510		
		450	400		65,8		435	435	1200		
	A4-70	140	90		14,6	29,3	135	530	270		
		220	170		28,0		225	520	510		
		450	400		65,5		285	285	1200		
	C-70	140	90		14,6	29,3	135	530	270		
		220	170		28,0		225	670	510		
		450	400		65,8		370	370	1200		
FIS A M 24	5.8	160	96	150	15,5	31,0	145	520	290	105	105
		270	210		33,9		265	590	630		
		540	480		77,6		330	330	1440		
	8.8	160	96		15,5	31,0	145	520	290		
		270	210		33,9		265	825	630		
		540	480		77,6		570	570	1440		
	A4-70	160	96		15,5	31,0	145	520	290		
		270	210		33,9		265	670	630		
		540	480		77,6		360	360	1440		
	C-70	160	96		15,5	31,0	145	520	290		
		270	210		33,9		265	825	630		
		540	480		77,6		480	480	1440		
FIS A M 27	5.8	170	108	200	17,4	34,9	165	545	325	125	125
		310	250		40,4		290	695	750		
		600	540		87,2		390	390	1620		
	8.8	170	108		17,4	34,9	165	545	325		
		310	250		40,4		290	885	750		
		600	540		87,2		700	700	1620		
	A4-70	170	108		17,4	34,9	165	545	325		
		310	250		40,4		290	795	750		
		600	540		87,2		440	440	1620		
	C-70	170	108		17,4	34,9	165	545	325		
		310	250		40,4		290	885	750		
		600	540		87,2		590	590	1620		

## LOADS

### Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5) 11)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
FIS A M 30	5.8	190	120	300	21,5	43,1	180	630	360	140	140
		350	280		50,3	80,6	320	795	840		
		670	600		107,7			440	1800		
	8.8	190	120		21,5	43,1	180	630	360		
		350	280		50,3	100,5	320	1035	840		
		670	600		107,7	128,2		805	1800		
	A4-70	190	120		21,5	43,1	180	630	360		
		350	280		50,3	89,9	320	905	840		
		670	600		107,7			505	1800		
	C-70	190	120		21,5	43,1	180	630	360		
		350	280		50,3	100,5	320	1035	840		
		670	600		107,7	112,2		675	1800		

For the design the complete assessment ETA-02/0024 has to be considered. <sup>10)</sup>

<sup>1)</sup> Also valid for threaded rod RG M in the same property class.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-02/0024 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-02/0024.

<sup>3)</sup> The given loads are valid for injection mortar FIS V for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-02/0024.

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>5)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-02/0024.

<sup>6)</sup> For the sizes M10 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

<sup>7)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-02/0024.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-02/0024.

<sup>10)</sup> The given loads refer to the European Technical Assessment ETA-02/0024, issue date 13/02/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

<sup>11)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

### Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load		
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance	
							Max. tension load c	Max. shear load c				Max. Load s <sub>cr</sub>
		h <sub>min</sub> [mm]	h <sub>ef</sub> <sup>6)</sup> [mm]	T <sub>max</sub> [Nm]	N <sub>perm</sub> <sup>7)</sup> [kN]	V <sub>perm</sub> <sup>7)</sup> [kN]						
FIS A M 6	5.8	100	50	5	4,0	2,9	65	50	150	40	40	
			60		4,8				180			
			72						220			
	8.8	100	50		4,0	4,6	65	70	150			
			60		4,8			180				
			72		5,8			220				
	A4-70	100	50		4,0	3,2		55	150			
			60		4,8			180				
			72		5,4			220				
	FIS A M 8	5.8	100	60	10	7,9	5,1	90	70	180	40	40
			110	80				80	240			
			190	160		9,0		40	60	480		
8.8		100	60	7,9		8,4	90	125	180			
		110	80	10,5			100	115	240			
		190	160	13,9			55	90	480			
A4-70		100	60	7,9		5,9	90	85	180			
		110	80	9,8			75	240				
		190	160	40			70	480				
C-70		100	60	7,9		7,3	90	105	180			
		110	80	10,5			100	95	240			
		190	160	12,2			40	80	480			
FIS A M 10	5.8	100	60	20	9,9	8,6	90	125	180	45	45	
		120	90				115	105	270			
		230	200		13,8		45	85	600			
	8.8	100	60		9,9	13,3	90	200	180			
		120	90		14,8		125	170	270			
		230	200		22,1		70	115	600			
	A4-70	100	60		9,9	9,3	90	135	180			
		120	90		14,8		125	115	270			
		230	200		15,5		45	90	600			
	C-70	100	60		9,9	11,6	90	175	180			
		120	90		14,8		125	150	270			
		230	200		19,3		55	105	600			
FIS A M 12	5.8	100	70	40	13,8	12,0	140	175	210	55	55	
		140	110				165	130	330			
		270	240		20,5		55	100	720			
	8.8	100	70		13,8	19,3	140	295	210			
		140	110		21,7		180	230	330			
		270	240		32,1		85	150	720			
	A4-70	100	70		13,8	13,5	140	200	210			
		140	110		21,7		180	150	330			
		270	240		22,5		55	110	720			
	C-70	100	70		13,8	16,9	140	255	210			
		140	110		21,7		180	195	330			
		270	240		28,1		65	135	720			

## LOADS

### Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
FIS A M 16	5.8	120	80	60	17,2	22,3	160	305	240	65	65
		170	125		29,9		245	235	375		
		360	320		37,6		65	150	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		29,9		245	405	375		
		360	320		59,8		135	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		29,9		245	270	375		
		360	320		42,0		70	165	960		
	C-70	120	80		17,2	31,4	160	445	240		
		170	125		29,9		245	350	375		
		360	320		52,3		105	195	960		
FIS A M 20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		48,3		340	300	510		
		450	400		58,6		85	195	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		48,3		340	510	510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,3	170	500	270		
		220	170		48,3		340	345	510		
		450	400		65,5		95	215	1200		
	C-70	140	90		20,5	41,1	170	525	270		
		220	170		48,3		340	450	510		
		450	400		81,7		140	260	1200		
FIS A M 24	5.8	160	96	150	22,6	45,2	170	540	290	105	105
		270	210		67,9		435	390	630		
		540	480		84,3		105	250	1440		
	8.8	160	96		22,6	45,2	170	540	290		
		270	210		67,9		435	675	630		
		540	480		134,5		360	365	1440		
	A4-70	160	96		22,6	45,2	170	540	290		
		270	210		67,9		435	445	630		
		540	480		94,4		120	270	1440		
	C-70	160	96		22,6	45,2	170	540	290		
		270	210		67,9		435	580	630		
		540	480		117,7		235	325	1440		
FIS A M 27	5.8	170	108	200	27,0	54,0	195	605	325	125	125
		310	250		85,8		495	460	750		
		600	540		109,5		125	295	1620		
	8.8	170	108		27,0	54,0	195	605	325		
		310	250		85,8		495	805	750		
		600	540		174,9		500	450	1620		
	A4-70	170	108		27,0	54,0	195	605	325		
		310	250		85,8		495	530	750		
		600	540		122,7		155	320	1620		
	C-70	170	108		27,0	54,0	195	605	325		
		310	250		85,8		495	690	750		
		600	540		153,0		355	385	1620		

## LOADS

### Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
FIS A M 30	5.8	190	120	300	31,6	63,2	210	660	360	140	140
		350	280		106,8	80,6	595	525	840		
		670	600		133,8		140	330	1800		
	8.8	190	120		31,6	63,2	210	660	360		
		350	280		106,8	128,2	595	920	840		
		670	600		213,7		610	515	1800		
	A4-70	190	120		31,6	63,2	210	660	360		
		350	280		106,8	89,9	595	600	840		
		670	600		150,0		195	365	1800		
	C-70	190	120		31,6	63,2	210	660	360		
		350	280		106,8	112,2	595	785	840		
		670	600		187,0		445	435	1800		

For the design the complete assessment ETA-02/0024 has to be considered. <sup>10)</sup>

<sup>1)</sup> Also valid for threaded rod RG M in the same property class.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-02/0024 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-02/0024.

<sup>3)</sup> The given loads are valid for injection mortar FIS V for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-02/0024.

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>5)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-02/0024.

<sup>6)</sup> For the sizes M6 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

<sup>7)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-02/0024.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-02/0024.

<sup>10)</sup> The given loads refer to the European Technical Assessment ETA-02/0024, issue date 13/02/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Injection system FIS V: Injection mortar FIS V with Internal threaded anchor RG M I

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]
RG M 8 I	5.8	120	90	10	9,0	5,3	70	65	270	55	55
	8.8				13,8	8,3	130	95			
	A4-70				9,9	5,9	80	70			
RG M 10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				19,0	13,3	175	155			
	A4-70				15,7	9,3	130	100			
RG M 12 I	5.8	170	125	40	20,5	12,1	155	110	375	75	75
	8.8				23,8	19,3	190	190			
	A4-70				22,5	13,5	175	125			
RG M 16 I	5.8	210	160	80	35,7	22,4	240	180	480	95	95
	8.8					35,8		320			
	A4-70					25,1		205			
RG M 20 I	5.8	270	200	120	54,8	35,4	335	245	600	125	125
	8.8					42,9		315			
	A4-70					39,4		285			

For the design the complete assessment ETA-02/0024 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-02/0024 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-02/0024.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-02/0024.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-02/0024.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-02/0024.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-02/0024, issue date 13/02/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).



## LOADS

### Injection system FIS V with threaded rod FIS A <sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-10/0383 has to be considered.

Type	Compressive- brick- strength	Brick raw density	Minimum brick- dimensions <sup>6)</sup>	Min. effective- anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characte- ristic spacing parallel to bed joint	Characte- ristic spacing perpendicu- lar to bed joint	Min. spacing <sup>2)</sup>	Characte- ristic resp. min. edge distance <sup>2)</sup>								
	f <sub>b</sub> [N/mm <sup>2</sup> ]	ρ [kg/dm <sup>3</sup> ]	(L x W x H) [mm]	h <sub>ef</sub> [mm]	h <sub>min</sub> [mm]	T <sub>inst,max</sub> [Nm]	N <sub>perm</sub> [kN]	V <sub>perm</sub> [kN]	s <sub>cr</sub>    [mm]	s <sub>cr</sub> ⊥ [mm]	s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	c <sub>cr</sub> = c <sub>min</sub> [mm]								
Solid brick Mz, NF acc. to EN 771-1																				
M6	≥ 10	≥ 1,8	240x115x71 (NF)	50	115	4	1,14	0,71	240	75	240 / 75	100								
M8				50		10	1,14	0,71				100								
M10				50		10	1,00	1,14				100								
M10				80		10	1,43	1,14				100								
M10				200		10	3,42	2,43				150								
M12				50		10	0,86	1,14				100								
M12				80		10	1,57	1,14				100								
M12				200		10	2,29	3,29				150								
M6	≥ 20			50		4	1,57	1,14				100								
M8				50		10	1,57	1,14				100								
M10				50		10	1,43	1,71				100								
M10				80		10	2,00	1,71				100								
M10				200		10	3,42	3,43				150								
M12				50		10	1,29	1,57				100								
M12				80		10	2,29	1,57				100								
M12				200		10	3,29	3,43				150								
Solid brick Mz, 2DF acc. to EN 771-1																				
M6				≥ 10		≥ 1,8	240x115x113 (2DF)	50				115	4	0,86	0,71	240	115	120 / 115	60	
M8	50	10	0,86		0,86															
M10	100	10	1,29		1,00															
M12	100	10	1,57		1,00															
M16	≥ 16	100	10	1,57	0,86															
M6		50	4	1,29	1,14															
M8		50	10	1,29	1,43															
M10		100	10	2,14	1,57															
M12		100	10	2,29	1,57															
M16		100	10	2,29	1,43															
Solid sand-lime brick KS acc. to EN 771																				
M6		≥ 10	≥ 2,0	250x240x240	50			240	4	1,43	0,71		250	240	80 / 80					60
M8	10					2,00	1,29													
M10	10					2,00	1,29													
M12	10					2,00	1,29													
M16	10					1,57	1,29													
M6	≥ 20	4				2,14	1,14													
M8		10				2,57	1,86													
M10		10				2,57	1,86													
M12		10				2,57	1,86													
M16		10				2,14	1,86													
M6	≥ 28	4				2,43	1,43													
M8		10				2,57	2,57													
M10		10				2,57	2,57													
M12		10				2,57	2,57													
M16		10				2,57	2,57													

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>6)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS V with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H..K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in solid brick masonry (with injection anchor sleeve) for pre-positioned installation.

For the design the complete assessment ETA-10/0383 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength  f <sub>b</sub> [N/mm²]	Brick raw density  ρ [kg/dm³]	Minimum brick dimensions <sup>6)</sup>  (L x W x H) [mm]	Min. effective anchorage depth <sup>4)</sup>  h <sub>ef</sub> [mm]	Min. member thickness  h <sub>min</sub> [mm]	Maximum torque  T <sub>inst,max</sub> [Nm]	Permissible tensile load <sup>3)</sup>  N <sub>perm</sub> [kN]	Permissible shear load <sup>3)</sup>  V <sub>perm</sub> [kN]	Characteristic spacing parallel to bed joint  s <sub>cr</sub>    [mm]	Characteristic spacing perpendicular to bed joint  s <sub>cr</sub> ⊥ [mm]	Min. spacing <sup>2)</sup>  s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  c <sub>cr</sub> = c <sub>min</sub> [mm]
Solid brick Mz, 2DF acc. to EN 771-1												
16x85 M8	≥ 10	≥ 1,8	240x115x113 (2DF)	85	115	10	0,86	0,86	240	115	120 / 115	60
16x85 M10							0,86	1,00				
16x85 M8	≥ 16						1,29	1,43				
16x85 M10							1,29	1,57				
Solid sand-lime brick KS acc. to EN 771												
16x85 M8/M10	≥ 10	≥ 2,0	250x240x240	85	240	10	2,29	1,29	250	240	80 / 80	60
16x85 M8/M10	≥ 20						2,57	1,86				
16x85 M8/M10	≥ 28						2,57	2,57				
Lightweight concrete block Vbl acc. to EN 771-3												
12x85 M6	≥ 4	≥ 1,6	250x240x239	85	240	4	1,00	0,57	250	250	250 / 250	130
12x50 M8				50			0,57	0,86				
12x85 M8				85			1,00	0,86				
16x85 M10				85			1,14	1,00				
20x85 M12				85			1,43	1,29				
12x85 M6	≥ 6			85			1,43	0,86				
12x50 M8				50			0,86	1,29				
12x85 M8				85			1,43	1,29				
16x85 M8 / M10				85			1,86	1,57				
20x85 M12 / M16				85			2,14	1,86				
12x85 M6	≥ 8			85			2,00	1,14				
12x50 M8				50			1,14	1,71				
12x85 M8				85			2,00	1,71				
16x85 M8 / M10				85			2,43	2,00				
20x85 M12 / M16				85			2,57	2,43				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS V with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H..K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation.  
For the design the complete assessment ETA-10/0383 has to be considered.

Type of anchor sleeve with threaded rod	Compressive brick-strength  f <sub>b</sub> [N/mm <sup>2</sup> ]	Brick raw density  ρ [kg/dm <sup>3</sup> ]	Minimum brick-dimensions <sup>7)</sup>  (L x W x H) [mm]	Min. effective anchorage depth <sup>4)</sup>  h <sub>ef</sub> [mm]	Min. member thickness  h <sub>min</sub> [mm]	Maximum torque  T <sub>inst,max</sub> [Nm]	Permissible tensile load <sup>3)</sup>  N <sub>perm</sub> [kN]	Permissible shear load <sup>3)</sup>  V <sub>perm</sub> [kN]	Characteristic spacing parallel to bed joint  s <sub>cr</sub>    [mm]	Characteristic spacing perpendicular to bed joint  s <sub>cr</sub> ⊥ [mm]	Min. spacing <sup>2)</sup>  s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  c <sub>cr</sub> = c <sub>min</sub> [mm]
Vertically perforated brick Hlz, shape B acc. to EN 771-1												
12x50 M6/M8	≥ 4	≥ 1,0	500x175x237 or 370x240x237	50	175	2,0	0,11	0,14	500 resp. 370	240	100 / 100	100
16x85 M8/M10	≥ 4			85			0,26	0,14				
20x130 M12/M16	≥ 4			130			0,34	0,17				
12x50 M6/M8	≥ 8			50			0,21	0,26				
16x85 M8/M10	≥ 8			85			0,57	0,26				
20x130 M12/M16	≥ 8			130			0,71	0,34				
12x50 M6/M8	≥ 12			50			0,34	0,43				
16x85 M8/M10	≥ 12			85			0,86	0,43				
20x130 M12/M16	≥ 12			130			1,14	0,57				
Vertically perforated brick Hlz, acc. to EN 771-1												
12x50 M6	≥ 6	≥ 1,4	240x115x113 (2DF)	50	115	2,0	0,21	0,34	240	115	240 / 115	80
12x85 M8	≥ 6			85			0,34	0,57				
16x85 M8/M10	≥ 6			85			0,21	0,43				
20x85 M12/M16	≥ 6			85			0,26	0,71				
12x50 M6	≥ 16			50			0,57	0,86				
12x85 M8	≥ 16			85			0,86	1,57				
16x85 M8/M10	≥ 16			85			0,57	1,00				
20x85 M12/M16	≥ 16			85			0,71	1,57				
12x50 M6	≥ 28			50			1,00	1,43				
12x85 M8	≥ 28			85			1,57	1,57				
16x85 M8/M10	≥ 28			85			1,00	1,57				
20x85 M12/M16	≥ 28			85			1,29	1,57				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x50 M6/M8	≥ 12	≥ 1,4	240x175x113	50	175	2,0	0,71	0,71	240	115	100 / 115	60
16x85 M8/M10	≥ 12			85			0,86	1,29				80
20x85 M12	≥ 12			85			1,00	1,29				60
12x50 M6/M8	≥ 20			50			1,29	1,14				80
16x85 M8/M10	≥ 20			85			1,43	2,14				80
20x85 M12	≥ 20			85			1,71	2,14				80
Lightweight concrete hollow block Hbl acc. to EN 771-3												
12x50 M6/M8	≥ 2	≥ 1,0	362x240x240	50	240	2,0	0,34	0,26	362	240	100 / 240	60
16x85 M8/M10	≥ 2			85			0,43	0,26				
20x200 M12/M16	≥ 2			180			0,71	0,26				
12x50 M6/M8	≥ 4			50			0,71	0,57				
16x85 M8/M10	≥ 4			85			0,86	0,57				
20x200 M12/M16	≥ 4			180			1,57	0,57				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS V with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in aerated concrete.

For the design the complete assessment ETA-10/0383 has to be considered.

Type threaded rod	Compressive-brick-strength  f <sub>b</sub> [N/mm <sup>2</sup> ]	Brick raw density  ρ [kg/dm <sup>3</sup> ]	Minimum brick dimensions  (L x W x H) [mm]	Min. effective-anchorage depth  h <sub>ef</sub> [mm]	Min. member thickness  h <sub>min</sub> [mm]	Maximum torque  T <sub>inst,max</sub> [Nm]	Permissible tensile load <sup>3)</sup>  N <sub>perm</sub> [kN]	Permissible shear load <sup>3)</sup>  V <sub>perm</sub> [kN]	Characteristic spacing parallel to bed joint  s <sub>cr</sub>    [mm]	Characteristic spacing perpendicular to bed joint  s <sub>cr</sub> ⊥ [mm]	Min. spacing <sup>2)</sup>  s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  c <sub>cr</sub> = c <sub>min</sub> [mm]			
Aerated concrete acc. to EN 771-4															
M8 <sup>6)</sup>	≥ 2	≥ 0,35		100	130	1	0,54	0,43	250	250	250	100			
M10 <sup>6)</sup>						2	0,54	0,43							
M12 <sup>6)</sup>						2	0,71	0,54							
M16 <sup>6)</sup>						2	0,71	0,43							
M8 <sup>6)</sup>	≥ 4	≥ 0,50				1	0,71	0,89							
M10 <sup>6)</sup>						2	1,07	0,71							
M12 <sup>6)</sup>						2	0,89	0,89							
M16 <sup>6)</sup>						2	0,71	0,71							
M8 <sup>6)</sup>	≥ 6	≥ 0,65				1	1,25	1,07							
M10 <sup>6)</sup>						2	1,79	1,07							
M12 <sup>6)</sup>						2	1,79	1,25							
M16 <sup>6)</sup>						2	1,07	1,61							
M8, M10, M12 <sup>7)</sup>	≥ 2	≥ 0,35		75	105	2	0,71	0,89	240	240	240	120			
M8, M10, M12 <sup>7)</sup>	≥ 4	≥ 0,50					1,07	1,61							
M8, M10, M12 <sup>7)</sup>	≥ 6	≥ 0,65					1,43	2,14							
M8, M10, M12 <sup>7)</sup>	≥ 2	≥ 0,35		95	125		0,89	0,89	300	250	300 / 250	150			
M8, M10, M12 <sup>7)</sup>	≥ 4	≥ 0,50					1,25	1,61							
M8, M10, M12 <sup>7)</sup>	≥ 6	≥ 0,65					1,61	2,14							

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>6)</sup> Cylindrical drill hole. Pre-positioned and push-through installation possible.

<sup>7)</sup> Drill hole to be made with cone drill bit PBB. Pre-positioned installation only.

## The solid injection mortar for standard applications in cracked concrete and masonry

3

Chemical fixings



High-bay warehouses



Air conditioning units

### BUILDING MATERIALS

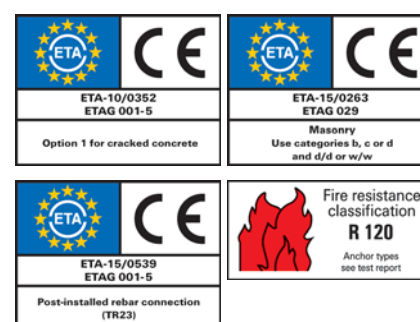
#### Approved for anchorings in:

- Concrete C20/25 to C50/60, cracked
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick
- Rebar connections
- Aerated concrete

#### Also suitable for:

- Concrete C12/15
- Hollow blocks made from concrete

### CERTIFICATES



### ADVANTAGES

- The FIS VL is approved for use in cracked concrete and masonry, and achieves a high load-bearing capacity in these conditions.
- The injection mortar, based on vinylester resin, allows for anchorings in water-filled drill holes (410 ml cartridges only), thus allowing for rapid progress.
- The temperature resistance of the FIS VL injection mortar of -40 °C to +120 °C allows for a solid load level even when subjected to high temperature demands, thus providing great flexibility.
- FIS VL HIGH SPEED has a significantly shorter curing time than FIS VL, thus also ensuring swift work progress even at low temperatures.

### APPLICATIONS

#### Injection mortar for use with:

- Threaded rods FIS A, see page 146
- Internal threaded anchor RG MI, see page 159
- Injection anchor sleeves FIS H, see page 167

### FUNCTIONING

- The FIS VL is a 2-component injection mortar based on vinylester.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- The 410 ml coaxial cartridge can be easily used with the fischer FIS AC dispenser.
- Partially used cartridges can be reused, simply by changing the static mixer.
- Related accessories for use in concrete and masonry can be found on page PL.

### SEE ALSO



#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

Page 195

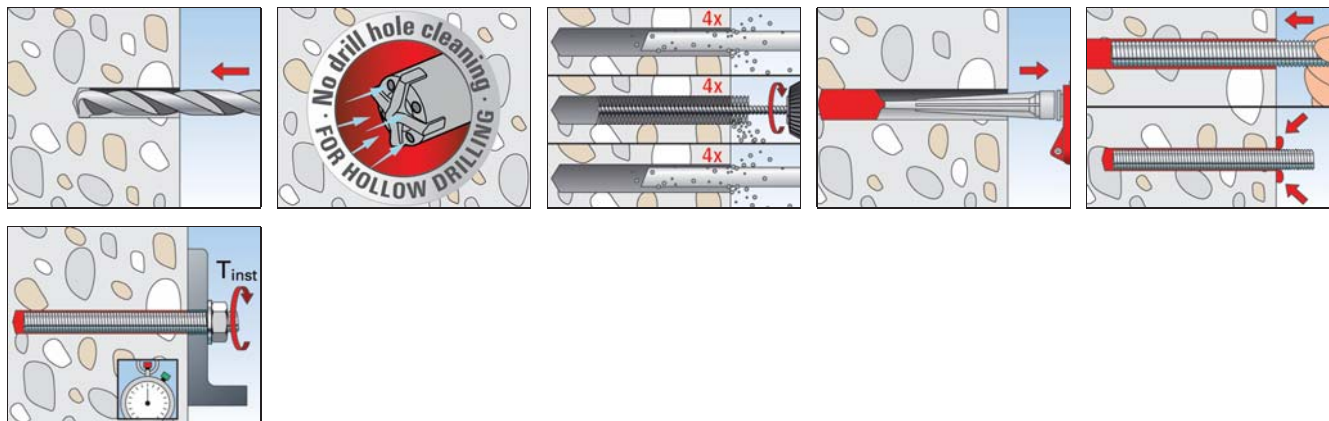


#### ACCESSORIES

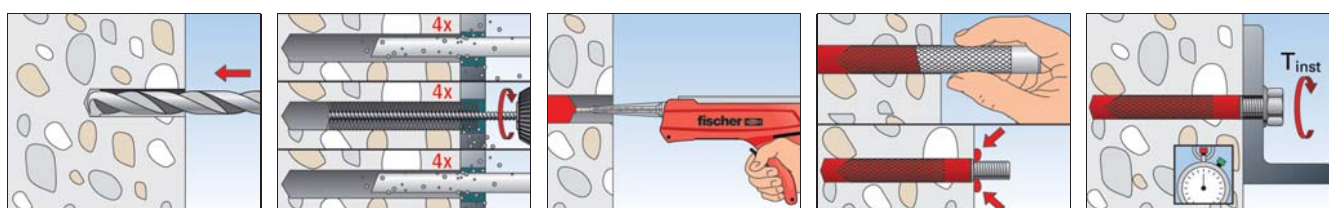
Page 198



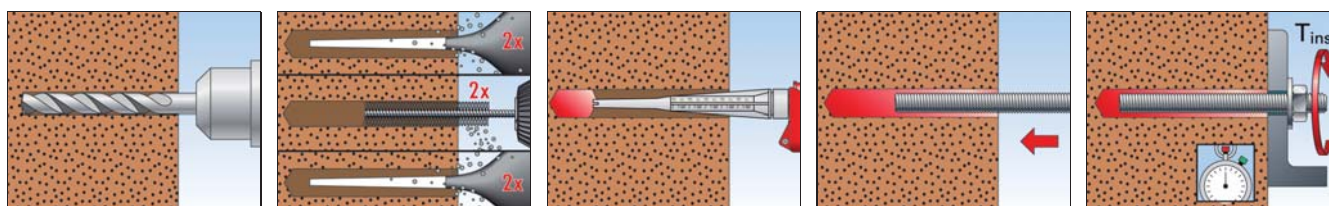
## INSTALLATION IN CONCRETE WITH FIS VL AND FIS A / RG M



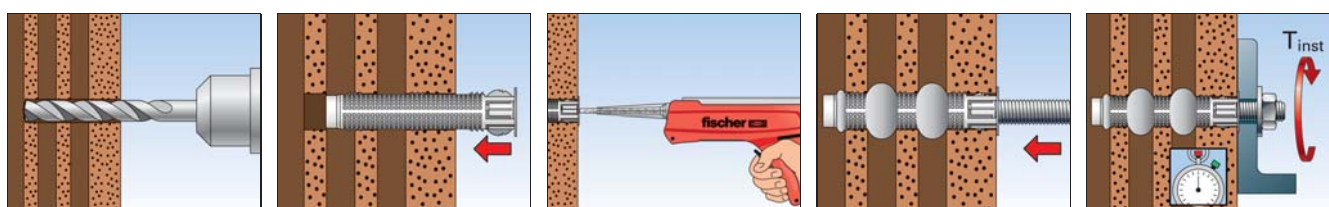
## INSTALLATION IN CONCRETE WITH FIS VL AND RG M I



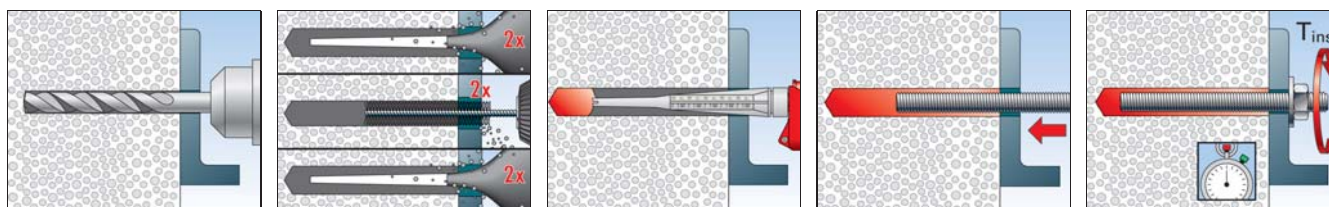
## INSTALLATION IN SOLID BRICK WITH FIS VL AND FIS A / RG M



## INSTALLATION IN HOLLOW BLOCKS WITH FIS VL AND FIS HK + FIS A / RG M



## INSTALLATION IN AERATED CONCRETE WITH FIS V AND FIS A / RG M





## TECHNICAL DATA



FIS VL 300 T



FIS VL 410 C



FIS VL 410 C in bucket



Static mixer FIS MR Plus

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	ETA				[pcs]
FIS VL 300 T with clip	537149	■	PT, ES, EN	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS VL 300 T with clip	538583	■	CS, SK	150	1 cartridge 300 ml, 2 x FIS MR Plus	10
FIS VL 300 T HIGH SPEED with clip	538585	■	CS, SK	150	1 cartridge 380 ml, 2 x FIS MR Plus	10
FIS VL 300 T	539461	■	EN, FR, ES, PT, RO, AR	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS VL 300 T in bucket	539462	■	EN, FR, ES, PT, RO, AR	150	20 cartridges 300 ml, 40 x FIS MR Plus	1
FIS VL 300 T HWK big	538589	■	CS, SK	150	20 cartridges 300 ml, 40 x FIS MR Plus	1
FIS VL 410 C	539463	■	EN, FR, ES, PT, RO, AR	200	1 cartridge 410 ml, 2 x FIS MR Plus	12
FIS VL 410 C	538584	■	CS, SK	200	1 cartridge 410 ml, 2 x FIS MR Plus	12
FIS VL 410 C HIGH SPEED	538586	■	CS, SK	200	1 cartridges 410 ml, 1 x FIS MR Plus	12
FIS VL 410 C in bucket	538549	■	DE, FR, NL, EN, TR	200	16 cartridges 410 ml, 32 x FIS MR Plus	1
FIS VL 410 C in bucket	539464	■	EN, FR, ES, PT, RO, AR	200	16 cartridges 410 ml, 32 x FIS MR Plus	1
FIS VL 410 C HWK big	538590	■	CS, SK	200	16 cartridges 410 ml, 32 x FIS MR Plus	1
FIS MR Plus	545853	—	—	—	10 static mixer FIS MR Plus	10

## CURING TIME FIS VL

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5°C - ± 0°C	24 hrs.
+ 0°C - + 5°C	13 min.	± 0°C - + 5°C	3 hrs.
+ 5°C - +10°C	9 min.	+ 5°C - +10°C	90 min.
+10°C - +20°C	5 min.	+10°C - +20°C	60 min.
+20°C - +30°C	4 min.	+20°C - +30°C	45 min.
+30°C - +40°C	2 min.	+30°C - +40°C	35 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

## CURING TIME FIS VL HIGH SPEED

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		-15°C - -10°C <sup>1)</sup>	12 hrs.
		-10°C - - 5°C <sup>1)</sup>	8 hrs.
- 5°C - ± 0°C <sup>1)</sup>	5 min.	- 5°C - ± 0°C	3 hrs.
0°C - + 5°C	5 min.	± 0°C - + 5°C	90 min.
+ 5°C - +10°C	3 min.	+ 5°C - +10°C	45 min.
+10°C - +20°C	1 min.	+10°C - +20°C	30 min.

<sup>1)</sup> Without approval.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

## LOADS

Injection system FIS VL: Injection mortar FIS VL with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5) 11)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
M10	5.8	100	60	20	4,5	8,6	90	185	180	45	45
		120	90		6,7		125	160	270		
		230	200		13,8		110	125	600		
	8.8	100	60		4,5	10,8	90	235	180		
		120	90		6,7		125	260	270		
		230	200		15,0		180	180	600		
	A4-70	100	60		4,5	9,3	90	200	180		
		120	90		6,7		125	175	270		
		230	200		15,0		130	600			
M12	5.8	100	70	40	6,3	12,0	105	255	210	55	55
		140	110		9,9		145	200	330		
		270	240		20,5		140	150	720		
	8.8	100	70		6,3	15,1	105	330	210		
		140	110		9,9		145	345	330		
		270	240		21,5		235	720			
	A4-70	100	70		6,3	13,5	105	290	210		
		140	110		9,9		145	230	330		
		270	240		21,5		165	720			
M16	5.8	120	80	60	9,6	22,3	120	445	240	65	65
		170	125		15,0		185	350	375		
		360	320		37,6		225	960			
	8.8	120	80		9,6	23,0	120	460	240		
		170	125		15,0		185	600	375		
		360	320		38,3		380	960			
	A4-70	120	80		9,6	23,0	120	460	240		
		170	125		15,0		185	400	375		
		360	320		38,3		25,2	250	960		
M20	5.8	140	90	120	12,2	29,3	135	530	270	85	85
		220	170		23,3		225	460	510		
		450	400		54,9		300	1200			
	8.8	140	90		12,2	29,3	135	530	270		
		220	170		23,3		225	785	510		
		450	400		54,9		520	1200			
	A4-70	140	90		12,2	29,3	135	530	270		
		220	170		23,3		225	525	510		
		450	400		54,9		39,3	345	1200		

For the design the complete assessment ETA-10/0352 has to be considered. <sup>10)</sup>

<sup>1)</sup> Also valid for threaded rod RG M in the same property class.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-10/0352 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-10/0352.

<sup>3)</sup> The given loads are valid for injection mortar FIS VL for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. F or drill hole cleaning see ETA-10/0352.

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>5)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-10/0352.

<sup>6)</sup> For the sizes M10 - M20 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

<sup>7)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-10/0352.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-10/0352.

<sup>10)</sup> The given loads refer to the European Technical Assessment ETA-10/0352, issue date 10/08/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

<sup>11)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3 \text{ mm}$ .

## LOADS

Injection system FIS VL: Injection mortar FIS VL with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load				
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance			
		$h_{min}$ [mm]	$h_{ef}$ <sup>6)</sup> [mm]	$T_{max}$ [Nm]	$N_{perm}$ <sup>6)</sup> [kN]	$V_{perm}$ <sup>6)</sup> [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}$ <sup>8) 9)</sup> [mm]	$c_{min}$ <sup>8) 9)</sup> [mm]			
M6	5.8	100	50	5	3,4	2,9	65	50	150	40	40			
			60		4,0				180					
			110		4,8				220					
	8.8	100	50		3,4	4,6		70	150					
			60		4,0				180					
			110		4,8				220					
	A4-70	100	50		3,4	3,2		55	150					
			60		4,0				180					
			110		4,8				220					
M8	5.8	100	60	10	6,6	5,1	90	70	180	40	40			
		110	80		8,8		100		240					
		190	160		9,0		40		480					
	8.8	100	60		6,6	8,4	90	125	180					
		110	80		8,8		100	115	240					
		190	160		13,9		75	100	480					
	A4-70	100	60		6,6	5,9	90	85	180					
		110	80		8,8		100	80	240					
		190	160		9,8		40	75	480					
	M10	5.8	100	60	20	8,2	8,6	90	125			180	45	45
			120	90		12,3		125	105			270		
			230	200		13,8		45	95			600		
8.8		100	60	8,2		13,3	90	200	180					
		120	90	12,3			125	175	270					
		230	200	22,1			90	130	600					
A4-70		100	60	8,2		9,3		135	180					
		120	90	12,3			125	115	270					
		230	200	15,5			50	100	600					
M12	5.8	100	70	40	11,5	12,0	140	175	210	55	55			
		140	110		18,1		180	135	330					
		270	240		20,5		55	120	720					
	8.8	100	70		11,5	19,3	140	295	210					
		140	110		18,1		180	235	330					
		270	240		32,1		110	170	720					
	A4-70	100	70		11,5	13,5	140	200	210					
		140	110		18,1		180	155	330					
		270	240		22,5		60	130	720					
M16	5.8	120	80	60	14,3	22,3	160	305	240	65	65			
		170	125		24,9		245	235	375					
		360	320		37,6		80	175	960					
	8.8	120	80		14,3	34,4	160	495	240					
		170	125		24,9		245	405	375					
		360	320		59,8		230	255	960					
	A4-70	120	80		14,3	25,2	160	350	240					
		170	125		24,9		245	270	375					
		360	320		42,0		100	190	960					

## LOADS

Injection system FIS VL: Injection mortar FIS VL with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
M20	5.8	140	90	120	17,1	34,9	170	435	270	85	85
		220	170		40,3		340	305	510		
		450	400		58,6		110	230	1200		
	8.8	140	90		17,1	41,1	170	525	270		
		220	170		40,3		340	530	510		
		450	400		93,3		375	350	1200		
	A4-70	140	90		17,1	39,3	170	500	270		
		220	170		40,3		340	350	510		
		450	400		65,5		135	255	1200		
M24	5.8	160	96	150	18,8	45,2	170	540	290	105	105
		270	210		56,5		435	400	630		
		540	480		84,3		140	295	1440		
	8.8	160	96		18,8	45,2	170	540	290		
		270	210		56,5		435	685	630		
		540	480		129,3		505	455	1440		
	A4-70	160	96		18,8	45,2	170	540	290		
		270	210		56,5		435	455	630		
		540	480		94,4		205	320	1440		
M27	5.8	170	108	200	22,5	54,0	195	605	325	125	125
		310	250		71,5		495	475	750		
		600	540		109,5		200	345	1620		
	8.8	170	108		22,5	54,0	195	605	325		
		310	250		71,5		495	825	750		
		600	540		154,5		570	560	1620		
	A4-70	170	108		22,5	54,0	195	605	325		
		310	250		71,5		495	545	750		
		600	540		122,7		315	380	1620		
M30	5.8	190	120	300	26,3	63,2	210	660	360	140	140
		350	280		89,0		595	545	840		
		670	600		133,8		270	395	1800		
	8.8	190	120		26,3	63,2	210	660	360		
		350	280		89,0		595	940	840		
		670	600		190,7		700	645	1800		
	A4-70	190	120		26,3	63,2	210	660	360		
		350	280		89,0		595	620	840		
		670	600		150,0		400	430	1800		

For the design the complete assessment ETA-10/0352 has to be considered. <sup>10)</sup>

<sup>1)</sup> Also valid for threaded rod RG M in the same property class.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-10/0352 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-10/0352.

<sup>3)</sup> The given loads are valid for injection mortar FIS VL for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-10/0352.

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>5)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-10/0352.

<sup>6)</sup> For the sizes M6 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

<sup>7)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-10/0352.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-10/0352.

<sup>10)</sup> The given loads refer to the European Technical Assessment ETA-10/0352, issue date 10/08/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Injection system FIS VL: Injection mortar FIS VL with Internal threaded anchor RG M I

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>									Minimum spacings while reducing the load		
Type	Screw material resp. screw surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	95	65	270	55	55
	8.8				11,9	8,3	135	95			
	A4-70				9,9	5,9	110	70			
RG M10 I	5.8	130	90	20	13,8	8,3	140	90	270	65	65
	8.8				15,9	13,3	170	155			
	A4-70				15,7	9,3		100			
RG M 12 I	5.8	170	125	40	19,8	12,1	190	110	375	75	75
	8.8					19,3		190			
	A4-70					13,5		125			
RG M 16 I	5.8	210	160	80	29,8	22,4	240	180	480	95	95
	8.8					35,8		320			
	A4-70					25,1		205			
RG M 20 I	5.8	270	200	120	45,6	35,4	330	245	600	125	125
	8.8					42,9		315			
	A4-70					39,4		280			

For the design the complete assessment ETA-10/0352 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-10/0352 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-10/0352.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-10/0352.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-10/0352.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-10/0352.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-10/0352, issue date 10/08/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Injection system FIS VL with threaded rod FIS A<sup>4)</sup>

Highest permissible loads <sup>1) 5)</sup> for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-15/0263 has to be considered.

Type	Compressive- brick- strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective- anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Character- istic spa- cing paral- lel to bed joint	Character- istic spa- cing perpen- dicular to bed joint	Min. spacing <sup>2)</sup>	Character- istic resp. min. edge distance <sup>2)</sup>					
	f <sub>b</sub>	ρ	(L x W x H)	h <sub>ef</sub>	h <sub>min</sub>	T <sub>inst,max</sub>	N <sub>perm</sub>	V <sub>perm</sub>	s <sub>cr</sub>	s <sub>cr</sub> ⊥	s <sub>min</sub>    / s <sub>min</sub> ⊥	c <sub>cr</sub> = c <sub>min</sub>					
	[N/mm <sup>2</sup> ]	[kg/dm <sup>3</sup> ]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]					
Solid brick Mz, NF acc. to EN 771-1																	
M8	≥10	≥1,8	240x115x71	50	115	10	1,14	0,71	150	75	150 / 75	100					
M10				50			1,00	1,14	150		150 / 75	100					
M10				80			1,43	1,14	240		240 / 75	100					
M10				200			2,43	3,40	240		240 / 75	150					
M12				50			0,86	1,14	150		150 / 75	100					
M12				80			1,51	1,14	240		240 / 75	100					
M12				200			3,20	2,43	240		240 / 75	150					
M8	≥20							50				1,57	1,14	150		150 / 75	100
M10								50				1,43	1,71	150		150 / 75	100
M10								80				2,00	1,71	240		240 / 75	100
M10								200				2,43	2,43	240		240 / 75	150
M12								50				1,29	1,57	150		150 / 75	100
M12								80				2,29	1,57	240		240 / 75	100
M12								200				2 43	2 43	240		240 / 75	150

## LOADS

### Injection system FIS VL with threaded rod FIS A<sup>4)</sup>

Highest permissible loads <sup>1) 5)</sup> for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-15/0263 has to be considered.

Type	Compressive brick-strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective-anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characteristic spacing parallel to bed joint	Characteristic spacing perpendicular to bed joint	Min. spacing <sup>2)</sup>	Characteristic resp. min. edge distance <sup>2)</sup>
	f <sub>b</sub>	ρ	(L x W x H)	h <sub>ef</sub>	h <sub>min</sub>	T <sub>inst,max</sub>	N <sub>perm</sub>	V <sub>perm</sub>	s <sub>cr</sub>	s <sub>cr</sub> ⊥	s <sub>min</sub>    / s <sub>min</sub> ⊥	c <sub>cr</sub> = c <sub>min</sub>
	[N/mm²]	[kg/dm³]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]
Solid sand-lime brick KS acc. to EN 771												
M8	≥10	≥1,8	240x115x71	50	115	10	0,71	1,14	240	75	240 / 75	100
M10				50			0,71	1,14				100
M10				80			0,71	1,14				100
M10				200			2,43	1,14				150
M12				50			0,71	1,43				100
M12				80			0,71	1,43				100
M12	200			2,43			1,43	150				
M8	≥20			50			1,00	1,57				100
M10				50			1,00	1,57				100
M10				80			1,00	1,57				100
M10				200			2,43	1,57				150
M12				50			1,00	2,00				100
M12		80	1,00	2,00	100							
M12	200	2,43	2,00	150								

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>6)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS VL with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H..K

Highest permissible loads <sup>1) 6)</sup> for a single anchor in solid brick masonry (with injection anchor sleeve) for pre-positioned installation.

For the design the complete assessment ETA-15/0263 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective anchorage depth <sup>4)</sup>	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characteristic spacing parallel to bed joint	Characteristic spacing perpendicular to bed joint	Min. spacing <sup>2)</sup>	Characteristic resp. min. edge distance <sup>2)</sup>
	f <sub>b</sub>	ρ	(L x W x H)	h <sub>ef</sub>	h <sub>min</sub>	T <sub>inst,max</sub>	N <sub>perm</sub>	V <sub>perm</sub>	s <sub>cr</sub>	s <sub>cr</sub> ⊥	s <sub>min</sub>    / s <sub>min</sub> ⊥	c <sub>cr</sub> = c <sub>min</sub>
	[N/mm <sup>2</sup> ]	[kg/dm <sup>3</sup> ]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]
Solid sand-lime brick KS acc. to EN 771												
12x85 M8	≥ 10	≥ 1,8	240x115x113	85	115	2	1,71	0,86	240	115	240 / 115	100
16x85 M10							1,00	1,00				
20x85 M12							2,43	1,00				
12x85 M8	≥ 20			85	115		2,43	1,29				
16x85 M10							1,57	1,57				
20x85 M12							2,43	1,57				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.



## LOADS

### Injection system FIS VL with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H...K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation. For the design the complete assessment ETA-15/0263 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength	Brick raw density	Minimum brick-dimensions <sup>7)</sup>	Min. effective anchorage depth <sup>4)</sup>	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characteristic spacing parallel to bed joint	Characteristic spacing perpendicular to bed joint	Min. spacing <sup>2)</sup>	Characteristic resp. min. edge distance <sup>2)</sup>
	f <sub>b</sub>	ρ	(L x W x H)	h <sub>ef</sub>	h <sub>min</sub>	T <sub>inst,max</sub>	N <sub>perm</sub>	V <sub>perm</sub>	s <sub>cr</sub>	s <sub>cr</sub> ⊥	s <sub>min</sub>    / s <sub>min</sub> ⊥	c <sub>cr</sub> = c <sub>min</sub>
	[N/mm <sup>2</sup> ]	[kg/dm <sup>3</sup> ]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]
Vertically perforated brick Hz, acc. to EN 771-1												
12x85 M8	≥ 10	≥ 0,9	240x175x113	85	175	2,0	1,14	1,14	240	115	240 / 115	100
16x85 M10							1,00	1,57				
20x85 M12							1,43	1,71				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x85 M8	≥ 12	≥ 1,4	240x175x113	85	175	2,0	0,71	0,71	240	115	100 / 115	100
16x85 M8/M10							0,86	1,29				
20x85 M12							1,00	1,29				
12x85 M8	≥ 20	≥ 1,4	240x175x113	85	175	2,0	1,29	1,29	240	115	100 / 115	100
16x85 M8/M10							1,43	2,14				
20x85 M12							1,71	2,14				
Lightweight concrete hollow block Hbl acc. to EN 771-3												
12x85 M8	≥ 4	≥ 1,0	362x240x240	85	240	2,0	0,86	0,57	365	240	365 / 240	80
16x85 M10												
20x85 M12												

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H...K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS VL with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in aerated concrete.

For the design the complete assessment ETA-15/0263 has to be considered.

Type threaded rod	Compressive- brick-strength	Brick raw density	Minimum brick dimensions	Min. effective-anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characteristic spacing parallel to bed joint	Characteristic spacing perpendicular to bed joint	Min. spacing <sup>2)</sup>	Characteristic resp. min. edge distance <sup>2)</sup>
	f <sub>b</sub>	ρ	(L x W x H)	h <sub>ef</sub>	h <sub>min</sub>	T <sub>inst,max</sub>	N <sub>perm</sub>	V <sub>perm</sub>	s <sub>cr</sub>	s <sub>cr</sub> ⊥	s <sub>min</sub>    / s <sub>min</sub> ⊥	c <sub>cr</sub> = c <sub>min</sub>
	[N/mm <sup>2</sup> ]	[kg/dm <sup>3</sup> ]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]
Aerated concrete acc. to EN 771-4												
M8	≥ 2	≥ 0,35	-	100	130	1	0,54	0,43	250	250	250	100
M10						2	0,54	0,43				
M12						2	0,54	0,54				
M8	≥ 4	≥ 0,50				1	0,71	0,89				
M10						2	0,89	0,71				
M12						2	0,89	0,89				
M8	≥ 6	≥ 0,65				1	1,25	1,07				
M10						2	1,79	1,07				
M12						2	1,79	1,25				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

## The first approved injection mortar made with renewable raw materials



Building renovation



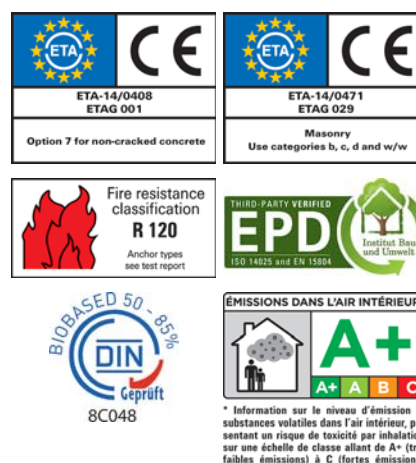
Staircase

### BUILDING MATERIALS

#### Approved for anchorings in:

- Concrete C20/25 to C50/60, non-cracked
- Solid brick
- Vertically perforated brick
- Solid sand-lime brick
- Perforated sand-lime brick
- Aerated concrete

### CERTIFICATES



### ADVANTAGES

- The worldwide first injection mortar with renewable raw materials. The share of renewable raw materials is certified by DIN CERTCO / TÜV Rheinland.
- Because of the European Technical Assessment it is possible to use the injection system in the area of public buildings.
- The low content of volatile organic compounds (VOC) has a positive effect for the evaluation of fixings in „Green Building“-projects.
- Biobased raw materials increase the residential and workplace quality and preserve valuable resources for future generations.
- The injection system is not mandatory for indication and thus reduces risks for installers and the environment.
- FIS GREEN is suitable for the use with the complete fischer injection accessories.

### APPLICATIONS

#### Injection mortar for use with:

- Threaded rods FIS A, see page 144
- Internal threaded anchor RG MI, see page 159
- Rebar anchor FRA, see page 179
- Concrete steel bars, see page 185
- Injection anchor sleeves FIS H, see page 167
- NSF certificate verifies its suitability for applications in drinking water

### FUNCTIONING

- FIS GREEN is a 2-component injection mortar.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- The injection cartridges are quick and easy to use with the fischer dispensers.
- Partially used cartridges can be reused by changing the static mixer.
- Related accessories for the various applications can be found on pages „non-cracked concrete“ and „masonry“.

### SEE ALSO



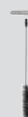
#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

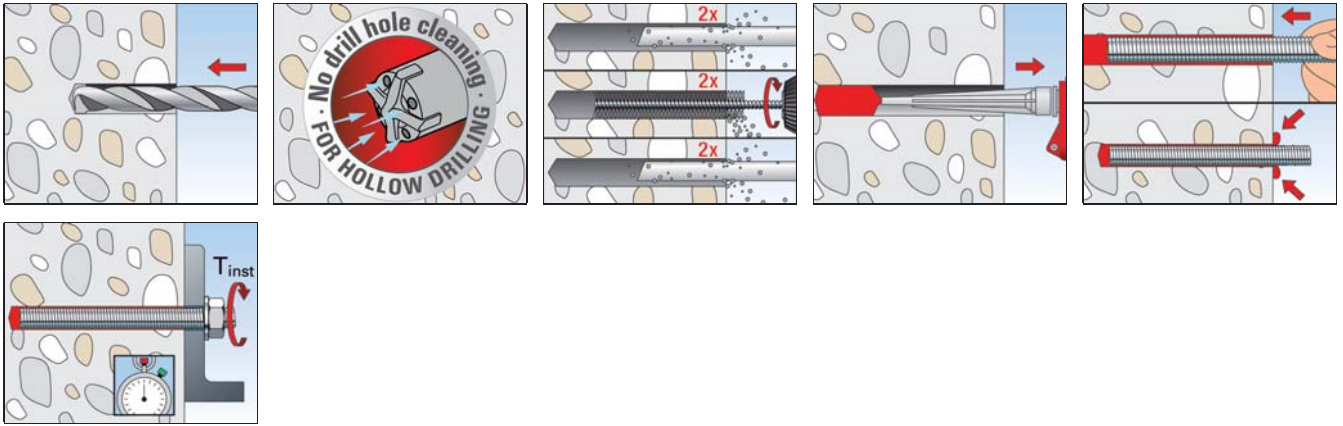
Page 195



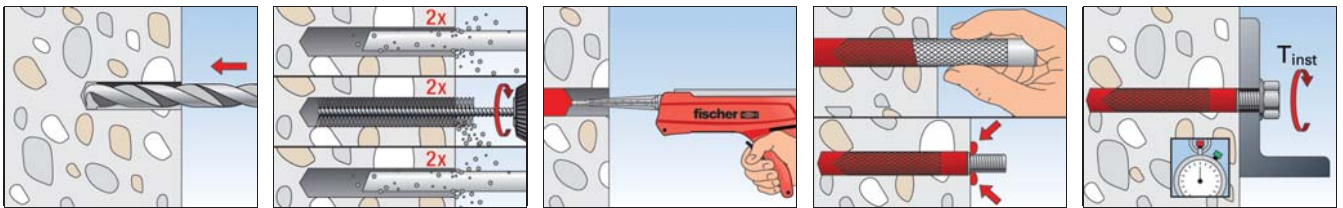
#### ACCESSORIES

Page 198

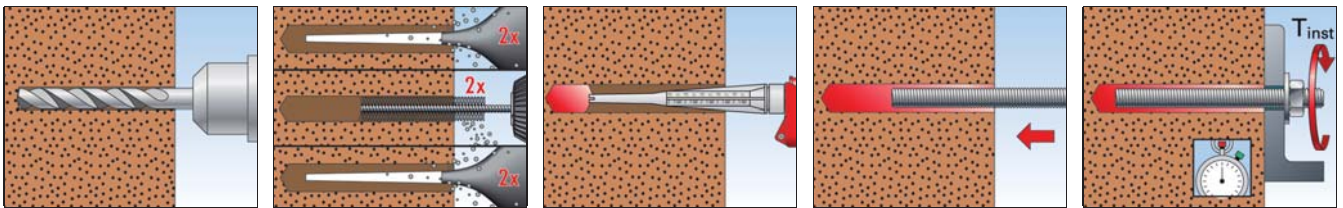
## INSTALLATION IN CONCRETE WITH FIS GREEN AND FIS A / RG M



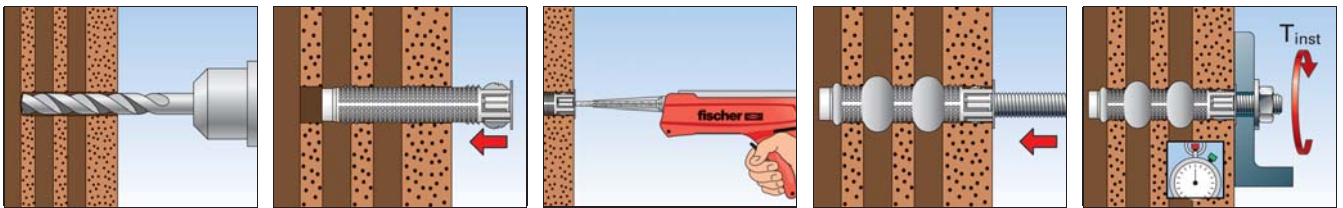
## INSTALLATION IN CONCRETE WITH FIS GREEN AND RG M I



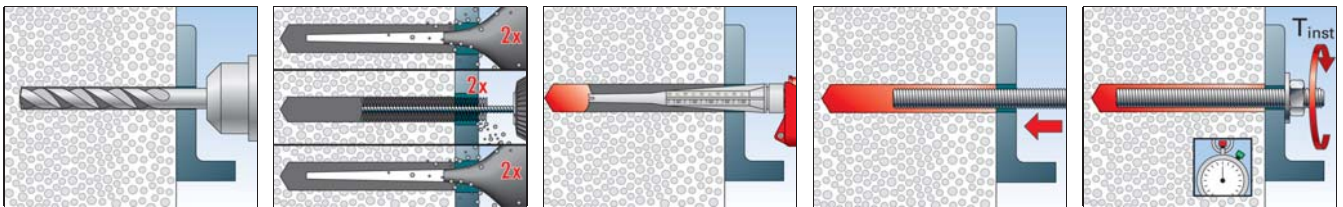
## INSTALLATION IN SOLID BRICK WITH FIS GREEN AND FIS A / RG M



## INSTALLATION IN HOLLOW BRICKS WITH FIS GREEN AND FIS HK + FIS A / RG M



## INSTALLATION IN AERATED CONCRETE WITH FIS GREEN AND FIS A / RG M



## TECHNICAL DATA



FIS GREEN 300 T



Static mixer FIS MR Plus

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	ETA				[pcs]
<b>FIS GREEN 300 T</b>	<b>522223</b>	■	DE	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
<b>FIS GREEN 300 T K</b>	<b>523244</b>	■	DE	150	1 Cartridge 300 ml, 2 x Static mixer (incl. clip with europerforation)	4
<b>FIS GREEN 300 T</b>	<b>522989</b>	■	FR	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	4
<b>FIS GREEN 300 T</b>	<b>523245</b>	■	IT	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
<b>FIS GREEN 300 T</b>	<b>538219</b>	■	CS, SK	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
<b>FIS GREEN 300 T</b>	<b>532972</b>	■	DA, SV, NO, FI	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
<b>FIS MR Plus</b>	<b>545853</b>	—	—	—	10 static mixer FIS MR Plus	10

## LOADS

Injection system FIS GREEN: Injection mortar FIS GREEN with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
<b>M8</b>	5.8	100	60	10	5,7	5,1	90	70	180	40	40
		110	80		7,6				240		
		190	160		9,0				480		
	8.8	100	60		5,7	8,6	90	130	180		
		110	80		7,6				240		
		190	160		14,3				480		
	A4-70	100	60		5,7	6,0	90	85	180		
		110	80		7,6				240		
		190	160		9,9				480		
	C-70	100	60		5,7	7,4	90	110	180		
		110	80		7,6				240		
		190	160		12,4				480		
<b>M10</b>	5.8	100	60	20	6,7	8,6	90	125	180	45	45
		120	90		10,1		110	105	270		
		230	200		13,8		55	85	600		
	8.8	100	60		6,7	13,1	90	200	180		
		120	90		10,1		110	170	270		
		230	200		22,4			115	600		
	A4-70	100	60		6,7	9,2	90	135	180		
		120	90		10,1		110	110	270		
		230	200		15,7			65	600		
	C-70	100	60		6,7	11,4	90	170	180		
		120	90		10,1		110	145	270		
		230	200		19,5			105	600		



## LOADS

### Injection system FIS GREEN: Injection mortar FIS GREEN with Threaded rod FIS A <sup>1)</sup>

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>2) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}^{6)}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8) 9)}$ [mm]	$c_{min}^{8) 9)}$ [mm]
M12	5.8	100	70	40	8,9	12,0	105	175	210	55	55
		140	110		14,0		130	130	330		
		270	240		20,5		70	100	720		
	8.8	100	70		8,9	19,4	105	295	210		
		140	110		14,0		130	230	330		
		270	240		30,5		150	150	720		
	A4-70	100	70		8,9	13,7	105	200	210		
		140	110		14,0		130	155	330		
		270	240		22,5		85	115	720		
	C-70	100	70		8,9	17,1	105	260	210		
		140	110		14,0		130	200	330		
		270	240		28,1		115	135	720		
M16	5.8	120	80	60	12,0	22,3	125	305	240	65	65
		170	125		18,7		160	235	375		
		360	320		37,6		115	150	960		
	8.8	120	80		12,0	28,7	125	405	240		
		170	125		18,7		160	220	375		
		360	320		47,9		160	220	960		
	A4-70	120	80		12,0	25,2	125	350	240		
		170	125		18,7		160	270	375		
		360	320		42,0		135	165	960		
	C-70	120	80		12,0	28,7	125	405	240		
		170	125		18,7		160	350	375		
		360	320		47,9		160	195	960		
M20	5.8	140	90	120	14,6	34,9	135	435	270	85	85
		220	170		27,6		190	300	510		
		450	400		58,6		165	195	1200		
	8.8	140	90		14,6	35,0	135	440	270		
		220	170		27,6		190	525	510		
		450	400		64,8		190	290	1200		
	A4-70	140	90		14,6	35,0	135	440	270		
		220	170		27,6		190	350	510		
		450	400		64,8		190	215	1200		
	C-70	140	90		14,6	35,0	135	440	270		
		220	170		27,6		190	455	510		
		450	400		64,8		190	260	1200		

For the design the complete assessment ETA-14/0408 has to be considered. <sup>10)</sup>

<sup>1)</sup> Also valid for threaded rod RG M in the same property class.

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-14/0408 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-14/0408.

<sup>3)</sup> The given loads are valid for injection mortar FIS GREEN for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-14/0408.

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>5)</sup> Drill method hammer drilling.

<sup>6)</sup> For the sizes M8 - M20 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

<sup>7)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-14/0408.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-14/0408.

<sup>10)</sup> The given loads refer to the European Technical Assessment ETA-14/0408, issue date 19/12/2014. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Injection system FIS GREEN: Injection resin FIS GREEN with Internal threaded anchor RGMI

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Screw steel property/surface	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	95	65	270	55	55
	8.8				11,9	8,3	135	95			
	A4-70				9,9	5,9	110	70			
RG M10 I	5.8	130	90	20	13,8	8,3	145	90	270	65	65
	8.8				13,9	13,3		155			
	A4-70					9,3		100			
RG M12 I	5.8	170	125	40	20,2	12,1	190	110	375	75	75
	8.8					19,3		190			
	A4-70					13,5		125			
RG M16 I	5.8	210	160	80	27,8	22,4	240	180	480	95	95
	8.8					30,9		265			
	A4-70					25,1		205			

For the design the complete assessment ETA-14/0408 has to be considered. <sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-14/0408 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-14/0408.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-14/0408.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-14/0408, issue date 19/12/2014. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>4)</sup>

Highest permissible loads <sup>1) 5)</sup> for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type	Compressive- brick- strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characte- ristic spacing parallel to bed joint	Characte- ristic spacing perpen- dicular to bed joint	Min. spacing <sup>2)</sup>	Characte- ristic resp. min. edge distance <sup>2)</sup>
	f <sub>b</sub> [N/mm <sup>2</sup> ]	ρ [kg/dm <sup>3</sup> ]	(L x W x H) [mm]	h <sub>ef</sub> [mm]	h <sub>min</sub> [mm]	T <sub>inst,max</sub> [Nm]	N <sub>perm</sub> [kN]	V <sub>perm</sub> [kN]	s <sub>cr</sub>    [mm]	s <sub>cr</sub> ⊥ [mm]	s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	c <sub>cr</sub> = c <sub>min</sub> [mm]
Solid brick Mz, NF acc. to EN 771-1												
M8	≥10	≥1,8	240x115x71 (NF)	50	80	10	0,71	0,71	150	150	150	100
M10				50	80		0,86	1,14	150	150	150	100
M10				80	110		1,29	1,14	240	240	240	100
M10				200	230		3,14	2,43	300	300	300	150
M12				50	80		0,86	1,14	150	150	150	100
M12				80	110		1,43	1,14	240	240	240	100
M12				200	230		2,00	3,29	300	300	300	150
M8	≥20			50	80		0,71	1,14	150	150	150	100
M10				50	80		1,29	1,71	150	150	150	100
M10				80	110		1,71	1,71	240	240	240	100
M10				200	230		3,43	3,43	300	300	300	150
M12				50	80		1,14	1,57	150	150	150	100
M12				80	110		2,00	1,57	240	240	240	100
M12				200	230		2,86	3,43	300	300	300	150



## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type	Compressive- brick- strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characte- ristic spacing parallel to bed joint	Characte- ristic spa- cing perpen- dicular to bed joint	Min. spacing <sup>2)</sup>	Characte- ristic respo- nse min. edge distance <sup>2)</sup>			
	f <sub>b</sub>  [N/mm <sup>2</sup> ]	ρ  [kg/dm <sup>3</sup> ]	(L x W x H)  [mm]	h <sub>ef</sub>  [mm]	h <sub>min</sub>  [mm]	T <sub>inst,max</sub>  [Nm]	N <sub>perm</sub>  [kN]	V <sub>perm</sub>  [kN]	s <sub>cr</sub>     [mm]	s <sub>cr</sub> ⊥  [mm]	s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	c <sub>cr</sub> = c <sub>min</sub>  [mm]			
Solid sand-lime brick KS acc. to EN 771															
M8	≥10	≥1,8	240x115x71 (NF)	50	80	10	0,71	1,14	150	150	150	100			
M10				50	80		0,71	1,14	150	150	150	100			
M10				80	110		0,86	1,14	240	240	240	100			
M10				200	230		2,57	1,14	300	300	300	150			
M12				50	80		0,57	1,43	150	150	150	100			
M12				80	110		0,86	1,43	240	240	240	100			
M12				200	230		2,57	1,43	300	300	300	150			
M8	≥20						50	80		0,71	1,57	150	150	150	100
M10							50	80		0,86	1,57	150	150	150	100
M10							80	110		1,14	1,57	240	240	240	100
M10							200	230		3,43	1,57	300	300	300	150
M12							50	80		0,86	2,00	150	150	150	100
M12							80	110		1,29	2,00	240	240	240	100
M12							200	230		3,43	2,00	300	300	300	150

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>6)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H..K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in solid brick masonry (with injection anchor sleeve) for pre-positioned installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective anchorage depth <sup>4)</sup>	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Characteristic spacing parallel to bed joint	Characteristic spacing perpendicular to bed joint	Min. spacing <sup>2)</sup>	Characteristic resp. min. edge distance <sup>2)</sup>		
	f <sub>b</sub>	ρ	(L x W x H)	h <sub>ef</sub>	h <sub>min</sub>	T <sub>inst,max</sub>	N <sub>perm</sub>	V <sub>perm</sub>	s <sub>cr</sub>	s <sub>cr</sub> ⊥	s <sub>min</sub>    / s <sub>min</sub> ⊥	c <sub>cr</sub> = c <sub>min</sub>		
	[N/mm <sup>2</sup> ]	[kg/dm <sup>3</sup> ]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]		
Solid sand-lime brick KS acc. to EN 771														
12x85 M8	≥ 10	≥ 1,8	240x115x113	85	115	2	0,86	0,86	255	255	255	100		
16x85 M10						4	0,57	1,00						
20x85 M12						4	1,57	1,00						
12x85 M8	≥ 20			85	115	2	1,29	1,29						
16x85 M10						4	0,86	1,57						
20x85 M12						4	2,29	1,57						

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H..K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation. For the design the complete assessment ETA-14/0471 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength  f <sub>b</sub> [N/mm <sup>2</sup> ]	Brick raw density  ρ [kg/dm <sup>3</sup> ]	Minimum brick-dimensions <sup>7)</sup>  (L x W x H) [mm]	Min. effective-anchorage depth <sup>4)</sup>  h <sub>ef</sub> [mm]	Min. member thickness  h <sub>min</sub> [mm]	Maximum torque  T <sub>inst,max</sub> [Nm]	Permissible tensile load <sup>3)</sup>  N <sub>perm</sub> [kN]	Permissible shear load <sup>3)</sup>  V <sub>perm</sub> [kN]	Characteristic spacing parallel to bed joint  s <sub>cr</sub>    [mm]	Characteristic spacing perpendicular to bed joint  s <sub>cr</sub> ⊥ [mm]	Min. spacing <sup>2)</sup>  s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  c <sub>cr</sub> = c <sub>min</sub> [mm]
Vertically perforated brick Hlz, acc. to EN 771-1												
12x85 M6/M8	≥ 8	≥ 1,4	230x108x55	85	115	2,0	0,57	0,71	230	55	230 / 55	100
16x85 M8/M10												
20x85 M12/M16												
12x85 M6/M8	≥ 10	≥ 0,9	240x175x113	85	175	2,0	0,57	1,14	240	115	240 / 115	120
16x85 M8/M10							0,57	1,57				
20x85 M12/M16							0,71	1,71				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x85 M6/M8	≥ 12	≥ 1,4	240x175x113	85	175	2,0	0,34	0,71	240	115	240 / 115	100
16x85 M8/M10							0,57	1,57				
20x85 M12/M16							0,57	1,29				
12x85 M6/M8	≥ 20	≥ 1,4	240x175x113	85	175	2,0	0,57	1,29	240	115	240 / 115	100
16x85 M8/M10							1,00	2,29				
20x85 M12/M16							1,00	2,14				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in aerated concrete. For the design the complete assessment ETA-14/0471 has to be considered.

Type threaded rod	Compressive brick-strength $f_b$ [N/mm <sup>2</sup> ]	Brick raw density $\rho$ [kg/dm <sup>3</sup> ]	Minimum brick dimensions (L x W x H) [mm]	Min. effective-anchorage depth $h_{ef}$ [mm]	Min. member thickness $h_{min}$ [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load <sup>3)</sup> $N_{perm}$ [kN]	Permissible shear load <sup>3)</sup> $V_{perm}$ [kN]	Characteristic spacing parallel to bed joint $s_{cr \parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr \perp}$ [mm]	Min. spacing <sup>2)</sup> $s_{min \parallel} / s_{min \perp}$ [mm]	Characteristic resp. min. edge distance <sup>2)</sup> $c_{cr} = c_{min}$ [mm]
<b>Aerated concrete acc. to EN 771-4</b>												
M8	≥ 2	≥ 0,35				1	0,71	0,32				
M10						2	0,71	0,32				
M12						2	0,89	0,32				
M16	≥ 4	≥ 0,50		100	130	2	0,89	0,43	240	115	240 / 115	80
M8						1	0,89	0,54				
M10						2	1,07	0,54				
M12	≥ 6	≥ 0,65				2	1,07	0,54				
M16						2	1,07	0,54				
M8						1	1,25	0,89				
M10	≥ 6	≥ 0,65				2	1,43	0,89				
M12						2	1,43	0,89				
M16						2	1,43	0,71				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

## The approved injection mortar for anchorings in masonry and non-cracked concrete

3

Chemical fixings



Cable duct



Air conditioning units

### BUILDING MATERIALS

- Concrete C20/25 to C50/60, non-cracked
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Perforated blocks made from light-weight concrete
- Solid brick
- Aerated concrete

#### Also suitable for:

- Solid brick made from lightweight concrete

### ASSESSMENT/APPROVAL



### ADVANTAGES

- With FIS P Plus, anchorings in masonry and non-cracked concrete for which approval is relevant can be realised in a particularly economical manner.
- FIS P Plus 300 T can be used with stable, standard silicone injection dispensers. No special equipment is required. As a result, procurement costs can be reduced on the basis of polyester resin.

### APPLICATIONS

#### Injection mortar for use in masonry and non-cracked concrete with:

- Threaded rods FIS A, see pages 146
- Injection anchor sleeves FIS H K, see page 167
- Injection push-through anchor sleeve FIS H K, see page 164

### FUNCTIONING

- FIS P Plus is a 2-component injection mortar based on polyester resin.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- Partially used cartridges can be reused, simply by changing the static mixer.
- Related accessories for use in masonry and non-cracked concrete can be found on page PL.

### SEE ALSO



#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

Page 195



#### ACCESSORIES

Page 198

The diagram illustrates the five steps of the drilling process:

- Drilling:** The drill bit is shown entering the material.
- Flushing:** The drill bit is shown with a 2x magnification of the flushing process, where the drill bit is retracted to clear the hole.
- Retraction:** The drill bit is shown being retracted from the hole.
- Advancement:** The drill bit is shown being advanced into the hole.
- Completion:** The drill bit is shown being retracted, and the final hole is shown with a 2x magnification of the completion process.

## TECHNICAL DATA



FIS P Plus 300 T



FIS P Plus 380 C



Static mixer FIS MR Plus

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	ETA				[pcs]
FIS P Plus 300 T	523226	■	EN, ES, PT	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
FIS P Plus 300 T	537551	■	CS, SK, EL	150	1 cartridge 300 ml, 2 x FIS MR Plus	10
FIS P Plus 300 T	522430	■	DE, FR, NL	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P Plus 300 T DIY	510637	■	ES, PT	150	1 cartridge 300 ml, 2 x FIS MR Plus	10
FIS P Plus 380 C	522178	■	EN, ES, PT	190	1 cartridge 380 ml, 2 x FIS MR Plus	12
FIS MR Plus	545853	—	—	—	10 static mixer FIS MR Plus	10

## CURING TIME

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5 °C - 0 °C	24 hrs.
		+ 1 °C - + 5 °C	3 hrs.
+ 5 °C - +10 °C	9 min.	+ 6 °C - +10 °C	90 min.
+10 °C - +20 °C	5 min.	+11 °C - +20 °C	60 min.
+20 °C - +30 °C	4 min.	+21 °C - +30 °C	45 min.
+30 °C - +40 °C	2 min.	+31 °C - +40 °C	35 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.



## LOADS

### Injection system FIS P Plus: Injection resin with Threaded rod FIS A

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70 <sup>2)</sup>

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		h <sub>min</sub> [mm]	h <sub>ef</sub> [mm]	T <sub>max</sub> [Nm]	N <sub>perm</sub> <sup>6)</sup> [kN]	V <sub>perm</sub> <sup>6)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s <sub>cr</sub> [mm]	s <sub>min</sub> <sup>7)</sup> [mm]	c <sub>min</sub> <sup>7)</sup> [mm]
FIS A M 8	5.8	100	60	10	4,7	5,1	75	70	180	40	40
		110	80		6,2		240				
		190	160		9,0		480				
	8.8	100	60		4,7	8,6	75	130	180		
		110	80		6,2			115	240		
		190	160		12,4			95	480		
	A4-70	100	60		4,7	6,0	75	85	180		
		110	80		6,2			75	240		
		190	160		9,9			480			
	C-70	100	60		4,7	7,4	75	110	180		
		110	80		6,2			100	240		
		190	160		12,4			85	480		
FIS A M 10	5.8	100	60	20	5,8	8,6	90	125	180	45	45
		120	90		8,8		95	105	270		
		230	200		13,8		60	90	600		
	8.8	100	60		5,8	11,7	90	175	180		
		120	90		8,8		95	170	270		
		230	200		19,4			125	600		
	A4-70	100	60		5,8	9,2	90	135	180		
		120	90		8,8		95	110	270		
		230	200		15,7		70	95	600		
	C-70	100	60		5,8	11,4	90	170	180		
		120	90		8,8		95	145	270		
		230	200		19,4			115	600		
FIS A M 12	5.8	100	70	40	8,2	12,0	105	175	210	55	55
		140	110		12,8		115	130	330		
		270	240		20,5		75	110	720		
	8.8	100	70		8,2	16,3	105	245	210		
		140	110		12,8		115	230	330		
		270	240		28,0			160	720		
	A4-70	100	70		8,2	13,7	105	200	210		
		140	110		12,8		115	155	330		
		270	240		22,5		85	125	720		
	C-70	100	70		8,2	16,3	105	245	210		
		140	110		12,8		115	200	330		
		270	240		28,0			145	720		
FIS A M 16	5.8	120	80	60	12,4	22,3	120	305	240	65	65
		170	125		19,4		150	235	375		
		360	320		37,6		105	165	960		
	8.8	120	80		12,4	24,9	120	345	240		
		170	125		19,4		150	405	375		
		360	320		49,8			235	960		
	A4-70	120	80		12,4	24,9	120	345	240		
		170	125		19,4		150	270	375		
		360	320		42,0			180	960		
	C-70	120	80		12,4	24,9	120	345	240		
		170	125		19,4			350	375		
		360	320		49,8			215	960		



## LOADS

### Injection system FIS P Plus: Injection resin with Threaded rod FIS A

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70 <sup>2)</sup>

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 3) 4) 5)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Maximum torque moment	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{6)}$ [kN]	$V_{perm}^{6)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{7)}$ [mm]	$c_{min}^{7)}$ [mm]
FIS A M 20	5.8	140	90	120	16,2	32,3	135	400	270	85	85
		220	170		30,5	34,9	180	300	510		
		450	400		58,6		140	215	1200		
	8.8	140	90		16,2	32,3	135	400	270		
		220	170		30,5	56,0	180	525	510		
		450	400		71,8			320	1200		
	A4-70	140	90		16,2	32,3	135	400	270		
		220	170		30,5	39,4	180	350	510		
		450	400		65,7		160	240	1200		
	C-70	140	90		16,2	32,3	135	400	270		
		220	170		30,5	49,1	180	455	510		
		450	400		71,8			285	1200		
FIS A M 24	5.8	160	96	150	20,7	41,4	150	490	290	105	105
		270	210		45,2	50,9	225	390	630		
		540	480		84,3		165	275	1440		
	8.8	160	96		20,7	41,4	150	490	290		
		270	210		45,2	80,6	225	675	630		
		540	480		103,4		215	420	1440		
	A4-70	160	96		20,7	41,4	150	490	290		
		270	210		45,2	56,8	225	445	630		
		540	480		94,3		195	300	1440		
	C-70	160	96		20,7	41,4	150	490	290		
		270	210		45,2	70,9	225	580	630		
		540	480		103,4		215	355	1440		

For the design the complete assessment ETA-18/0383 has to be considered. <sup>8)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-18/0383 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-18/0383

<sup>2)</sup> Also valid for threaded rod RGM in the same property class.

<sup>3)</sup> The given loads are valid for injection mortar for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-18/0383.

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>5)</sup> Drill method hammer drilling. For further allowable application conditions see ETA-18/0383.

<sup>6)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>7)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>8)</sup> The given loads refer to the European Technical Assessment ETA-18/0383, issue date 06/09/2018. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

## LOADS

### Injection system FIS P Plus with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-11/04 19 has to be considered.

Type	Compressive- brick- strength	Brick raw density	Minimum brick dimensions <sup>6)</sup>	Min. effective- anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Character- istic spa- cing paral- lel to bed joint	Character- istic spa- cing perpen- dicular to bed joint	Min. spacing <sup>2)</sup>	Character- istic resp. min. edge distance <sup>2)</sup>
	f <sub>b</sub> [N/mm²]	ρ [kg/dm³]	(L x W x H) [mm]	h <sub>ef</sub> [mm]	h <sub>min</sub> [mm]	T <sub>inst,max</sub> [Nm]	N <sub>perm</sub> [kN]	V <sub>perm</sub> [kN]	s <sub>cr</sub>    [mm]	s <sub>cr</sub> ⊥ [mm]	s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	c <sub>cr</sub> = c <sub>min</sub> [mm]
Solid brick Mz, NF acc. to EN 771-1												
M8	≥10	≥1,8	240x115x71	50	115	10	1,14	0,71	150	75	150 / 75	100
M10				50			1,00	1,14	150		150 / 75	100
M10				80			1,43	1,14	240		240 / 75	100
M10				200			2,43	3,40	240		240 / 75	150
M12				50			0,86	1,14	150		150 / 75	100
M12				80			1,51	1,14	240		240 / 75	100
M12				200			3,20	2,43	240		240 / 75	150
M8	≥20			50			1,57	1,14	150		150 / 75	100
M10				50			1,43	1,71	150		150 / 75	100
M10				80			2,00	1,71	240		240 / 75	100
M10				200			2,43	2,43	240		240 / 75	150
M12				50			1,29	1,57	150		150 / 75	100
M12				80			2,29	1,57	240		240 / 75	100
M12				200			2,43	2,43	240		240 / 75	150
Solid sand-lime brick KS acc. to EN 771												
M8	≥10	≥1,8	240x115x71	50	115	10	0,71	1,14	240	75	240 / 75	100
M10				50			0,71	1,14				100
M10				80			0,71	1,14				100
M10				200			2,43	1,14				150
M12				50			0,71	1,43				100
M12				80			0,71	1,43				100
M12				200			2,43	1,43				150
M8	≥20			50			1,00	1,57				100
M10				50			1,00	1,57				100
M10				80			1,00	1,57				100
M10				200			2,43	1,57				150
M12				50			1,00	2,00				100
M12				80			1,00	2,00				100
M12				200			2,43	2,00				150

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>6)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS P Plus with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H...K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation. For the design the complete assessment ETA-11/04 19 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength  f <sub>b</sub> [N/mm <sup>2</sup> ]	Brick raw density  ρ [kg/dm <sup>3</sup> ]	Minimum brick-dimensions <sup>7)</sup>  (L x W x H) [mm]	Min. effective anchorage depth <sup>4)</sup>  h <sub>ef</sub> [mm]	Min. member thickness  h <sub>min</sub> [mm]	Maximum torque  T <sub>inst,max</sub> [Nm]	Permissible tensile load <sup>3)</sup>  N <sub>perm</sub> [kN]	Permissible shear load <sup>3)</sup>  V <sub>perm</sub> [kN]	Characteristic spacing parallel to bed joint  s <sub>cr</sub>    [mm]	Characteristic spacing perpendicular to bed joint  s <sub>cr</sub> ⊥ [mm]	Min. spacing <sup>2)</sup>  s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  c <sub>cr</sub> = c <sub>min</sub> [mm]
Vertically perforated brick Hlz, acc. to EN 771-1												
12x85 M8	≥ 10	≥ 0,9	240x175x113	85	175	2,0	1,14	1,14	240	115	240 / 115	100
16x85 M10							1,00	1,57				
20x85 M12							1,43	1,71				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x85 M8	≥ 12	≥ 1,4	240x175x113	85	175	2,0	0,71	0,71	240	115	100 / 115	100
16x85 M8/M10							0,86	1,29				
20x85 M12							1,00	1,29				
12x85 M8	≥ 20	≥ 1,4	240x175x113	85	175	2,0	1,29	1,29	240	115	100 / 115	100
16x85 M8/M10							1,43	2,14				
20x85 M12							1,71	2,14				
Lightweight concrete hollow block Hbl acc. to EN 771-3												
12x85 M8	≥ 4	≥ 1,0	362x240x240	85	240	2,0	0,86	0,57	365	240	365 / 240	80
16x85 M10												
20x85 M12												

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H...K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

## LOADS

### Injection system FIS P Plus with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in aerated concrete.

For the design the complete assessment ETA-11/04 19 has to be considered.

Type threaded rod	Compressive brick-strength $f_b$ [N/mm <sup>2</sup> ]	Brick raw density $\rho$ [kg/dm <sup>3</sup> ]	Minimum brick dimensions (L x W x H) [mm]	Min. effective anchorage depth $h_{ef}$ [mm]	Min. member thickness $h_{min}$ [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load <sup>3)</sup> $N_{perm}$ [kN]	Permissible shear load <sup>3)</sup> $V_{perm}$ [kN]	Characteristic spacing parallel to bed joint $s_{cr \parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr \perp}$ [mm]	Min. spacing <sup>2)</sup> $s_{min \parallel} / s_{min \perp}$ [mm]	Characteristic resp. min. edge distance <sup>2)</sup> $c_{cr} = c_{min}$ [mm]
<b>Aerated concrete acc. to EN 771-4</b>												
M8	≥ 2	≥ 0,35					1	0,54	0,43			
M10							2	0,54	0,43			
M12							2	0,54	0,54			
M8	≥ 4	≥ 0,50	-	100	130		1	0,71	0,89	250	250	250
M10							2	0,89	0,71			
M12							2	0,89	0,89			
M8	≥ 6	≥ 0,65					1	1,25	1,07			
M10							2	1,79	1,07			
M12							2	1,79	1,25			

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

## The reliable injection mortar for anchorings in masonry



Gates



Wall consoles

### BUILDING MATERIALS

- Vertically perforated brick
- Hollow block
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

### ADVANTAGES

- The FIS P is the economical solution for anchorings in masonry that do not require approvals.
- The FIS P 300 T can be used with stable, standard silicone injection dispensers. No special equipment is required. This helps to reduce procurement costs.

### APPLICATIONS

#### Injection mortar for use in masonry and aerated concrete with:

- Threaded rods FIS A, see page 144
- Internal threaded anchor FIS E, see page 161
- Injection anchor sleeves FIS H, see page 167
- Aerated concrete centring sleeve PBZ, see page 199

### FUNCTIONING

- The FIS P is a 2-component injection mortar based on polyester resin.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- Partially used cartridges can be reused, simply by changing the static mixer.
- Related accessories for use in masonry and aerated concrete can be found on page 167 or page 198.

### SEE ALSO



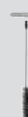
#### ANCHORS + SLEEVES

Page 144



#### DISPENSER

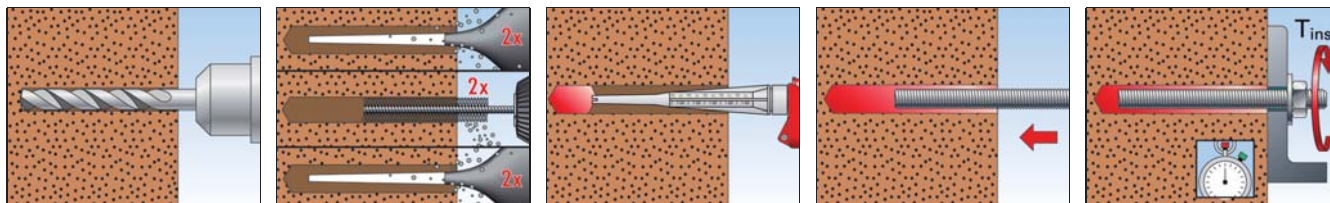
Page 195



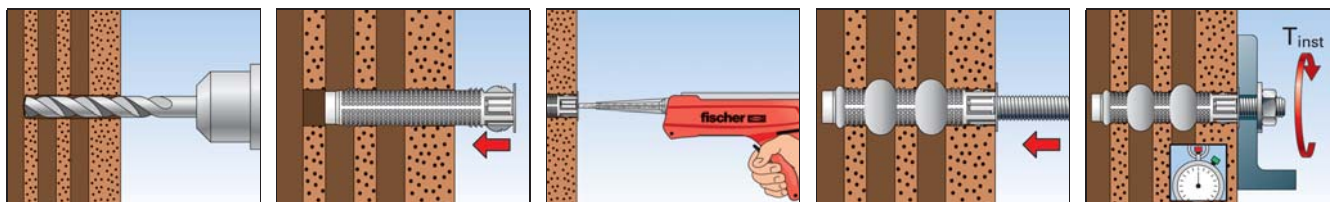
#### ACCESSORIES

Page 198

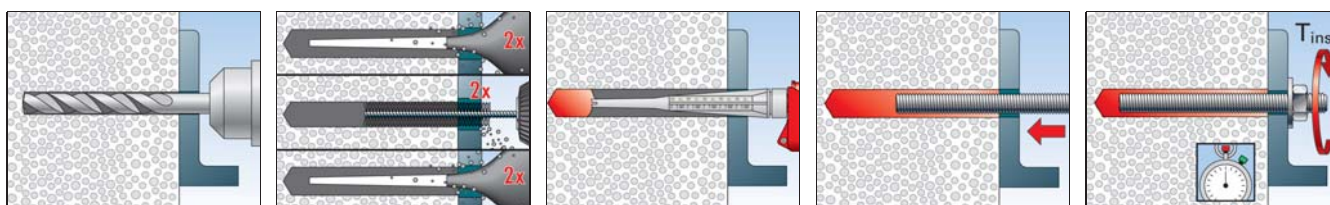
## INSTALLATION IN SOLID BRICK WITH FIS P AND FIS A / RG M



## INSTALLATION IN HOLLOW BLOCKS WITH FIS P AND FIS HK + FIS A / RG M



## INSTALLATION IN AERATED CONCRETE WITH FIS P AND FIS A / RG M



## TECHNICAL DATA



FIS P 300 TB



FIS P 300 T



FIS P 360 S



FIS P 380 C



FIS P 410 C



Static mixer FIS MR Plus

		Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.				[pcs]
FIS P 300 TB	044725	DE, EN, NL, ES, ZH, PT	150	1 cartridge 300 ml, 2 x FIS MR Plus	6
FIS P 300 T	093175	DE, EN, NL, ES, ZH, PT	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T	093178	PL, SL, HU, HR, RO	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T	502287	LT, LV, ET, UK, RU, KK	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T	051061	CS, SK, EL	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T	535861	USA, RA, BR, MEX	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T with Clip	537150	USA, RA, BR, MEX	150	1 cartridge 300 ml, 2 x FIS MR Plus	10
FIS P 360 S	056691	DE, FR, NL, CS, TR, PL	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS P 360 S	056708	GB, I, E, P, F, UAE	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS P 360 S	531547	USA, RA, BR, MEX	180	1 cartridge 360 ml, 2 x FIS MR Plus	12
FIS P 380 C	059234	EN, IT, PT, ES, ZH, JA	190	1 cartridge 380 ml, 2 x FIS MR Plus	12
FIS P 410 C	538134	USA, RA, BR, MEX	205	1 cartridge 410 ml, 2 x FIS MR Plus	12
FIS MR Plus	545853	—	—	10 static mixer FIS MR Plus	10


**FIS P 300 T HWK small**

**FIS P 300 T in bucket**

**FIS P 380 C in bucket**

		Languages on the cartridge	Contents	Sales unit
Item	Art.-No.			[pcs]
<b>FIS P 300 T HWK small</b>	<b>040040</b>	DE, EN, NL, ES, ZH, PT	12 cartridges, 24 x FIS MR Plus	1
<b>FIS P 300 T in bucket</b>	<b>511341</b>	DE, EN, NL, ES, ZH, PT	20 cartridges, 20 x FIS MR Plus	1
<b>FIS P 380 C in bucket</b>	<b>511340</b>	EN, IT, PT, ES, ZH, JA	16 cartridges, 16 x FIS MR Plus	1

## CURING TIME FIS P 300 T

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		± 0 °C - + 5 °C	6 hrs.
+ 5 °C - +10 °C	15 min.	+ 5 °C - +10 °C	3 hrs.
+10 °C - +20 °C	8 min.	+10 °C - +20 °C	2 hrs.
+20 °C - +30 °C	5 min.	+20 °C - +30 °C	60 min.
+30 °C - +40 °C	3 min.	+30 °C - +40 °C	30 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

## CURING TIME FIS P 360 S

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5 °C	480 min.
		± 0 °C	240 min.
+ 5 °C	14 min.	+ 5 °C	120 min.
+20 °C	5 min.	+20 °C	60 min.
+30 °C	3 min.	+30 °C	30 min.
+40 °C	2 min.	+40 °C	20 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled.

## CURING TIME FIS P 380 C / FIS P 410 C

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5 °C - ± 0 °C	6 hrs.
		± 0 °C - + 5 °C	3 hrs.
+ 5 °C - +20 °C	5 min.	+ 5 °C - +20 °C	90 min.
+20 °C - +30 °C	4 min.	+20 °C - +30 °C	45 min.
+30 °C - +40 °C	2 min.	+30 °C - +40 °C	30 min.











The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.














## Anchors and Mortars











											
	Threaded Rod FIS A	Threaded Rod RG M	Internal Threaded Anchor RGM I	Internal Threaded Socket FIS E	Highbond Anchor FHB II-A L / FHB II-AS	Highbond Anchor FHB II-A L Inject / FHB II-A S Inject	FHB dyn	FDA	UMV-A dyn	Rebar	Page

### Mortar Cartridges





	Best performance in concrete					■	■	■	■		52
Highbond-System FHB II											
	Concrete all-rounder	■	■	■						■	64
Superbond-System FSB											
	Powerful rebar connections + cracked concrete	■	■	■						■	86
Epoxy mortar FIS EM Plus											
	Basic Epoxy mortar for concrete	■	■							■	95
Epoxy mortar FIS EB											
	Versatile mortar for masonry und cracked concrete	■	■	■	■					■	101
Injection mortar FIS V											
	Solid mortar for standard anchorings in masonry and cracked concrete	■	■	■	■					■	117
Injection mortar FIS VL											
	First approved mortar made with renewable raw materials	■	■	■	■						126
Injection mortar FIS GREEN											
	Approved for Masonry	■	■		■						133
Injection mortar FIS P Plus											
	Reliable in masonry	(■)	(■)		(■)						140
Injection mortar FIS P											

■ = approved · (■) = recommendation

## Anchors and Mortars

											
	Threaded Rod FIS A	Threaded Rod RG M	Internal Threaded Anchor RG M I	Internal Threaded Socket FIS E	Highbond Anchor FHB II-A L / FHB II-AS	Highbond Anchor FHB II-A L Inject / FHB II-A S Inject	FHB dyn	FDA	UMV-A dyn	Rebar	Page
Positioning											

### Mortar Capsules

 Resin capsules FHB II-P, FHB II-PF High Speed	Best performance in concrete											53
 Resin capsules RSB	Concrete all-rounder											73
 Resin capsules RM II	Bonded anchor for cracked concrete without drill hole cleaning											80
 UMV-P	Capsule system for dynamic loads											176



Bridges for traffic signs



Steel constructions

## ADVANTAGES

- The system of anchor rod FIS A and an injection mortar for cracked concrete (M10 to M30) and non-cracked concrete (M6 to M30) can be individually selected based on requirements, thus allowing for a wide range of applications.
- Variable anchorage depths allow for ideal adaptation to the load to be applied, and ensure an optimised installation time and use of materials.
- Push-through installation is possible without any special parts through filling the annular gap with injection mortar.
- The wide range of approved steel types allows for use in all corrosion resistance classes and offers maximum application safety.

## VERSIONS

- Zinc-plated steel
- Stainless steel

## BUILDING MATERIALS

### Approved for:










- Concrete C20/25 to C50/60, cracked and non-cracked

### Also suitable for:

- Concrete C12/15

## FUNCTIONING

- The system of threaded rod FIS A and an injection mortar for cracked concrete (M10 to M30) and non-cracked concrete (M6 to M30) can be individually selected based on requirements, thus allowing for a wide range of applications.
- The mortar is extruded bubble free from the drill hole base.
- The mortar bonds the entire surface of the threaded rod with the drill hole wall and seals the drill hole.
- The threaded rod is set manually, by lightly rotating it until it reaches the drill hole base.

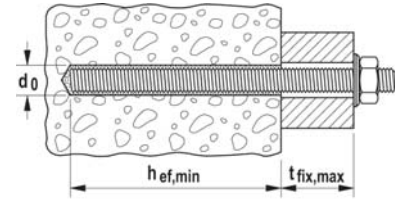
															
	zinc plated, steel grade 5.8	zinc plated, steel grade 8.8	stainless steel	FIS SB	FIS EM Plus	FIS EB	FIS V	FIS VL	FIS GREEN	FIS P Plus	FIS P				
	gvz Art.-No.	gvz Art.-No.	A4 Art.-No.												
Item				Concrete	Concrete	Concrete	Concrete	Masonry	Concrete	Masonry	Concrete	Masonry	Concrete	Masonry	Masonry
FIS A M 6 x 70	046204						■	■	■			■			(■)
FIS A M 6 x 75	090243		090437				■	■	■			■			(■)
FIS A M 6 x 85	090272						■	■	■			■			(■)
FIS A M 6 x 110	090273		090439				■	■	■			■			(■)
FIS A M 8 x 90	090274	519390	090440	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 8 x 110	090275	519391	090441	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 8 x 130	090276	519392	090442	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 8 x 175	090277	519393	090443	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 8 x 1000	509214 <sup>1)</sup>	—	509230 <sup>1)</sup>	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 110	090278	—	090444	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 130	090279	—	090447	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 130	—	524170	—	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 150	090281	517935	090448	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 170	044969	519395	044973	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 190	—	517936	—	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 200	090282	519396	090449	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 1000	509215 <sup>1)</sup>	509223 <sup>1)</sup>	509231 <sup>1)</sup>	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 120	044971	519397	044974	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 140	090283	519398	090450	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 160	090284	517937	090451	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 180	090285	519399	090452	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 200	—	517938	519421	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 210	090286	—	090453	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 260	090287	—	090454	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 1000	509216 <sup>1)</sup>	509224 <sup>1)</sup>	509232 <sup>1)</sup>	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 16 x 130	044972	519400	044975	■	■	■	■	■	■	■	■	■	■		
FIS A M 16 x 175	090288	519401	090455	■	■	■	■	■	■	■	■	■	■		
FIS A M 16 x 200	090289	517939	090456	■	■	■	■	■	■	■	■	■	■		
FIS A M 16 x 250	090290	517940	090457	■	■	■	■	■	■	■	■	■	■		
FIS A M 16 x 300	090291	519402	090458	■	■	■	■	■	■	■	■	■	■		
FIS A M 16 x 1000	509217 <sup>1)</sup>	509225 <sup>1)</sup>	509233 <sup>1)</sup>	■	■	■	■	■	■	■	■	■	■		
FIS A M 20 x 245	090292	519404	090459	■	■	■	■	■	■	■	■	■	■		
FIS A M 20 x 290	090293	519406	090460	■	■	■	■	■	■	■	■	■	■		
FIS A M 20 x 1000	—	519410 <sup>1)</sup>	519427 <sup>1)</sup>	■	■	■	■	■	■	■	■	■	■		
FIS A M 24 x 290	090294	—	090461	■	■	■	■	■	■	■	■	■	■		
FIS A M 24 x 380	090295	—	090462	■	■	■	■	■	■	■	■	■	■		
FIS A M 24 x 1000	533881	—	—	■	■	■	■	■	■	■	■	■	■		
FIS A M 30 x 430	090297	—	090464	■	■	■	■	■	■	■	■	■	■		

■ = approved - (■) = recommendation

## TECHNICAL DATA IN CONCRETE



Threaded rod **FIS A**



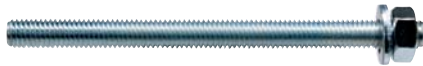
	Zinc plated, steel grade 5.8 Art.-No.	Zinc plated, steel grade 8.8 Art.-No.	Stainless steel Art.-No.	Approval		Drill hole diameter d <sub>0</sub> [mm]	Min. / max. anchorage depth [mm]	Min. / max. usable length [mm]	Min. / max. filling quantity [scale units]	Sales unit [pcs]
Item	gvz	gvz	A4	ETA	ICC					
<b>FIS A M 6 x 70</b>	<b>046204</b>	—	—	■	—	8	50 / 61	1 / 12	2	10
<b>FIS A M 6 x 75</b>	<b>090243</b>	—	<b>090437</b>	■	—	8	50 / 66	1 / 17	2	20
<b>FIS A M 6 x 85</b>	<b>090272</b>	—	—	■	—	8	50 / 72	5 / 27	2	20
<b>FIS A M 6 x 110</b>	<b>090273</b>	—	<b>090439</b>	■	—	8	50 / 72	30 / 52	2	20
<b>FIS A M 8 x 90</b>	<b>090274</b>	<b>519390</b>	<b>090440</b>	■	▲	10	60 / 78	1 / 19	2 / 3	10
<b>FIS A M 8 x 110</b>	<b>090275</b>	<b>519391</b>	<b>090441</b>	■	▲	10	60 / 98	1 / 39	2 / 3	10
<b>FIS A M 8 x 130</b>	<b>090276</b>	<b>519392</b>	<b>090442</b>	■	▲	10	60 / 118	1 / 59	2 / 4	10
<b>FIS A M 8 x 175</b>	<b>090277</b>	<b>519393</b>	<b>090443</b>	■	▲	10	60 / 160	4 / 104	2 / 5	10
<b>FIS A M 8 x 1000</b>	<b>509214</b> <sup>1)</sup>	—	<b>509230</b> <sup>1)</sup>	■	▲	10	60 / 160	—	2 / 5	10
<b>FIS A M 8 x 1000</b>	—	<b>509222</b> <sup>1)</sup>	—	■	—	10	60 / 160	—	2 / 5	10
<b>FIS A M 10 x 110</b>	<b>090278</b>	—	<b>090444</b>	■	▲	12	60 / 96	1 / 37	3 / 4	10
<b>FIS A M 10 x 130</b>	<b>090279</b>	<b>524170</b>	<b>090447</b>	■	▲	12	60 / 116	1 / 57	3 / 5	10
<b>FIS A M 10 x 150</b>	<b>090281</b>	<b>517935</b>	<b>090448</b>	■	▲	12	60 / 136	1 / 77	3 / 5	10
<b>FIS A M 10 x 170</b>	<b>044969</b>	<b>519395</b>	<b>044973</b>	■	▲	12	60 / 156	1 / 97	3 / 6	10
<b>FIS A M 10 x 190</b>	—	<b>517936</b>	—	■	▲	12	60 / 176	1 / 117	3 / 7	10
<b>FIS A M 10 x 200</b>	<b>090282</b>	<b>519396</b>	<b>090449</b>	■	▲	12	60 / 186	1 / 127	3 / 7	10
<b>FIS A M 10 x 1000</b>	<b>509215</b> <sup>1)</sup>	<b>509223</b> <sup>1)</sup>	<b>509231</b> <sup>1)</sup>	■	▲	12	60 / 200	—	3 / 7	10
<b>FIS A M 12 x 120</b>	<b>044971</b>	<b>519397</b>	<b>044974</b>	■	▲	14	70 / 103	1 / 34	3 / 5	10
<b>FIS A M 12 x 140</b>	<b>090283</b>	<b>519398</b>	<b>090450</b>	■	▲	14	70 / 123	1 / 54	3 / 6	10
<b>FIS A M 12 x 160</b>	<b>090284</b>	<b>517937</b>	<b>090451</b>	■	▲	14	70 / 143	1 / 74	3 / 7	10
<b>FIS A M 12 x 180</b>	<b>090285</b>	<b>519399</b>	<b>090452</b>	■	▲	14	70 / 163	1 / 94	3 / 7	10
<b>FIS A M 12 x 200</b>	—	<b>517938</b>	—	■	▲	14	70 / 183	1 / 114	3 / 8	10
<b>FIS A M 12 x 210</b>	<b>090286</b>	—	<b>090453</b>	■	▲	14	70 / 193	1 / 124	3 / 9	10
<b>FIS A M 12 x 260</b>	<b>090287</b>	—	<b>090454</b>	■	▲	14	70 / 240	4 / 174	3 / 10	10
<b>FIS A M 12 x 1000</b>	<b>509216</b> <sup>1)</sup>	<b>509224</b> <sup>1)</sup>	<b>509232</b> <sup>1)</sup>	■	▲	14	70 / 240	—	3 / 10	10
<b>FIS A M 16 x 130</b>	<b>044972</b>	<b>519400</b>	<b>044975</b>	■	▲	18	80 / 109	1 / 30	5 / 7	10
<b>FIS A M 16 x 175</b>	<b>090288</b>	<b>519401</b>	<b>090455</b>	■	▲	18	80 / 154	1 / 75	5 / 10	10
<b>FIS A M 16 x 200</b>	<b>090289</b>	<b>517939</b>	<b>090456</b>	■	▲	18	80 / 179	1 / 100	5 / 11	10
<b>FIS A M 16 x 250</b>	<b>090290</b>	<b>517940</b>	<b>090457</b>	■	▲	18	80 / 229	1 / 150	5 / 14	10
<b>FIS A M 16 x 300</b>	<b>090291</b>	<b>519402</b>	<b>090458</b>	■	▲	18	80 / 279	1 / 200	5 / 17	10
<b>FIS A M 16 x 1000</b>	<b>509217</b> <sup>1)</sup>	<b>509225</b> <sup>1)</sup>	<b>509233</b> <sup>1)</sup>	■	▲	18	80 / 320	—	5 / 19	10
<b>FIS A M 20 x 245</b>	<b>090292</b>	<b>519404</b>	<b>090459</b>	■	▲	24	90 / 220	1 / 131	11/28	10
<b>FIS A M 20 x 290</b>	<b>090293</b>	<b>519406</b>	<b>090460</b>	■	▲	24	90 / 265	1 / 176	11/32	10
<b>FIS A M 20 x 1000</b>	—	<b>519410</b> <sup>1)</sup>	<b>519427</b> <sup>1)</sup>	■	▲	24	90 / 400	—	11/48	10
<b>FIS A M 24 x 290</b>	<b>090294</b>	—	<b>090461</b>	■	▲	28	96 / 260	1 / 165	15/69	5
<b>FIS A M 24 x 380</b>	<b>090295</b>	—	<b>090462</b>	■	▲	28	96 / 350	1 / 255	15/52	5
<b>FIS A M 24 x 1000</b>	<b>533881</b>	—	—	■	▲	28	96 / 480	—	15/69	10
<b>FIS A M 30 x 430</b>	<b>090297</b>	—	<b>090464</b>	■	▲	35	120 / 394	1 / 275	28/88	5

<sup>1)</sup> Order washer and nut separately.

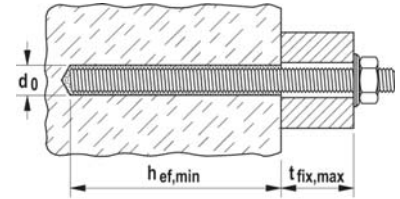
**FIS A M 6 x ... : ETA-Approval in combination with FIS V, FIS VW, FIS VS**



## TECHNICAL DATA IN SOLID BRICK MASONRY



Threaded rod FIS A



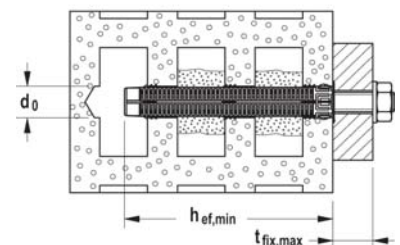
	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter	Min. effective anchorage depth acc. ETA	Max. effective length acc. ETA	Fill quantity for effect. anchoring depth	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	$d_0$ [mm]	[mm]	[mm]	[scale units]	[pcs]
Item	gvz	gvz	A4						
FIS A M 6 x 70	046204	—	—	■	8	50	11	2	10
FIS A M 6 x 75	090243	—	090437	■	8	50	17	2	20
FIS A M 6 x 85	090272	—	—	■	8	50	27	2	20
FIS A M 6 x 110	090273	—	090439	■	8	50	50	2	20
FIS A M 8 x 90	090274	519390	090440	■	10	50	29	2	10
FIS A M 8 x 110	090275	519391	090441	■	10	50	46	2	10
FIS A M 8 x 130	090276	519392	090442	■	10	50	66	2	10
FIS A M 8 x 175	090277	519393	090443	■	10	50	111	2	10
FIS A M 10 x 110	090278	—	090444	■	12	50	30	3	10
FIS A M 10 x 130	090279	524170	090447	■	12	50	50	3	10
FIS A M 10 x 150	090281	517935	090448	■	12	50	70	3	10
FIS A M 10 x 170	044969	519395	044973	■	12	50	90	3	10
FIS A M 10 x 190	—	517936	—	■	12	50	110	3	10
FIS A M 10 x 200	090282	519396	090449	■	12	50	120	3	10
FIS A M 12 x 120	044971	519397	044974	■	14	50	39	3	10
FIS A M 12 x 140	090283	519398	090450	■	14	50	59	3	10
FIS A M 12 x 160	090284	517937	090451	■	14	50	79	3	10
FIS A M 12 x 180	090285	519399	090452	■	14	50	99	3	10
FIS A M 12 x 200	—	517938	—	■	14	50	119	3	10
FIS A M 12 x 210	090286	—	090453	■	14	50	129	3	10
FIS A M 12 x 260	090287	—	090454	■	14	50	179	3	10
FIS A M 16 x 130	044972	519400	044975	■	18	50	20	6	10
FIS A M 16 x 175	090288	519401	090455	■	18	50	65	6	10
FIS A M 16 x 200	090289	517939	090456	■	18	50	90	6	10
FIS A M 16 x 250	090290	517940	090457	■	18	50	140	6	10
FIS A M 16 x 300	090291	519402	090458	■	18	50	190	6	10

FIS A M 6 x ... : ETA-Approval in combination with FIS V, FIS VW, FIS VS

## TECHNICAL DATA IN PERFORATED BRICK MASONRY



Threaded rod FIS A

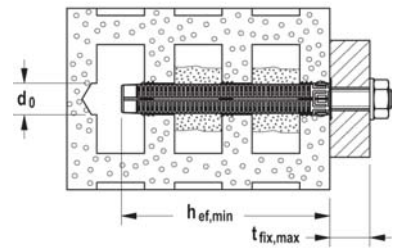


	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter in perforated brick masonry $d_0$ [mm]	Min. anchorage depth in perfora- ted brick masonry $h_{ef, min}$ [mm]	Max. useful length in perforated brick masonry $t_{fix, max}$ [mm]	Suitable injection anchor sleeve	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	[mm]	[mm]	[mm]		[pcs]
Item	gvz	gvz	A4						
FIS A M 6 x 70	046204	—	—	■	12	50	11	FIS H 12 x 50 K	10
FIS A M 6 x 75	090243	—	090437	■	12	50	16	FIS H 12 x 50 K	20
FIS A M 6 x 85	090272	—	—	■	12	50	26	FIS H 12 x 50 K	20

## TECHNICAL DATA IN PERFORATED BRICK MASONRY



Threaded rod FIS A

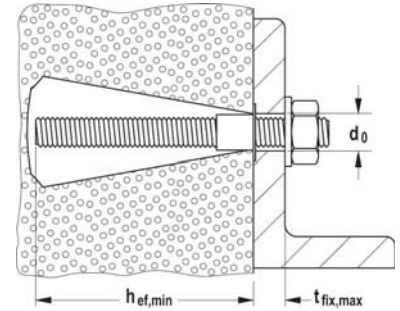


	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter in perforated brick masonry $d_0$ [mm]	Min. anchorage depth in perfora- ted brick masonry $h_{ef,min}$ [mm]	Max. useful length in perforated brick masonry $t_{fix,max}$ [mm]	Suitable injection anchor sleeve	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA					[pcs]
Item	gvz	gvz	A4						
FIS A M 6 x 110	090273	—	090439	■	12	50 85	52 17	FIS H 12 x 50 K FIS H 12 x 85 K	20
FIS A M 8 x 90	090274	519390	090440	■	12	50	29	FIS H 12 x 50 K	10
FIS A M 8 x 110	090275	519391	090441	■	12	50	49	FIS H 12 x 50 K	10
					12	85	14	FIS H 12 x 85 K	
					16	85	14	FIS H 16 x 85 K	
FIS A M 8 x 130	090276	519392	090442	■	12/16	50	69	FIS H 12 x 50 K	10
						85	34	FIS H 12 x 85 K	
						85	34	FIS H 16 x 85 K	
FIS A M 8 x 175	090277	519393	090443	■	12	50	114	FIS H 12 x 50 K	10
					12	85	79	FIS H 12 x 85 K	
					16	85	79	FIS H 16 x 85 K	
					16	130	34	FIS H 16 x 130 K	
FIS A M 10 x 110	090278	—	090444	■	16	85	12	FIS H 16 x 85 K	10
FIS A M 10 x 130	090279	524170	090447	■	16	85	32	FIS H 16 x 85 K	10
FIS A M 10 x 150	090281	517935	090448	■	16	85	52	FIS H 16 x 85 K	10
						130	7	FIS H 16 x 130 K	
FIS A M 10 x 170	044969	519395	044973	■	16	85	72	FIS H 16 x 85 K	10
						130	27	FIS H 16 x 130 K	
FIS A M 10 x 190	—	517936	—	■	16	85	92	FIS H 16 x 85 K	10
						130	47	FIS H 16 x 130 K	
FIS A M 10 x 200	090282	519396	090449	■	16	85	102	FIS H 16 x 85 K	10
						130	57	FIS H 16 x 130 K	
FIS A M 12 x 120	044971	519397	044974	■	20	85	19	FIS H 20 x 85 K	10
FIS A M 12 x 140	090283	519398	090450	■	20	85	39	FIS H 20 x 85 K	10
FIS A M 12 x 160	090284	517937	090451	■	20	85	59	FIS H 20 x 85 K	10
						130	14	FIS H 20 x 130 K	
FIS A M 12 x 180	090285	519399	090452	■	20	85	79	FIS H 20 x 85 K	10
						130	34	FIS H 20 x 130 K	
FIS A M 12 x 200	—	517938	—	■	20	85	99	FIS H 20 x 85 K	10
						130	54	FIS H 20 x 130 K	
FIS A M 12 x 210	090286	—	090453	■	20	85	109	FIS H 20 x 85 K	10
						130	64	FIS H 20 x 130 K	
FIS A M 12 x 260	090287	—	090454	■	20	85	169	FIS H 20 x 85 K	10
						130	114	FIS H 20 x 130 K	
						200	44	FIS H 20 x 200 K	
FIS A M 16 x 130	044972	519400	044975	■	20	85	25	FIS H 20 x 85 K	10
FIS A M 16 x 175	090288	519401	090455	■	20	85	70	FIS H 20 x 85 K	10
						130	25	FIS H 20 x 130 K	
FIS A M 16 x 200	090289	517939	090456	■	20	85	95	FIS H 20 x 85 K	10
						130	50	FIS H 20 x 130 K	
FIS A M 16 x 250	090290	517940	090457	■	20	85	145	FIS H 20 x 85 K	10
						130	100	FIS H 20 x 130 K	
						200	30	FIS H 20 x 200 K	
FIS A M 16 x 300	090291	519402	090458	■	20	85	195	FIS H 20 x 85 K	10
						130	150	FIS H 20 x 130 K	
						200	80	FIS H 20 x 200 K	

## TECHNICAL DATA IN UNDERCUT DRILL HOLE IN AERATED CONCRETE



Threaded rod FIS A

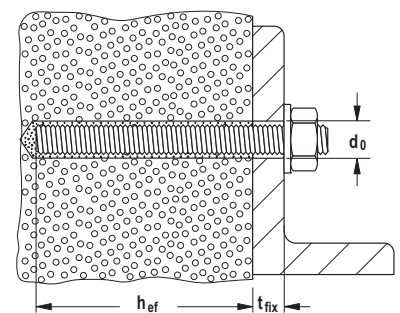


	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter in aerated con- crete in undercut drill hole	Min. / max. anchorage depth in aerated concrete in undercut drill hole $h_{ef}$	Min. / max. usable length in aerated concrete $t_{fix}$	Filling quantity for min. / max. anchorage depth in aerated concrete	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	[mm]	[mm]	[mm]	[scale units]	[pcs]
Item	gvz	gvz	A4						
FIS A M 8 x 90	090274	519390	090440	■	14	75 / 95	4 / -	15 / 20	10
FIS A M 8 x 110	090275	519391	090441	■	14	75 / 95	24 / 4	15 / 20	10
FIS A M 8 x 130	090276	519392	090442	■	14	75 / 95	44 / 24	15 / 20	10
FIS A M 8 x 175	090277	519393	090443	■	14	75 / 95	89 / 69	15 / 20	10
FIS A M 10 x 110	090278	—	090444	■	14	75 / 95	22 / 2	15 / 20	10
FIS A M 10 x 130	090279	524170	090447	■	14	75 / 95	42 / 22	15 / 20	10
FIS A M 10 x 150	090281	517935	090448	■	14	75 / 95	62 / 42	15 / 20	10
FIS A M 10 x 170	044969	519395	044973	■	14	75 / 95	82 / 62	15 / 20	10
FIS A M 10 x 190	—	517936	—	■	14	75 / 95	102 / 82	15 / 20	10
FIS A M 10 x 200	090282	519396	090449	■	14	75 / 95	112 / 92	15 / 20	10
FIS A M 12 x 120	044971	519397	044974	■	14	75 / 95	29 / 9	15 / 20	10
FIS A M 12 x 140	090283	519398	090450	■	14	75 / 95	49 / 29	15 / 20	10
FIS A M 12 x 160	090284	517937	090451	■	14	75 / 95	69 / 49	15 / 20	10
FIS A M 12 x 180	090285	519399	090452	■	14	75 / 95	89 / 69	15 / 20	10
FIS A M 12 x 200	—	517938	—	■	14	75 / 95	109 / 89	15 / 20	10
FIS A M 12 x 210	090286	—	090453	■	14	75 / 95	119 / 99	15 / 20	10
FIS A M 12 x 260	090287	—	090454	■	14	75 / 95	169 / 149	15 / 20	10

## TECHNICAL DATA IN AERATED CONCRETE



Threaded rod FIS A

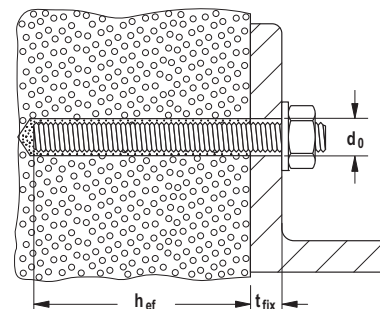


	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter in aerated con- crete in cylindrical drill hole $d_0$	Anchorage depth in aerated con- crete in cylindrical drill hole $h_{ef}$	Usable length $t_{fix}$	Fill quantity for effect. anchorage depth in aerated concrete	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	[mm]	[mm]	[mm]	[scale units]	[pcs]
Item	gvz	gvz	A4						
FIS A M 8 x 90	—	—	090440	■	10	100	—	—	10
FIS A M 8 x 110	090275	519391	090441	■	10	100	2	—	10
FIS A M 8 x 130	090276	519392	090442	■	10	100	19	3	10
FIS A M 8 x 175	090277	519393	090443	■	10	100	64	3	10
FIS A M 10 x 110	090278	—	090444	■	12	100	—	—	10
FIS A M 10 x 130	090279	524170	090447	■	12	100	17	6	10
FIS A M 10 x 150	090281	517935	090448	■	12	100	37	4	10

## TECHNICAL DATA IN AERATED CONCRETE



Threaded rod FIS A



	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter in aerated con- crete in cylindrical drill hole $d_0$ [mm]	Anchorage depth in aerated con- crete in cylindrical drill hole $h_{ef}$ [mm]	Usable length $t_{fix}$ [mm]	Fill quantity for effect. anchorage depth in aerated concrete [scale units]	Sales unit [pcs]
	Art.-No.	Art.-No.	Art.-No.	ETA					
Item	gvz	gvz	A4						
FIS A M 10 x 170	044969	519395	044973	■	12	100	57	4	10
FIS A M 10 x 190	—	517936	—	■	12	100	77	4	10
FIS A M 10 x 200	090282	519396	090449	■	12	100	87	4	10
FIS A M 12 x 120	044971	519397	044974	■	14	100	4	5	10
FIS A M 12 x 140	090283	519398	090450	■	14	100	24	5	10
FIS A M 12 x 160	090284	517937	090451	■	14	100	44	5	10
FIS A M 12 x 180	090285	519399	090452	■	14	100	64	5	10
FIS A M 12 x 200	—	517938	—	■	14	100	84	5	10
FIS A M 12 x 210	090286	—	090453	■	14	100	94	5	10
FIS A M 12 x 260	090287	—	090454	■	14	100	144	5	10
FIS A M 16 x 130	044972	519400	044975	■	18	100	10	6	10
FIS A M 16 x 175	090288	519401	090455	■	18	100	55	6	10
FIS A M 16 x 200	090289	517939	090456	■	18	100	80	6	10
FIS A M 16 x 250	090290	517940	090457	■	18	100	130	6	10
FIS A M 16 x 300	090291	519402	090458	■	18	100	180	6	10

## TECHNICAL DATA



Hexagonal nut and washer

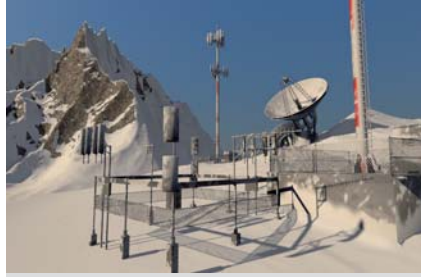
	Zinc plated, steel grade 8.8	Stainless steel	Width across nut $\circ SW$ [mm]	Washer (outer diameter x thickness) [mm]	Match	Sales unit [pcs]
	Art.-No.	Art.-No.				
Item	gvz	A4				
Nut & washer M8	510509	—	13	16 x 1,6	FIS A M8	50
Nut & washer M10	510510	—	17	20 x 2	FIS A M10	50
Nut & washer M12	510511	—	19	24 x 2,5	FIS A M12	25
Nut & washer M16	510512	—	24	30 x 3	FIS A M16	20
Nut & washer M8	—	510513	13	16 x 1,6	FIS A M8 A4	50
Nut & washer M10	—	510514	17	20 x 2	FIS A M10 A4	50
Nut & washer M12	—	510515	19	24 x 2,5	FIS A M12 A4	25
Nut & washer M16	—	510516	24	30 x 3	FIS A M16 A4	20
Nut & washer M20	—	519738	30	37 x 3	FIS A M20 A4	10
Nut & washer M20	519737	—	30	37 x 3	FIS A M 20	10

## TECHNICAL DATA



Filling Sets for subsequent filling of the annular gap

Item	Art.-No.	For use with injection mortar	Match	Sales unit [pcs]
<b>Filling Set M12</b>	<b>537218</b>	FIS SB, FIS EM Plus, FIS V	FIS A M12	10
<b>Filling Set M16</b>	<b>537219</b>	FIS SB, FIS EM Plus, FIS V	FIS A M16	10
<b>Filling Set M20</b>	<b>537220</b>	FIS SB, FIS EM Plus, FIS V	FIS A M 20	10



Steel constructions



Underwater applications

## ADVANTAGES

- The wide range of the RG M from M8 to M30 opens up a wide range of applications and therefore offers great flexibility.
- The wide range of approved steel types for RG M allows for use in all corrosion resistance classes and offers the best possible application safety.
- Please refer to the approvals for the resin capsules and mortar used.

## VERSIONS

- Zinc-plated steel
- Stainless steel

## BUILDING MATERIALS

### Approved for anchorings in:

- Concrete C20/25 to C50/60, cracked and non-cracked












### Also suitable for:

- Natural stone with dense structure

## FUNCTIONING

- Due to its oblique edge, the threaded rod RG M is particularly suitable for use in conjunction with resin capsules.
- The threaded rod RG M is set using a hammer drill and the accompanying setting tool in rotating and hitting motions.
- During setting, the oblique edge of the RG M destroys the capsule, and mixes and activates the mortar.
- Use with injection mortar is also possible. Here, the threaded rod is manually inserted into the drill hole with a light rotating movement until it reaches the base of the hole.



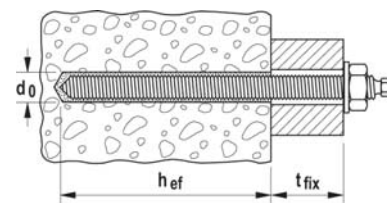
																									
	zinc plated, steel grade 5.8	zinc plated, steel grade 8.8	stainless steel	hot-dip galva- nised steel	highly corro- sion resistant steel	FIS SB	FIS EM Plus	FIS EB	FIS V	FIS VL	FIS GREEN	FIS P Plus	FIS P	RSB	RM II										
Item	gvz Art.-No.	gvz Art.-No.	A4 Art.-No.	hdg Art.-No.	C Art.-No.	Concrete	Concrete	Concrete	Concrete	Masonry	Concrete	Masonry	Concrete	Masonry	Concrete	Masonry	Masonry	Concrete	Concrete						
RG M 8 x 110	050256	—	050263			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 8 x 150	095698	519443	050293			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 10 x 110	535007	—	535009			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 10 x 130	050257	—	050264		096217 <sup>1)</sup>	■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 10 x 165	050280	—	050294			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 10 x 190	050281	—	050296			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 10 x 220	—	519444	—			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 10 x 250	095703	—	095701			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 10 x 350	095718	—	095709			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 12 x 120	535010	—	535011			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 12 x 160	050258	—	050265	512247	096218 <sup>1)</sup>	■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 12 x 180	512248	—	512249			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 12 x 200	—	—	050576			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 12 x 220	050283	519445	050297			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 12 x 250	050284	—	095702			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 12 x 300	050285	—	095705			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 12 x 380	095720 <sup>2)</sup>	—	095710 <sup>1)</sup>			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■						
RG M 16 x 165	050287	—	095704	537062		■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 16 x 140	542407	—	—			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 16 x 190	050259	—	050266	512250	096219 <sup>1)</sup>	■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 16 x 250	050288	—	050298			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 16 x 270	—	519446	—			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 16 x 300	050289	—	050299			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 16 x 380	095722 <sup>2)</sup>	—	095712 <sup>1)</sup>			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 16 x 500	095723 <sup>2)</sup>	—	095713 <sup>1)</sup>			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 20 x 220	512251	—	—			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 20 x 260	050260	—	050267			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 20 x 290	—	519447	—			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 20 x 350	095707	—	095706			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 20 x 500	095725 <sup>1)</sup>	—	—			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 24 x 295	—	519448 <sup>1)</sup>	—			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 24 x 300	050261 <sup>1)</sup>	—	050268 <sup>1)</sup>			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 24 x 400	095727 <sup>1)</sup>	—	095715 <sup>1)</sup>			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 24 x 600	095728	—	—			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 30 x 380	050262 <sup>1)</sup>	—	090726 <sup>1)</sup>			■	■	■	■	■	■	■	■	■	■	■		■	■						
RG M 30 x 500	095730 <sup>1)</sup>	—	—			■	■	■	■	■	■	■	■	■	■	■		■	■						

■ = approved  
 (■) = recommendation

## TECHNICAL DATA IN CONCRETE



Threaded rod **RG M**



Item	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval		Drill hole diameter d <sub>0</sub> [mm]	Anchorage depth (short/standard/ large) h <sub>ef</sub> [mm]	Usable length (short/standard/ large) t <sub>fix</sub> [mm]	Fits capsule RSB	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	ICC					[pcs]
	gvz	gvz	A4							
<b>RG M 8 x 110</b>	<b>050256</b>	—	<b>050263</b>	■	—	10	- / 80 / -	- / 14 / -	1 x RSB 8	10
<b>RG M 8 x 150</b>	<b>095698</b>	—	<b>050293</b>	■	—	10	- / 80 / -	- / 54 / -	1 x RSB 8	10
<b>RG M 8 x 150</b>	—	<b>519443</b>	—	—	—	10	- / 80 / -	- / 54 / -	1 x RSB 8	10
<b>RG M 10 x 110</b>	<b>535007</b>	—	<b>535009</b>	—	—	12	75 / - / -	15 / - / -	1 x RSB 10 Mini	10
<b>RG M 10 x 130</b>	<b>050257</b>	—	<b>050264</b>	■	—	12	75 / 90 / -	35 / 20 / -	1 x RSB 10 mini 1 x RSB 10	10
<b>RG M 10 x 165</b>	<b>050280</b>	—	<b>050294</b>	■	—	12	75 / 90 / -	70 / 55 / -	1 x RSB 10 mini 1 x RSB 10	10
<b>RG M 10 x 190</b>	<b>050281</b>	—	<b>050296</b>	■	—	12	75 / 90 / 150	95 / 80 / 20	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
<b>RG M 10 x 220</b>	—	<b>519444</b>	—	—	—	12	75 / 90 / 150	125 / 110 / 50	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
<b>RG M 10 x 250</b>	<b>095703</b>	—	<b>095701</b>	■	—	12	75 / 90 / 150	155 / 140 / 80	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
<b>RG M 10 x 350</b>	—	—	<b>095709</b>	—	—	12	75 / 90 / 150	255 / 240 / 180	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
<b>RG M 10 x 350</b>	<b>095718</b>	—	—	■	—	12	75 / 90 / 150	255 / 240 / 180	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
<b>RG M 12 x 120</b>	<b>535010</b>	—	<b>535011</b>	■	—	14	75 / - / -	21 / - / -	1 x RSB 12 mini	10
<b>RG M 12 x 160</b>	<b>050258</b>	—	<b>050265</b>	■	—	14	75 / 110 / -	61 / 26 / -	1 x RSB 12 mini 1 x RSB 12	10
<b>RG M 12 x 180</b>	<b>512248</b>	—	<b>512249</b>	■	—	14	75 / 110 / 150	81 / 46 / 6	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
<b>RG M 12 x 200</b>	—	—	<b>050576</b>	■	—	14	75 / 110 / 150	101 / 66 / 26	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
<b>RG M 12 x 220</b>	—	<b>519445</b>	—	—	—	14	75 / 110 / 150	121 / 86 / 46	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
<b>RG M 12 x 220</b>	<b>050283</b>	—	<b>050297</b>	■	—	14	75 / 110 / 150	121 / 86 / 46	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
<b>RG M 12 x 250</b>	<b>050284</b>	—	<b>095702</b>	■	—	14	75 / 110 / 150	151 / 116 / 76	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
<b>RG M 12 x 300</b>	<b>050285</b>	—	<b>095705</b>	■	—	14	75 / 110 / 150	201 / 166 / 126	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
<b>RG M 12 x 380</b>	<b>095720</b> <sup>2)</sup>	—	<b>095710</b> <sup>1)</sup>	■	—	14	75 / 110 / 150	281 / 246 / 206	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10

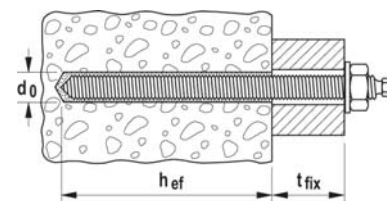
1) Straight cut, additional setting tool required

2) Straight cut, setting tool is enclosed.

## TECHNICAL DATA IN CONCRETE



Threaded rod **RG M**



Item	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval		Drill hole diameter	Anchorage depth (short/standard/ large)	Usable length (short/standard/ large)	Fits capsule RSB	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	ICC	d <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	t <sub>fix</sub> [mm]		[pcs]
<b>RG M 16 x 165</b>	<b>050287</b>	—	<b>095704</b>	■	—	18	95 / 125 / -	38 / 8 / -	1 x RSB 16 mini 1 x RSB 16	10
<b>RG M 16 x 140</b>	<b>542407</b>	—	—	■	—	18	95 / - / -	13 / - / -	1 x RSB 16 mini 1 x RSB 16	10
<b>RG M 16 x 190</b>	—	—	<b>050266</b>	—	—	18	95 / 125 / -	63 / 33 / -	1 x RSB 16 mini 1 x RSB 16	10
<b>RG M 16 x 190</b>	<b>050259</b>	—	—	■	—	18	95 / 125 / -	63 / 33 / -	1 x RSB 16 mini 1 x RSB 16	10
<b>RG M 16 x 250</b>	<b>050288</b>	—	<b>050298</b>	■	—	18	95 / 125 / 190	123 / 93 / 28	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
<b>RG M 16 x 270</b>	—	<b>519446</b>	—	—	—	18	95 / 125 / 190	143 / 113 / 48	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
<b>RG M 16 x 300</b>	<b>050289</b>	—	<b>050299</b>	■	—	18	95 / 125 / 190	173 / 143 / 78	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
<b>RG M 16 x 380</b>	<b>095722</b> <sup>2)</sup>	—	<b>095712</b> <sup>1)</sup>	■	—	18	95 / 125 / 190	253 / 223 / 158	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
<b>RG M 16 x 500</b>	<b>095723</b> <sup>2)</sup>	—	<b>095713</b> <sup>1)</sup>	■	—	18	95 / 125 / 190	373 / 343 / 278	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
<b>RG M 20 x 220</b>	<b>512251</b>	—	—	■	—	25	- / 170 / -	- / 14 / -	1 x RSB 20	10
<b>RG M 20 x 260</b>	<b>050260</b>	—	<b>050267</b>	■	—	25	- / 170 / 210	- / 54 / 14	1 x RSB 20 1 x RSB 20 E / 24	10
<b>RG M 20 x 290</b>	—	<b>519447</b>	—	—	—	25	- / 170 / 210	- / 84 / 44	1 x RSB 20 1 x RSB 20 E / 24	10
<b>RG M 20 x 350</b>	<b>095707</b>	—	—	■	—	25	- / 170 / 210	- / 144 / 104	1 x RSB 20 1 x RSB 20 E / 24	10
<b>RG M 20 x 350</b>	—	—	<b>095706</b>	—	—	25	- / 170 / 210	- / 144 / 104	1 x RSB 20 1 x RSB 20 E / 24	10
<b>RG M 20 x 500</b>	<b>095725</b> <sup>1)</sup>	—	—	■	—	25	- / 170 / 210	- / 294 / 254	1 x RSB 20 1 x RSB 20 E / 24	10
<b>RG M 24 x 295</b>	—	<b>519448</b> <sup>1)</sup>	—	—	—	28	- / 210 / -	- / 56 / -	1 x RSB 20 E / 24	10
<b>RG M 24 x 300</b>	<b>050261</b> <sup>1)</sup>	—	<b>050268</b> <sup>1)</sup>	■	—	28	- / 210 / -	- / 61 / -	1 x RSB 20 E / 24	10
<b>RG M 24 x 400</b>	<b>095727</b> <sup>1)</sup>	—	<b>095715</b> <sup>1)</sup>	■	—	28	- / 210 / -	- / 161 / -	1 x RSB 20 E / 24	10
<b>RG M 24 x 600</b>	<b>095728</b> <sup>1)</sup>	—	—	■	—	28	- / 210 / -	- / 361 / -	1 x RSB 20 E / 24	5
<b>RG M 30 x 380</b>	<b>050262</b> <sup>1)</sup>	—	<b>090726</b> <sup>1)</sup>	■	—	35	- / 280 / -	- / 65 / -	1 x RSB 30	5
<b>RG M 30 x 500</b>	<b>095730</b> <sup>1)</sup>	—	—	■	—	35	- / 280 / -	- / 185 / -	1 x RSB 30	5

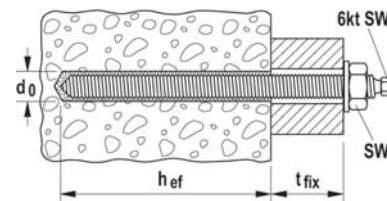
1) Straight cut, additional setting tool required

2) Straight cut, setting tool is enclosed.

## TECHNICAL DATA IN CONCRETE



Threaded rod **RG M**



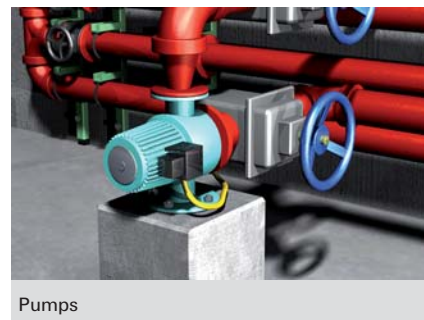
	Highly corrosion resistant steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Effect. anchorage depth	Max. fixture thickness	Hexagon drive	Hexagon nut	Fits capsule RSB	Sales unit
	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	t <sub>fix</sub> [mm]	6kt SW [mm]	○ SW [mm]		[pcs]
Item	C	hdg								
<b>RG M 10 x 130</b>	096217	—	■	12	90	20	7	17	1 x RSB 10 mini 1 x RSB 10	10
<b>RG M 12 x 160</b>	096218	512247	■	14	110	25	8	19	1 x RSB 12 mini 1 x RSB 12	10
<b>RG M 16 x 165</b>	—	537062	■	18	125	8	12	24	1 x RSB 16 mini 1 x RSB 16	10
<b>RG M 16 x 190</b>	096219	512250	■	18	125	35	12	24	1 x RSB 16 mini 1 x RSB 16	10

## TECHNICAL DATA



Filling Sets for subsequent filling of the annular gap

Item	Art.-No.	For use with injection mortar	Match	Sales unit [pcs]
<b>Filling Set M12</b>	537218	FIS SB, FIS EM Plus, FIS V	FIS A M12	10
<b>Filling Set M16</b>	537219	FIS SB, FIS EM Plus, FIS V	FIS A M16	10
<b>Filling Set M20</b>	537220	FIS SB, FIS EM Plus, FIS V	FIS A M 20	10



## ADVANTAGES

- The system internal threaded anchor RG M I and an injection mortar for concrete can be individually selected based on requirements, thus allowing for a wide range of applications.
- The internal threaded anchor RG M I allows for surface flush removal and reuse of the fixing point, and therefore offers the best possible flexibility.
- The metric internal thread allows for the use of standard screws or threaded rods for the ideal adaptation to suit the intended use.

## VERSIONS

- Zinc-plated steel
- Stainless steel

## BUILDING MATERIALS

### Approved for:








- Concrete C20/25 to C50/60, non-cracked

### Also suitable for:

- Concrete C12/15, non-cracked

## FUNCTIONING

- The injection system is suitable for pre-positioned installation when combined with the internal threaded anchor RG M I.
- The mortar is extruded bubble free from the drill hole base.
- The mortar bonds the entire surface of the internal threaded anchor with the drill hole wall and seals the drill hole.
- The internal threaded anchor is set manually, by lightly rotating it until it reaches the drill hole base.

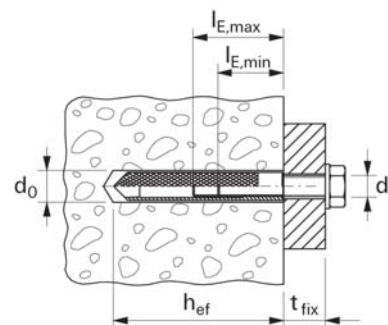
Item	zinc plated, steel grade 5.8  gvz Art.-No.	stainless steel  A4 Art.-No.	 FIS SB  Concrete	 FIS EM Plus  Concrete	 FIS V  Concrete	 FIS VL  Concrete	 FIS GREEN  Concrete	 RSB  Concrete	 RM II  Concrete
RG 8 x 75 M 5 I	48221								
RG 10 x 75 M 6 I	48222								
RG 12 x 90 M 8 I	50552	50565	■	■	■	■	■	■	■
RG 16 x 90 M 10 I	50553	50566	■	■	■	■	■	■	■
RG 18 x 125 M 12 I	50562	50567	■	■	■	■	■	■	■
RG 22 x 160 M 16 I	50563	50568	■	■	■	■	■	■	■
RG 28 x 200 M 20 I	50564	50569	■	■	■	■		■	■

■ = approved

## TECHNICAL DATA IN CONCRETE



Internal threaded anchor **RG M I**



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Effect. anchorage depth	Min. bolt penetration	Max. bolt penetration	Fits capsules	Sales unit
	Art.-No.	Art.-No.	ETA	$d_0$ [mm]	$h_{ef}$ [mm]	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]		[pcs]
Item	gvz	A4							
<b>RG 8 x 75 M 5 I</b>	048221 <sup>1)</sup>	—	—	10	75	8	14	539796 RM II 8	10
<b>RG 10 x 75 M 6 I</b>	048222 <sup>1)</sup>	—	—	12	75	10	16	539797 RM II 10	10
<b>RG 12 x 90 M 8 I</b>	050552 <sup>1)</sup>	050565 <sup>1)</sup>	—	14	90	8	18	539797 RM II 10	10
<b>RG 16 x 90 M 10 I</b>	050553 <sup>1)</sup>	050566 <sup>1)</sup>	—	18	90	10	23	539798 RM II 12	10
<b>RG 18 x 125 M 12 I</b>	050562 <sup>1)</sup>	050567 <sup>1)</sup>	—	20	125	12	26	539800 RM II 16	10
<b>RG 22 x 160 M 16 I</b>	050563 <sup>1)</sup>	050568 <sup>1)</sup>	—	24	160	16	35	539801 RM II 16 E	5
<b>RG 28 x 200 M 20 I</b>	050564 <sup>1)</sup>	050569 <sup>1)</sup>	—	32	200	20	45	539803 RM II 24	5

<sup>1)</sup> Setting tool is included in each package.





French balconies



Satellite dishes

## ADVANTAGES

- The fixing system threaded rod FIS A and an injection mortar can be individually selected based on requirements, thus allowing for a wide range of applications.
- The wide range of approved threaded rods FIS A from M6 to M16 allows for various applications.
- The internal threaded anchor FIS E allows for surface flush removal and reuse of the fixing point, and therefore offers the best possible flexibility.

## VERSIONS

- Zinc-plated steel
- Stainless steel

## BUILDING MATERIALS

### Approved for:





- Solid sand-lime brick
- Solid brick

### Also suitable for:

- Solid and lightweight concrete blocks
- Solid pumice and other solid building materials

## FUNCTIONING

- FIS E is suitable for pre-positioned installation, whilst FIS A is suitable for pre-positioned and push-through installation.
- The mortar bonds the entire surface of the anchor with the drill hole wall and seals the drill hole.
- The anchor is set manually, by lightly rotating it until it reaches the drill hole base.
- In general, it is also possible to use the FIS H K anchor sleeves in solid brick masonry, and this provides additional safety when the base material is unknown. Technical data see page 168.

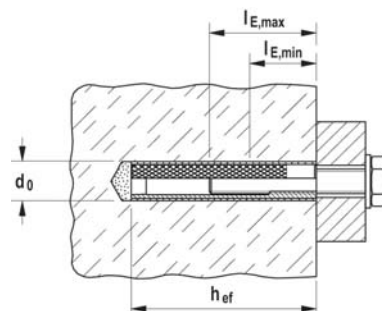
Item	zinc plated, steel grade 5.8  gvz Art.-No.	 FIS V	 FIS VL	 FIS P Plus	 FIS GREEN
FIS E 11 x 85 M6	43631	■	■	■	■
FIS E 11 x 85 M8	43632	■	■	■	■
FIS E 15 x 85 M10	43633	■	■	■	■
FIS E 15 x 85 M12	43634	■	■	■	■

■ = approved

## TECHNICAL DATA IN SOLID BRICK MASONRY



Internal threaded sockets FIS E

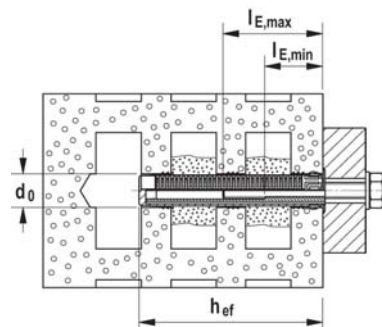


	Zinc-plated steel	Approval	Drill hole diameter	Effect. anchorage depth	Min. bolt penetration	Max. bolt penetration	Fill quantity for effect. anchorage depth in solid brick masonry		Sales unit
	Art.-No.	ETA	$d_0$ [mm]	$h_{ef}$ [mm]	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[scale units]		[pcs]
Item	gvz								
<b>FIS E 11 x 85 M6</b>	<b>043631</b>	■	14	85	6	60	4		10
<b>FIS E 11 x 85 M8</b>	<b>043632</b>	■	14	85	8	60	4		10
<b>FIS E 15 x 85 M10</b>	<b>043633</b>	■	18	85	10	60	5		10
<b>FIS E 15 x 85 M12</b>	<b>043634</b>	■	18	85	12	60	5		10

## TECHNICAL DATA IN PERFORATED BRICK MASONRY



Internal threaded sockets FIS E

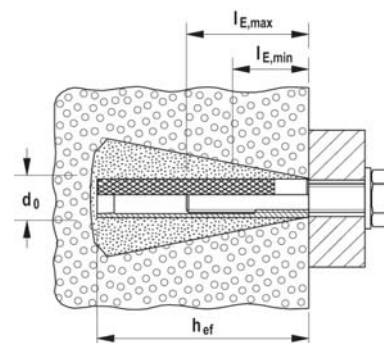


	Zinc-plated steel	Approval	Drill hole diameter in perforated brick masonry	Effect. anchorage depth	Min. bolt penetration	Max. bolt penetration	Suitable injection anchor sleeve	Sales unit
	Art.-No.	ETA	$d_0$ [mm]	$h_{ef}$ [mm]	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]		[pcs]
Item	gvz							
<b>FIS E 11 x 85 M6</b>	<b>043631</b>	■	16 20	85	6	60	FIS H 16 x 85 K FIS H 20 x 85 K	10
<b>FIS E 11 x 85 M8</b>	<b>043632</b>	■	16 20	85	8	60	FIS H 16 x 85 K FIS H 20 x 85 K	10
<b>FIS E 15 x 85 M10</b>	<b>043633</b>	■	20	85	10	60	FIS H 20 x 85 K	10
<b>FIS E 15 x 85 M12</b>	<b>043634</b>	■	20	85	12	60	FIS H 20 x 85 K	10

## TECHNICAL DATA IN UNDERCUT DRILL HOLE IN AERATED CONCRETE



Internal threaded sockets **FIS E**



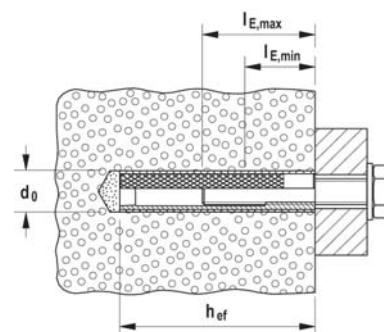
	Zinc-plated steel	Approval	Drill hole diameter in undercut drill hole	Min. anchorage depth in undercut drill hole	Min. bolt penetration	Max. bolt penetration	Fill quantity for effect. anchorage depth in aerated concrete	Sales unit
	Art.-No.	ETA	[mm]	[mm]	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[scale units]	[pcs]
Item	gvz							
<b>FIS E 11 x 85 M6</b>	<b>043631</b>	■	14	85	6	60	20	10
<b>FIS E 11 x 85 M8</b>	<b>043632</b>	■	14	85	8	60	20	10

The ETA also allows that the internal threaded sockets FIS E M6 - M12 can be anchored in cylindric drilled holes.

## TECHNICAL DATA IN CYLINDRICAL DRILL HOLE IN AERATED CONCRETE



Internal threaded sockets **FIS E**



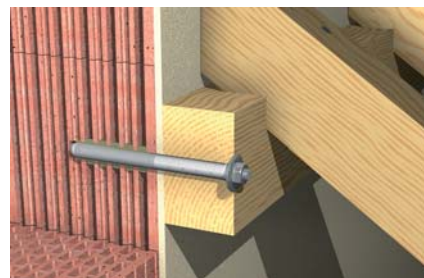
	Zinc-plated steel	Approval	Drill hole diameter in cylindrical drill hole	Min. anchorage depth in cylindrical drill hole	Min. bolt penetration	Max. bolt penetration	Fill quantity for effect. anchorage depth in aerated concrete	Sales unit
	Art.-No.	ETA	[mm]	$h_{ef}$ [mm]	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[scale units]	[pcs]
Item	gvz							
<b>FIS E 11 x 85 M6</b>	<b>043631</b>	■	14	85	6	60	20	10
<b>FIS E 11 x 85 M8</b>	<b>043632</b>	■	14	85	8	60	20	10
<b>FIS E 15 x 85 M10</b>	<b>043633</b>	■	18	85	10	60	—	10
<b>FIS E 15 x 85 M12</b>	<b>043634</b>	■	18	85	12	60	—	10

The ETA also allows that the internal threaded sockets FIS E M6 - M12 can be anchored in cylindric drilled holes.

## Simple push-through installation in masonry



Car ports



Detail: Wood constructions in push-through installation

### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

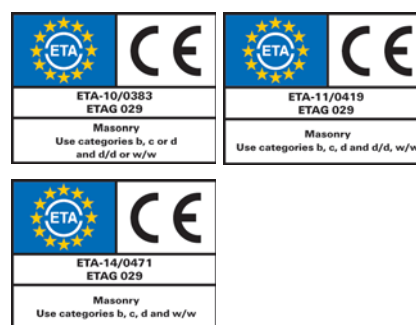
#### Approved for:

- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Hollow blocks made from concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick

#### Also suitable for:

- Hollow pumice slabs
- Slabs made of hollow brick and other perforated brick
- Solid pumice and other solid building materials

### CERTIFICATES



### ADVANTAGES

- The direct installation through the fixture reduces preliminary work whenever there are several fixing points for each fixture, and guarantees a significantly simpler installation process.
- The design of the push-through anchor sleeve FIS H K allows for a range of usable lengths with just one product, thus providing maximum flexibility and cost-effectiveness.
- The movable edge, in combination with the scale, makes it easier to adapt the anchor sleeve to suit the desired usable length.
- The grating structure of the push-through anchor sleeve is adapted for the injection mortars FIS V, FIS VW HIGH SPEED, FIS VS LOW SPEED, FIS GREEN and FIS P Plus, and ensures sparing mortar use with the best interlock.

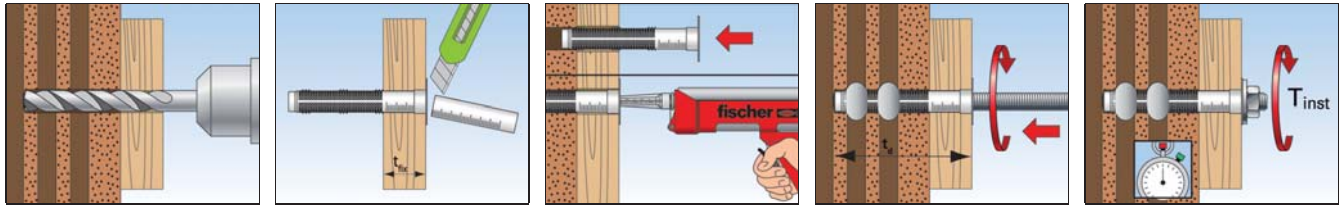
### APPLICATIONS

- Timber constructions
- Awnings
- Canopies
- Car ports
- Gates

### FUNCTIONING

- The system can be used with any of the following injection mortars: FIS V or FIS GREEN. FIS P can be used but does not have approvals.
- The injection system is suitable for push-through installation when combined with the push-through anchor sleeve FIS H K.
- The push-through anchor sleeve is adapted to suit the fixture thickness using the scale and the movable edge, and cut as required.
- The anchor sleeve is placed in the drill hole, and filled with injection mortar from the anchor sleeve base. It should be ensured that the anchor sleeve is completely filled, including in the fixture region.
- Turning in the anchor causes the mortar to be pushed through the anchor sleeve's grating structure, so that it fits the base material perfectly. The load is borne by the interlock.

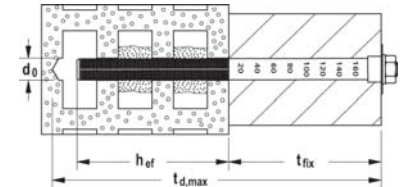
## INSTALLATION WITH FIS V AND FIS HK



## TECHNICAL DATA



Injection push-through anchor sleeve **FIS HK**

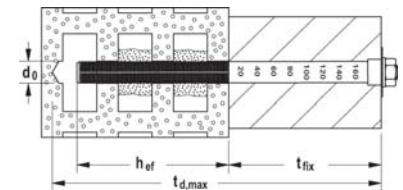


	Art.-No.	Approval ETA	Drill hole diameter $d_0$ [mm]	Max. drill hole depth [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Match	Fill quantity [scale units]	Sales unit [pcs]
Item									
<b>FIS H 18 x 130/200 K</b>	<b>045707</b>	■	18	340	130	200	M10 - M12	35	10
<b>FIS H 22 x 130/200 K</b>	<b>045708</b>	■	22	340	130	200	M 16	45	10

## TECHNICAL DATA



FIS Set 18 x 130/200 M12/200



	Zinc-plated steel	Stainless steel	Approval ETA	Drill hole diameter $d_0$ [mm]	Max. drill hole depth [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Fill quantity [scale units]	Sales unit [pcs]
Item	Art.-No. gvz	Art.-No. A4							
<b>FIS Set 18 x 130/200 M12/200</b>	<b>047443</b>	<b>047452</b>	■	18	340	130	200	35	5

## LOADS

### Injection system FIS V with threaded rod FIS A<sup>5)</sup> and push-through anchor sleeve FIS H..K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in perforated brick masonry (with push-through anchor sleeve) for push-through installation.

For the design the complete assessment ETA-10/0383 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength  f <sub>b</sub> [N/mm <sup>2</sup> ]	Brick raw density  ρ [kg/dm <sup>3</sup> ]	Minimum brick-dimensions <sup>7)</sup>  (L x W x H) [mm]	Min. effective-anchorage depth <sup>4)</sup>  h <sub>ef</sub> [mm]	Min. member thickness  h <sub>min</sub> [mm]	Maximum torque  T <sub>inst,max</sub> [Nm]	Permissible tensile load <sup>3)</sup>  N <sub>perm</sub> [kN]	Permissible shear load <sup>3)</sup>  V <sub>perm</sub> [kN]	Characteristic spacing parallel to bed joint  s <sub>cr</sub>    [mm]	Characteristic spacing perpendicular to bed joint  s <sub>cr</sub> ⊥ [mm]	Min. spacing <sup>2)</sup>  s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  c <sub>cr</sub> = c <sub>min</sub> [mm]
Vertically perforated brick HLz, shape B acc. to EN 771-1												
18x130/200 M10/M12	≥ 4	≥ 0,7	500x200x300	130	200	2	0,34	0,17	500	300	100 / 300	80
22x130/200 M16	≥ 4						0,43	0,17				
18x130/200 M10/M12	≥ 6						0,57	0,26				
22x130/200 M16	≥ 6						0,71	0,26				
18x130/200 M10/M12	≥ 8						0,71	0,34				
22x130/200 M16	≥ 8						0,86	0,34				
18x130/200 M10/M12	≥ 10						0,86	0,43				
22x130/200 M16	≥ 10						1,14	0,43				
Perforated sand-lime brick KSL acc. to EN 771-2												
18x130/200 M10/M12	≥ 8	≥ 1,4	240x175x113	130	175	2	0,71	0,86	240	115	100 / 115	80
22x130/200 M16	≥ 8						0,71	0,71				
18x130/200 M10/M12	≥ 12						1,00	1,29				
22x130/200 M16	≥ 12						1,00	1,14				
18x130/200 M10/M12	≥ 16						1,29	1,71				
22x130/200 M16	≥ 16						1,29	1,57				
18x130/200 M10/M12	≥ 20						1,71	1,71				
22x130/200 M16	≥ 20						1,71	1,71				
Lightweight concrete hollow block Hbl acc. to EN 771-3												
18x130/200 M10/M12	≥ 2	≥ 1,0	362x240x240	130	240	2	0,43	0,26	365	240	100 / 240	60
and 22x130/200 M16	≥ 4						0,86	0,57				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> The maximum anchorage depth is corresponding with the relevant push-through anchor sleeves FIS H18.. K and FIS H22.. K (see technical data).

<sup>5)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.



## FIS H K



## FIS H L



## FIS H N



3

Chemical fixings

### ADVANTAGES

- The grating structure of the FIS H K anchor sleeve is adapted for the injection mortars FIS V, FIS GREEN and FIS P Plus, and ensures sparing mortar use with the best interlock.
- The centring blades perfectly align the anchor in the anchor sleeve, and allow for use with various threaded rod diameters.
- The barbed hooks secure the anchor sleeve in the drill hole and allow for a trouble-free overhead installation.
- The geometry of the anchor sleeves allows for the bridging of non-bearing layers for a simple and convenient installation.

### ADVANTAGES

- The metal anchor sleeve can be cut to the required length and thus allows for a range of usable lengths with just one produce, providing flexibility and cost-effectiveness.
- The grating structure of the anchor sleeve allows for uniform distribution of mortar in the drill hole and thus for secure hold.

### ADVANTAGE

- The net structure of the anchor sleeve allows for uniform distribution of mortar in the drill hole and thus for secure hold.

### FUNCTIONING

- The system can be used with any of the following injection mortars: FIS V, FIS VW HIGH SPEED, FIS VS LOW SPEED, FIS GREEN or FIS P Plus. FIS P can be used but does not have approvals.
- The system is suitable for pre-positioned installation when combined with injection anchor sleeves and threaded rods FIS A or internal threaded anchors FIS E.
- The anchor sleeve is placed in the drill hole, and filled with injection mortar from the anchor sleeve base.
- Turning in the anchor causes the mortar to be pushed through the anchor sleeve's grating structure, so that it fits the base material perfectly. The load is borne by the interlock.

### FUNCTIONING

- The anchor sleeve is at first cut to the required length.
- The anchor sleeve is placed in the drill hole, and filled with injection mortar from the anchor sleeve base.
- Turning in the anchor causes the mortar to be pushed through the anchor sleeve's grating structure, so that it fits the base material perfectly.
- The load is borne by the interlock.

### FUNCTIONING

- The anchor sleeve is placed in the drill hole, and filled with injection mortar from the anchor sleeve base.
- Turning in the anchor causes the mortar to be pushed through the anchor sleeve's grating structure, so that it fits the base material perfectly.
- The load is borne by the interlock.

## TECHNICAL DATA


 Injection anchor sleeve **FIS H K**

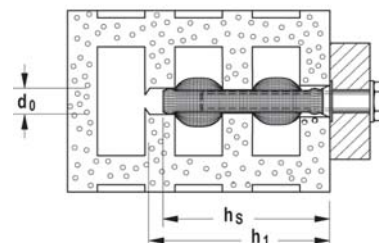
	Art.-No.	Approval ETA	Drill hole diameter $d_0$ [mm]	Drill hole depth acc. ETA [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Match	Fill quantity per sleeve [scale units]	Sales unit [pcs]
Item								
<b>FIS H 12 x 50 K</b>	<b>041900</b>	■	12	55	50	FIS A M6-M8	5	50
<b>FIS H 12 x 85 K</b>	<b>041901</b>	■	12	90	85	FIS A M6-M8	10	50
<b>FIS H 16 x 85 K</b>	<b>041902</b>	■	16	90	85	FIS A M8-M10, FIS E M6-M8	12	50
<b>FIS H 16 x 130 K</b>	<b>041903</b>	■	16	135	110	FIS A M8-M10	15	20
<b>FIS H 20 x 85 K</b>	<b>041904</b>	■	20	90	85	FIS A M12-M16, FIS E M10-M12	15	20
<b>FIS H 20 x 130 K</b>	<b>046703</b>	■	20	135	110	FIS A M12-M16	25	20
<b>FIS H 20 x 200 K</b>	<b>046704</b>	■	20	205	180	FIS A M12-M16	40	20

## TECHNICAL DATA


 Injection anchor sleeve, 1 m length **FIS H L**














	Art.-No.	Drill hole diameter $d_0$ [mm]	Total length $l$ [mm]	Match	Fill quantity per 10 cm	Sales unit [pcs]
Item						
<b>FIS H 12 x 1000 L</b>	<b>050598</b>	12	1000	Ø6 / M 6 - Ø8 / M 8	12	10
<b>FIS H 16 x 1000 L</b>	<b>050599</b>	16	1000	Ø10/M10 / Ø12/M12	14	10
<b>FIS H 22 x 1000 L</b>	<b>045301</b>	22	1000	Ø12/M12 - Ø16/M16	20	6
<b>FIS H 30 x 1000 L</b>	<b>000645</b>	30	1000	Ø16/M16 - Ø22/M22	26	4

## TECHNICAL DATA


 Injection anchor sleeve with net **FIS H N**


	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. anchorage depth anchor $h_v$ [mm]	Fill quantity per sleeve [scale units]	Match	Sales unit [pcs]
Item							
<b>FIS H 16 x 85 N</b>	<b>050470</b>	16	95	90	15	Ø8/M8	20
<b>FIS H 18 x 85 N</b>	<b>050472</b>	18	95	90	17	Ø10/M10	20
<b>FIS H 20 x 85 N</b>	<b>050474</b>	20	95	90	18	Ø12/M12	20

## Special Applications

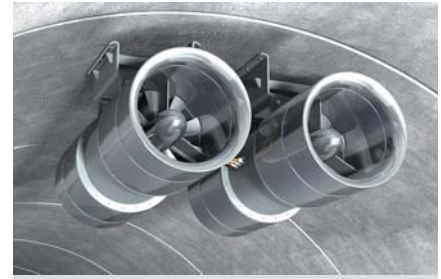
Item									Page
	Performance class amongst dynamic anchors	■							170
	Dynamic push-through anchor for an economical serial installation at medium load level	■							174
	The capsule system for the anchoring of dynamic loads							■	176
	Professional rebar connections	■	■	■	■	■	■		179
	Approved system for building renovation	■	■	■		■			185
	Facade repair for two-leaf cavity walls					■			187
	Economical repair of triple-skin outer wall panels					■			189

■ = approved  
 (■) = recommendation

## The performance class amongst dynamic anchors



Production robots



Tunnel ventilators

### VERSIONS

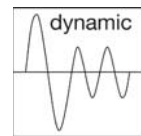
- Zinc-plated steel
- Highly corrosion-resistant steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

### CERTIFICATES



### ADVANTAGES

- During the setting process, the injection mortar FIS HB fills the annular gap in the fixture, and ensures optimum load distribution. This allows for the absorption of dynamic alternating loads.
- The cone shape of the FHB-A dyn anchor rod ensures a controlled expansion under dynamic stress, thus allowing for use in cracked concrete.
- The anchor rod FHB-A dyn is also available made from highly corrosion-resistant steel. This makes it suitable for use in aggressive atmospheres, for example in tunnels.
- The Highbond anchor dynamic system can achieve even greater shear loads thanks to the additional sleeve of the anchor rod FHB-A dyn V, and therefore provides an increased level of safety.

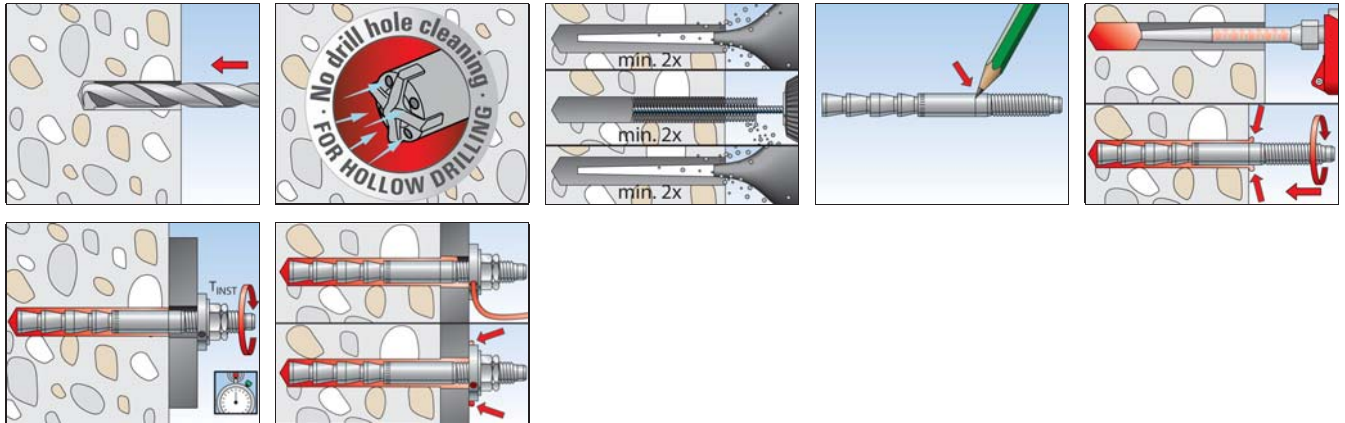
### APPLICATIONS

- Jib cranes
- Gantry and overhead cranes
- Guide rails for elevators
- Tunnel ventilators (jet fans)
- Gantries in road construction
- Antennas and transmitter masts
- Industrial robots

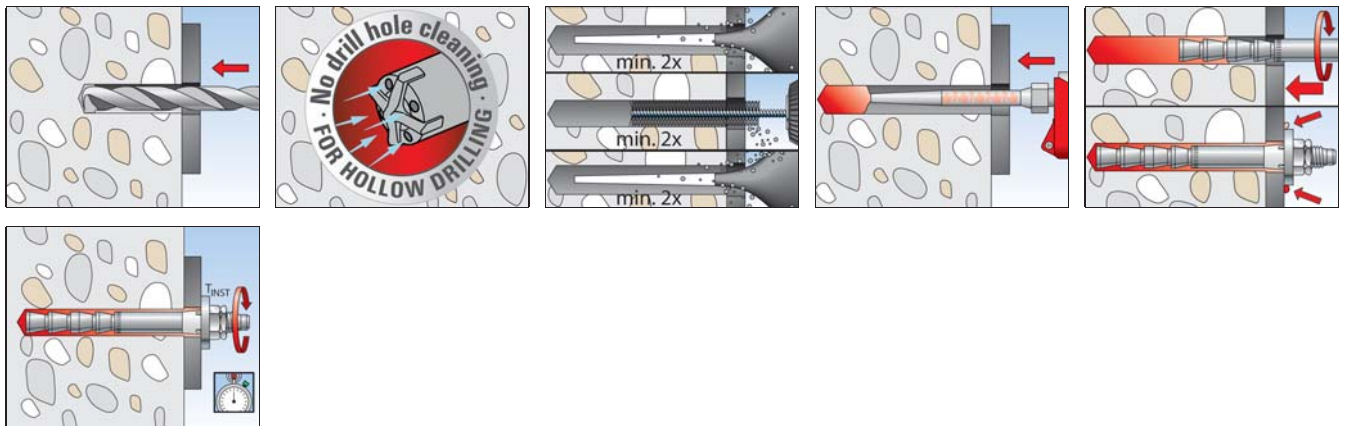
### FUNCTIONING

- The injection system suitable for tensile zones consists of the Highbond dynamic anchor rod FHB-A dyn and the injection mortar FIS HB.
- FHB dyn is approved for pre-positioned and push-through installation.
- Extruding the mortar causes the two components to be mixed and activated in the static mixer.
- The mortar bonds the entire surface of the anchor rod with the drill hole wall and seals the drill hole.
- The centring sleeve centres the anchor in the fixture, thus ensuring a safe load application.
- The lock nut prevents the nut from becoming loose.

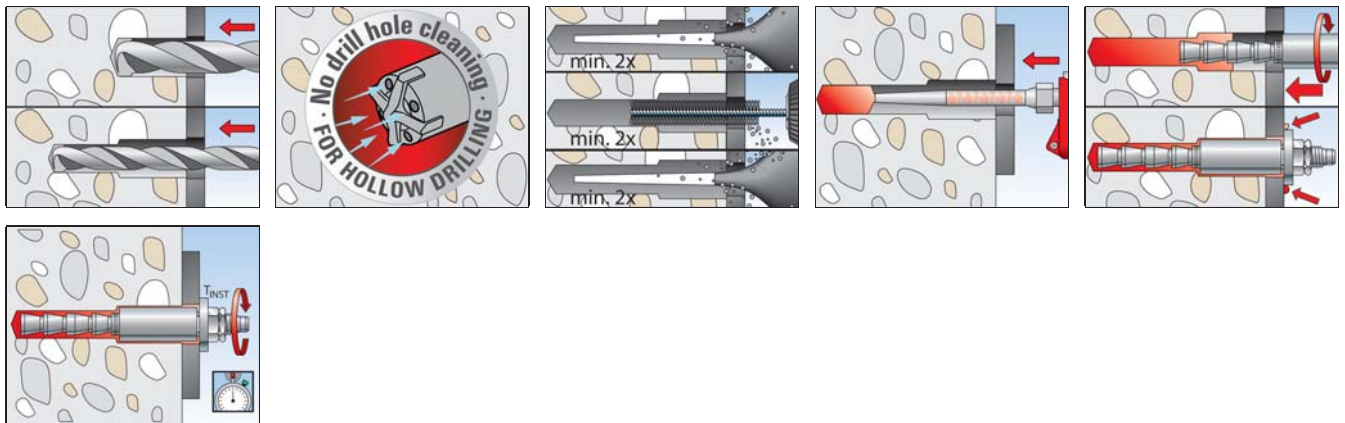
## PRE-POSITIONED INSTALLATION IN CONCRETE WITH FIS HB AND FHB DYN



## PUSH-THROUGH INSTALLATION IN CONCRETE WITH FIS HB AND FHB DYN



## PUSH-THROUGH INSTALLATION IN CONCRETE WITH FIS HB AND FHB DYN V

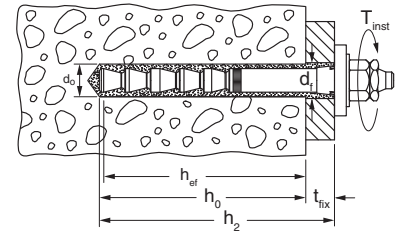




## TECHNICAL DATA



Highbond anchor dynamic **FHB-A dyn**



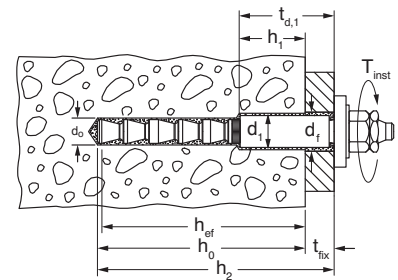
	Zinc-plated steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchorage depth	Min. - max. usable length	Drill hole diameter in fixture	Width across nut	Sales unit
	Art.-No.	Art.-No.	DIBt	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	h <sub>ef</sub> [mm]	t <sub>fix</sub> [mm]	d <sub>f</sub> [Ø mm]	○ SW [mm]	[pcs]
Item	gvz	C								
<b>FHB-A dyn 12 x 100/25</b>	<b>092018</b>	<b>531384</b> 1)	●	14	130	100	8 - 25	15	19	10
<b>FHB-A dyn 12 x 100/50</b>	<b>092019</b>	—	●	14	155	100	8 - 50	15	19	10
<b>FHB-A dyn 16 x 125/25</b>	<b>092020</b>	—	●	18	155	125	10 - 25	19	24	10
<b>FHB-A dyn 16 x 125/50</b>	<b>092036</b>	<b>093445</b> 1)	●	18	180	125	10 - 50	19	24	10
<b>FHB-A dyn 20 x 170/50</b>	<b>092037</b>	—	●	24	225	170	12 - 50	25	30	10
<b>FHB-A dyn 24 x 220/50</b>	<b>092038</b>	—	●	28	275	220	14 - 50	29	36	5

1) Prices and delivery time on request.

## TECHNICAL DATA



Highbond anchor dynamic **FHB-A dyn V**



	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchorage depth	Min. - max. usable length	Drill hole diameter in fixture	Width across nut	Sales unit
	Art.-No.	DIBt	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	h <sub>ef</sub> [mm]	t <sub>fix</sub> [mm]	d <sub>f</sub> [Ø mm]	○ SW [mm]	[pcs]
Item	gvz								
<b>FHB-A dyn 12 x 100/50 V</b>	<b>092039</b> 1)	●	14	160	105	8 - 50	21	19	10
<b>FHB-A dyn 16 x 125/50 V</b>	<b>092040</b> 2)	●	18	185	130	10 - 50	29	24	10

1) Stepped hole: 1st drill hole with Ø 20 mm and depth 85 mm. 2nd drill hole with Ø 14 mm and depth 160 mm.

2) Stepped hole: 1st drill hole with Ø 28 mm and depth 100 mm. 2nd drill hole with Ø 18 mm and depth 185 mm.

## TECHNICAL DATA



Injection mortar **FIS HB 345 S**



Injection mortar **FIS HB 150 C**



Static mixer **FIS MR Plus**

		Approval	Languages on the cartridge	Contents	Sales unit
Item		DIBt			[pcs]
<b>FIS HB 345 S</b>	<b>033211</b>	●	DE, GB, FR, ES, NL, CS	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS HB 150 C</b>	<b>519665</b>	●	DE, FR, NL	1 cartridge 145 ml, 2 x FIS MR Plus	6
<b>FIS MR Plus</b>	<b>545853</b>	—	—	10 static mixer FIS MR Plus	10



## CURING TIME - FIS HB

Cartridge temperature FIS HB (minimum + 5°C)	Gelling time FIS HB	Temperature at anchoring base	Curing time FIS HB
		- 5°C - ± 0°C	360 min.
		± 0°C - + 5°C	180 min.
+ 5°C - +20°C	15 min.	+ 5°C - +20°C	90 min.
+20°C - +30°C	6 min.	+20°C - +30°C	35 min.
+30°C - +40°C	4 min.	+30°C - +40°C	20 min.
> +40°C	2 min.	> +40°C	12 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled. Remove water from drill hole.

## FILLING QUANTITIES

Type	Mortar volume in scale units shown on the cartridge labels' corresponding scale	Anchors per cartridge FIS HB 345 S *)
FHB-A dyn 12 x 100 / 25	7	24
FHB-A dyn 12 x 100 / 50	8	21
FHB-A dyn 16 x 125 / 25	9	18
FHB-A dyn 16 x 125 / 50	10	17
FHB-A dyn 20 x 170 / 50	23	7
FHB-A dyn 24 x 220 / 50	38	4
FHB-A dyn 12 x 100 / 50 V	12	14
FHB-A dyn 16 x 125 / 50 V	20	8

\*) max. number with one static mixer

## LOADS

### Highbond anchor dynamic FHB dyn

zinc-plated steel / high corrosion-resistant steel C

Design values for cyclic fatigue loading <sup>1)</sup> of a single anchor in cracked or non-cracked normal concrete of strength class C20/25 <sup>2)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth	Minimum member thickness	Installation torque	Design value of tensile load	Design value of shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{ef}$ [mm]	$h_{min}^{5)}$ [mm]	$T_{inst}$ [Nm]	$\Delta N_{Ed,max}^{2)}$ [kN]	$\Delta V_{Ed,max}^{2) 9)}$ [kN]	Max. tension load $\Delta N_{Ed}$ c <sup>6) 8)</sup> [mm]	Max. shear load $\Delta V_{Ed}$ c <sup>6)</sup> [mm]	Max. Load $s_{cr}^{6)}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
FHB dyn 12 x 100	gvz C / 1.4529	100	130	40	14,1	6,7	200	200	300	100	200 <sup>4) 7)</sup>
			200				120	100			100 <sup>4)</sup>
			130		11,3	4,4	200	200			200 <sup>4) 7)</sup>
			200				100	100			100 <sup>4) 7)</sup>
FHB dyn 12 x 100 V	gvz	105	130	40	14,1	9,6	200	200	315	100	200 <sup>4) 7)</sup>
			200				105	130			100
FHB dyn 16 x 125	gvz C / 1.4529	125	160	60	23,0	11,9	200	200	375	100	200 <sup>4) 7)</sup>
			250				185	145			100
			160		15,6	11,9	200	200			200 <sup>4) 7)</sup>
			250				100	145			100 <sup>7)</sup>
FHB dyn 16 x 125 V	gvz	130	160	60	23,0	17,0	200	260	375	100	200 <sup>7)</sup>
			250				170	200			100
FHB dyn 20 x 170	gvz	170	220	100	28,4	17,0	175	190	510	80	80
FHB dyn 24 x 220	gvz	220	440	120	28,9	22,2	180	200	660	180	180 <sup>7)</sup>

For the design the complete approval Z-21.3-1748 has to be considered.

- <sup>1)</sup> The design values of the cyclic fatigue loading apply for  $\geq 5 \times 10^6$  load cycles in accordance with design method I - for unknown static lower load. If the static lower load is known and / or for lower number of load cycles higher load values are possible. The partial safety factors as regulated in the approval are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$ . The given load values apply for anchorages in dry and wet concrete and temperatures in the base material up to +50 °C (resp. short-term up to +80 °C) and drill hole cleaning in accordance with the approval.
- <sup>2)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) a detailed anchor design is required.
- <sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible. - see approval. The concrete is assumed to be standard-reinforced.
- <sup>4)</sup> Without reduction of the shear load.
- <sup>5)</sup> Intermediate values for  $h_{min}$  may be applied in accordance with table 5 resp. 7 of the approval Z-21.3-1748 considering the influence on  $s_{min}$  and  $c_{min}$ .
- <sup>6)</sup> A splitting reinforcement, which limits the crack width to  $\sim 0,3$  mm considering the splitting forces, is assumed to be available. For an actual edge distance, which is smaller than the characteristic edge distance  $c_{cr,N}$  a longitudinal reinforcement of at least diameter 6 mm in the area of the anchorage depth of the anchor must be available.
- <sup>7)</sup> Without reduction of the shear load.
- <sup>8)</sup> Values apply for predominantly non-static (dynamic) actions. For predominantly static actions differing values can be decisive.
- <sup>9)</sup> Valid for pulsating loads. For alternating loads see approval.

## The dynamic push-through anchor for an economical serial installation at medium load level



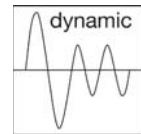
### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

- Concrete C20/25 to C50/60, cracked and non-cracked

### CERTIFICATES



### ADVANTAGES

- Medium load level for a variety of applications.
- Pre-assembled anchor rod for fast installation.
- Approved safety by DIBt-Approval for endless numbers of load cycles.
- Easy push-through installation leads to cost effectiveness – especially for serial installations.
- Tight assortment with the size.
- Less spacings and edge distances.
- Drill holes are sealed.

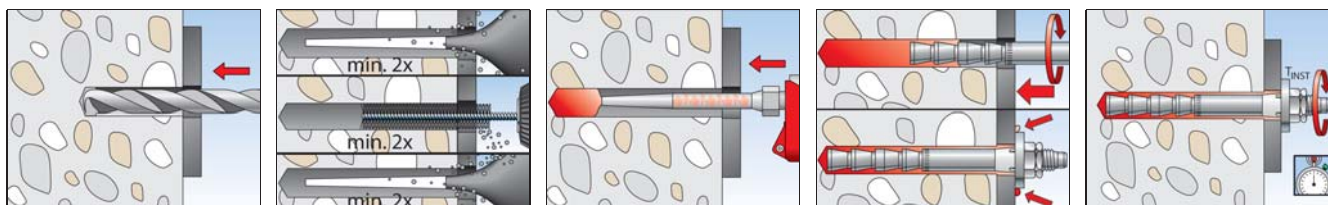
### APPLICATIONS

- hydraulic ramps
- Conveyor belts
- Industrial robots
- cooperation robots and -parts
- Guide rails for elevators

### FUNCTIONING

- The injection system suitable for tensile zones consists of the fischer dynamic anchor rod FDA-A dyn and the injection mortar FIS HB.
- FDA is approved push-through installation.
- Extruding the mortar causes the two components to be mixed and activated in the static mixer.
- The mortar bonds the entire surface of the anchor rod with the drill hole wall and seals the drill hole.
- The centring sleeve centres the anchor in the fixture, thus ensuring a safe load application.
- During the setting process, the injection mortar FIS HB fills the annular gap in the fixture, and ensures optimum load distribution. This allows for the absorption of dynamic alternating loads.

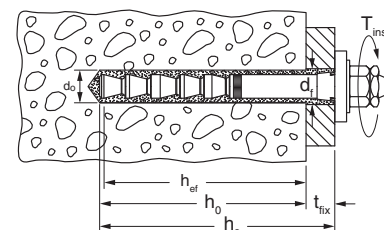
## INSTALLATION IN CONCRETE WITH FIS HB AND FDA



## TECHNICAL DATA



Dynamic-Anchor FDA



	Zinc-plated steel	Approval	Drill hole diameter	Drill hole diameter in fixture	Anchorage depth	Min. - max. usable length	Min. drill hole depth for through fixings	Width across nut	Sales unit
	Art.-No.	DIBt	d <sub>0</sub> [mm]	d <sub>f</sub> [Ø mm]	h <sub>ef</sub> [mm]	t <sub>fix</sub> [mm]	h <sub>2</sub> [mm]	○ SW [mm]	[pcs]
Item	gvz								
FDA-A 12 x 100/25 gvz	536943	●	14	15	100	12 - 25	130	19	10
FDA-A 12 x 100/50 gvz	536944	●	14	15	100	12 - 50	155	19	10
FDA-A 16 x 125/25 gvz	536945	●	18	19	125	16 - 25	155	24	10
FDA-A 16 x 125/50 gvz	536946	●	18	19	125	16 - 50	180	24	10

## LOADS

### Dynamic-Anchor FDA

zinc-plated steel

Design values for cyclic fatigue loading <sup>1)</sup> of a single anchor in cracked or non-cracked normal concrete of strength class C20/25 <sup>3)</sup>									Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth	Minimum member thickness	Installation torque	Design value of tensile load	Design value of shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing
		h <sub>ef</sub> [mm]	h <sub>min</sub> <sup>5)</sup> [mm]	T <sub>inst</sub> [Nm]	ΔN <sub>Ed,max</sub> <sup>2)</sup> [kN]	ΔV <sub>Ed,max</sub> <sup>2) 8)</sup> [kN]	Max. tension load ΔN <sub>Ed</sub> c <sup>6) 7)</sup> [mm]	Max. shear load ΔV <sub>Ed</sub> c <sup>7)</sup> [mm]	Max. Load s <sub>cr</sub> <sup>6)</sup> [mm]	Min. edge distance c <sub>min</sub> <sup>5)</sup> [mm]
FDA 12 x 100	gvz	100	130	40	11,3	5,1	200	200	300	100
			200				100	100		
FDA 16 x 125	gvz	125	160	60	18,8	9,1	200	200	375	100
			250				140	115		

For the design the complete approval Z-21.3-2058 has to be considered.

<sup>1)</sup> The design values of the cyclic fatigue loading apply for  $\geq 5 \times 10^6$  load cycles in accordance with design method I - for unknown static lower load. If the static lower load is known and / or for lower number of load cycles higher load values are possible. The partial safety factors as regulated in the approval are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$ . The given load values apply for anchorages in dry and wet concrete and temperatures in the base material up to +50 °C (resp. short-term up to +80 °C) and drill hole cleaning in accordance with the approval.

<sup>2)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) a detailed anchor design is required.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible. - see approval. The concrete is assumed to be standard-reinforced.

<sup>4)</sup> Without reduction of the shear load.

<sup>5)</sup> Intermediate values for  $h_{min}$  may be applied in accordance with table 5 of the approval Z-21.3-2058 considering the influence on  $s_{min}$  and  $c_{min}$ .

<sup>6)</sup> A splitting reinforcement, which limits the crack width to  $\sim 0,3$  mm considering the splitting forces, is assumed to be available. For an actual edge distance, which is smaller than the characteristic edge distance  $c_{cr,N}$ , a longitudinal reinforcement of at least diameter 6 mm in the area of the anchorage depth of the anchor must be available.

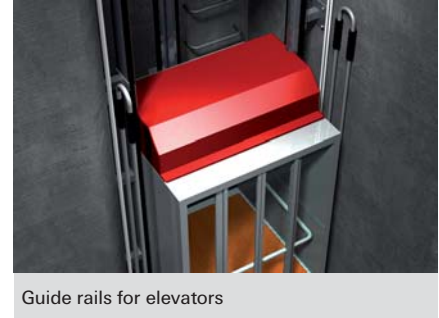
<sup>7)</sup> Values apply for predominantly non-static (dynamic) actions. For predominantly static actions differing values can be decisive.

<sup>8)</sup> Valid for pulsating loads. For alternating loads see approval.

## The capsule system for the anchoring of dynamic loads



Slewing cranes



Guide rails for elevators

### VERSIONS

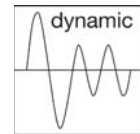
- Zinc-plated steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

### CERTIFICATES



### ADVANTAGES

- The bushing fills the annular gap in the fixture and, in combination with the anchor rod UMV-A dyn, ensures an even load distribution. This allows for the bearing of dynamic alternating loads.
- The cone shape of the UMV-A dyn anchor rod ensures a controlled expansion under dynamic stress, thus allowing for use in cracked concrete.
- The pre-portioned resin capsule ensures a quick and easy installation on the construction site, and helps to avoid errors.
- The glass particles of the capsule body rough up the drill hole wall during the setting process, and improve the bond between the anchor rod and concrete.

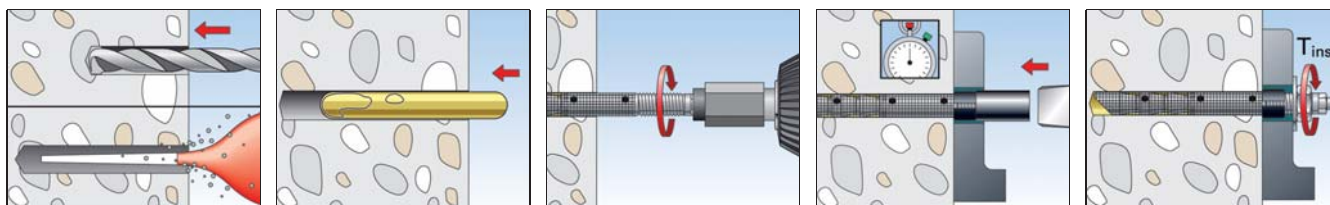
### APPLICATIONS

- Jib cranes
- Gantry and overhead cranes
- Guide rails for elevators
- Antennas and transmitter masts
- Industrial robots

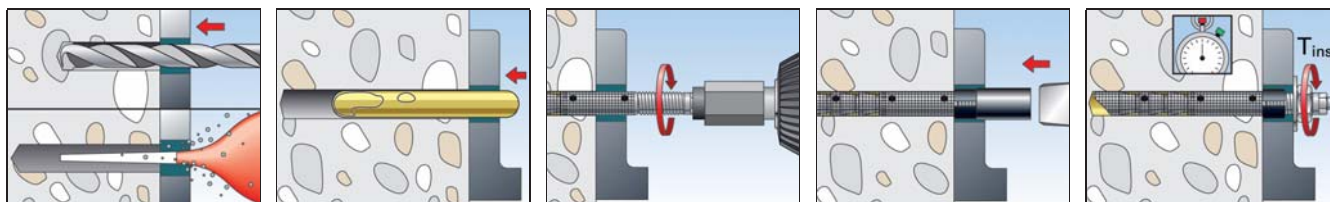
### FUNCTIONING

- The bonded anchor suitable for tensile zones consists of the UMV multicone dynamic anchor rod and the UMV multicone resin capsule.
- UMV multicone dynamic is suitable for pre-positioned and push-through installation.
- During setting (rotating/hitting), the tip of the anchor rod destroys the capsule in the drill hole, and mixes and activates the mortar.
- The mortar bonds the entire surface of the anchor rod with the drill hole wall and seals the drill hole.
- Once the fixture has been positioned, the installation sleeve is used to drive the bushing over the anchor rod.

## PRE-POSITIONED INSTALLATION IN CONCRETE WITH CAPSULE UMV-P AND UMV-A DYN



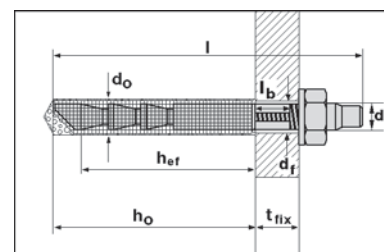
## PUSH-THROUGH INSTALLATION IN CONCRETE WITH CAPSULE UMV-P AND UMV-A DYN



## TECHNICAL DATA



UMV multicone chemical anchor capsule

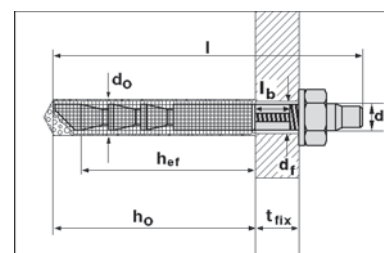


		Approval	Drill diameter	Drill hole depth	Sales unit
Item	Art.-No.	DIBt	[mm]	[mm]	[pcs]
UMV-P 12 x 100	007947	●	15	115	10
UMV-P 16 x 125	007948	●	18	140	10
UMV-P 20 x 170	007949	●	25	190	10
UMV-P 24 x 220	007973	●	28	245	5

## TECHNICAL DATA



UMV multicone dynamic anchor rod



	Zinc-plated steel	Approval	Drill hole diameter	Total length	Min. fixing thickness	Max. fixing thickness	Through hole	Clamping bush height	Qty. per pack threaded rod	Qty. per pack clamping chuck
	Art.-No.	DIBt	d <sub>0</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	t <sub>fix</sub> [mm]	d <sub>f</sub> [mm]	l <sub>b</sub> [mm]	[pcs]	[pcs]
Item	gvz									
UMV-A dyn 12 x 100/10	007943	●	15	145	5	10	16	5	10	10
UMV-A dyn 12 x 100/15	007988	●	15	150	8	15	16	8	10	10
UMV-A dyn 12 x 100/25	008004	●	15	160	15	25	16	15	10	10
UMV-A dyn 12 x 100/50	008005	●	15	185	25	50	16	15	10	10
UMV-A dyn 16 x 125/30	008006	●	18	200	15	30	19	15	10	10
UMV-A dyn 16 x 125/60	008007	●	18	230	30	60	19	15	10	10
UMV-A dyn 20 x 170/40	008008 1)	●	25	255	20	40	26	20	10	10
UMV-A dyn 24 x 220/50	008009 1)	●	28	325	25	50	29	25	5	5

1) Without external hexagon. Please use a separate setting tool.

## LOADS

### UMV multicone dynamic bonded anchor

zinc-plated steel

Design values for cyclic fatigue loading <sup>1)</sup> of a single anchor in cracked or non-cracked normal concrete of strength class C20/25 <sup>3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth	Minimum member thickness	Installation torque	Design value of tensile load	Design value of shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{ef}$ [mm]	$h_{min}$ [mm]	$T_{inst}$ [Nm]	$\Delta N_{Ed,max}^{2)}$ [kN]	$\Delta V_{Ed,max}^{2) 6)}$ [kN]	Max. tension load $\Delta N_{Ed,c}^{5)}$	Max. shear load $\Delta V_{Ed,c}^{5)}$	Max. Load $s_{cr}$ [mm]	$s_{min}$ [mm]	$c_{min}$ [mm]
<b>UMV dyn 100 M12</b>	gvz	100	200	40	12,2	5,6	125	100	300	100	100 <sup>4)</sup>
<b>UMV dyn 125 M16</b>	gvz	125	250	60	14,8	6,7	130	130	375	130	130 <sup>7)</sup>
<b>UMV dyn 170 M20</b>	gvz	170	340	100	31,4	16,3	255	170	510	170	170 <sup>4)</sup>
<b>UMV dyn 220 M24</b>	gvz	220	440	120	38,5	16,3	260	220	660	220	220 <sup>4)</sup>

For the design the complete approval Z-21.3-1662 has to be considered.

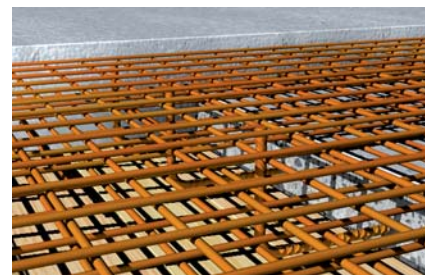
- <sup>1)</sup> The design values of the cyclic fatigue loading apply for  $\geq 5 \times 10^6$  load cycles in accordance with design method I - for unknown static lower load. If the static lower load is known and / or for lower number of load cycles higher load values are possible. The partial safety factors as regulated in the approval are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$ . The given load values apply for anchorages in dry and wet concrete and temperatures in the base material up to +50 °C (resp. short-term up to +80 °C) and drill hole cleaning in accordance with the approval.
- <sup>2)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) a detailed anchor design is required.
- <sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible. - see approval. The concrete is assumed to be standard-reinforced.
- <sup>4)</sup> Without reduction of the shear load.
- <sup>5)</sup> Values apply for predominantly non-static (dynamic) actions. For predominantly static actions differing values can be decisive.
- <sup>6)</sup> Valid for pulsating loads. For alternating loads see approval.
- <sup>7)</sup> Without reduction of the tensile and the shear load.



## Professional rebar connections



Rebar connections



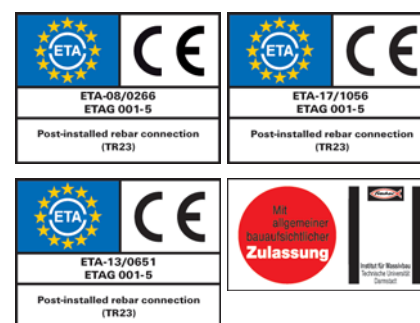
Rebar connections

### BUILDING MATERIALS

#### Approved for:

- Concrete C12/15 to C50/60, cracked and non-cracked

### CERTIFICATES



### ADVANTAGES

- The injection mortars FIS V and FIS VS LOW SPEED allow for rebar connections from Ø8 to 28 mm, whilst injection mortar FIS EM Plus allows for rebar connections up to Ø40 mm to be carried out. This offers maximum flexibility.
- The injection mortar FIS SB allows the user for realizing rebar connections from Ø 8 to 32 mm in combination with a simple and thus user-friendly cleaning of the drill hole.
- FIS EM Plus also allows for the execution of rebar connections in diamond-drilled holes.
- The FRA with connecting thread in stainless steel A4 fully utilises the load-bearing capacity of the concrete. This means that extremely high tensile loads can be introduced into the base material.
- Accessories in line with building site requirements, such as injection adapters and extension tubes, ensure rapid progress.
- The FIS rebar case contains all of the individual components required, thus ensuring a convenient installation.

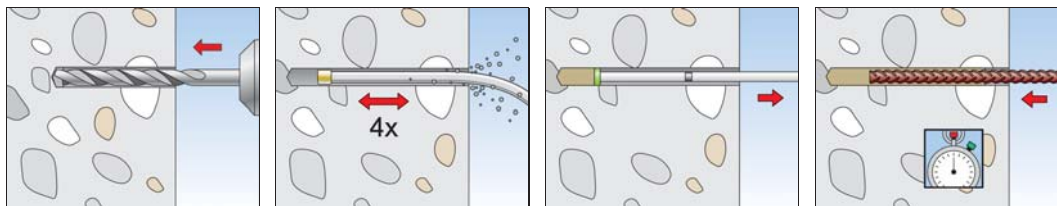
### APPLICATIONS

- Post-installed concrete steel bars, e.g. for overlap connections, end anchorings, starter bars, crack stitching etc.
- Rebar anchor FRA
- Concrete-Concrete Shear Connector FCC

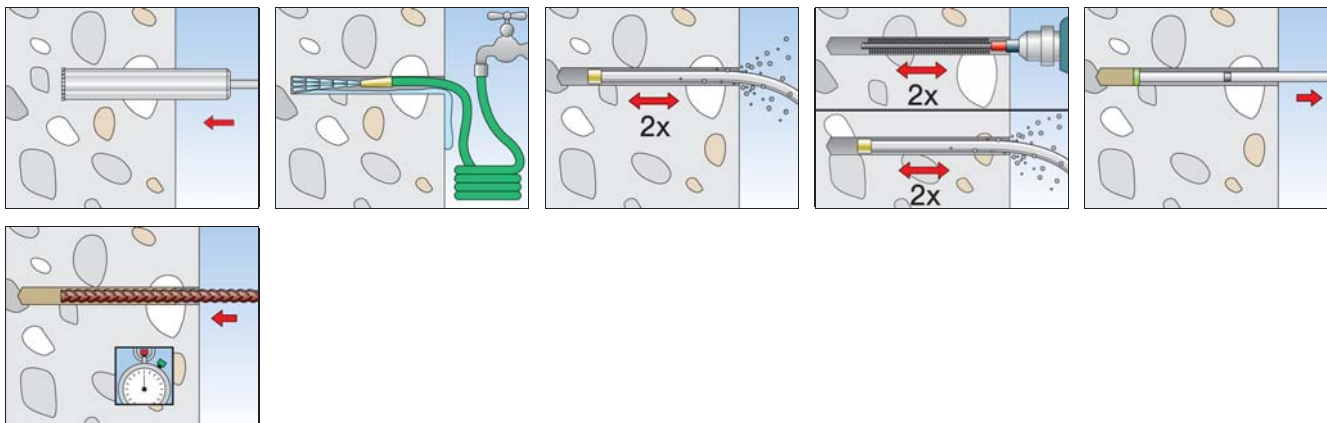
### FUNCTIONING

- Anchoring as with cast-in reinforcement bars in line with Eurocode 2 and DIN 1045-1.
- The mortar is extruded bubble free into the drill hole using the injection adapter. The geometry causes a build-up of pressure in the drill hole, which pushes the injection adapter and extension tube automatically out of the drill hole.
- The mortar bonds the entire surface of the reinforcement bar with the drill hole wall.
- A special certification is necessary for installation according to approval in Germany. The fischer Academy offers the relevant training courses.

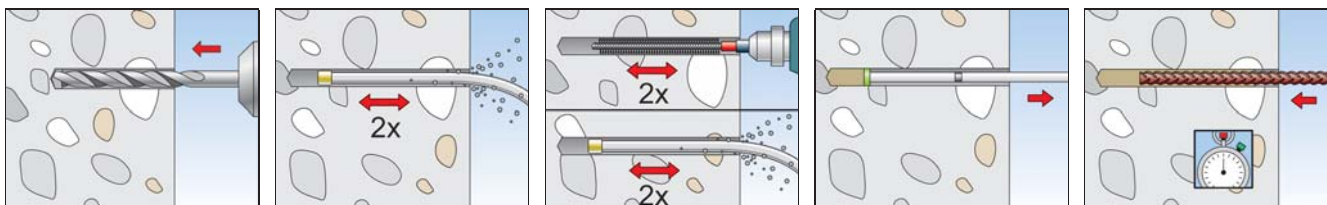
## INSTALLATION IN CONCRETE WITH FIS EM PLUS AND HAMMER DRILLED HOLES



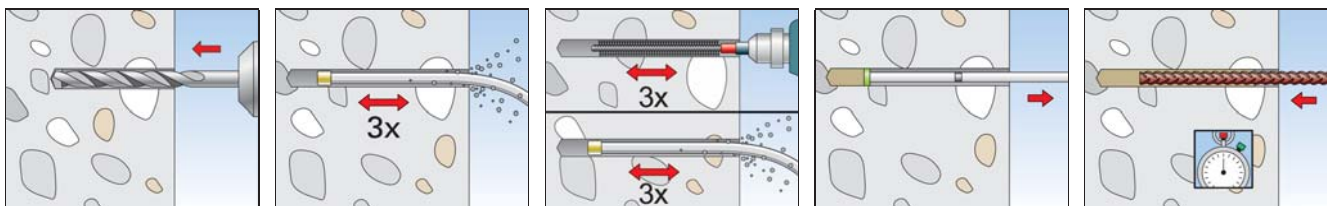
## INSTALLATION IN CONCRETE WITH FIS EM PLUS IN DIAMOND DRILLED HOLES



## INSTALLATION IN CONCRETE WITH FIS SB IN HAMMER DRILLED HOLES



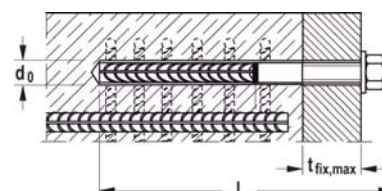
## INSTALLATION IN CONCRETE WITH FIS V AND FIS VS LOW SPEED IN HAMMER DRILLED HOLES



## TECHNICAL DATA



Rebar anchor **FRA**



	Combination of materials		Approval		Total length	Max. fixing thickness	Drill hole	Fill quantity	Sales unit		
	Art.-No.	DIBt	ETA		l [mm]	t <sub>fix</sub> [mm]	d <sub>0</sub> [Ø mm]	[scale units]	[pcs]		
Item											
<b>FRA 12/900 M12-60</b>	<b>505529</b>	●	■		975	60	16	50	8		
<b>FRA 16/1100 M16-60</b>	<b>505533</b>	●	■		1180	60	20	81	8		
<b>FRA 20/1400 M20-60</b>	<b>505534</b>	●	■		1485	60	25	160	4		

Reinforcement bar welded with threaded part made of stainless steel A4.

## TECHNICAL DATA



**FIS-Rebar Case** for reinforcement connection

Item	Art.-No.	Approval		Contents	Sales unit [pcs]
		DIBt	ETA		
<b>FIS-Rebar case D</b>	<b>505941</b>	•	■	8 x Cleaning brush BSB, 5 x Extensions for cleaning brushes à 40 cm, 1 x SDS Chuck with internal thread M 8, 24 x Injection adapter, 1 x Cleaning hose complete, 1 x Brush control template, 8 x Cleaning nozzle, 1 x Marker tape, 1 x Digital thermometer, 1 x Protective goggles, 1 x Installation instructions (german), 10 x Installation report, 2 x Flat spanner SW 7 and the relevant approvals	1
<b>FIS-Rebar case Int</b>	<b>505942</b>	•	■	8 x Cleaning brush BSB, 5 x Extensions for cleaning brushes à 40 cm, 1 x SDS Chuck with internal thread M 8, 24 x Injection adapter, 1 x Cleaning hose complete, 1 x Brush control template, 8 x Cleaning nozzle, 1 x Marker tape, 1 x Digital thermometer, 1 x Protective goggles, 1 x Installation instructions (german, english, french, italian, spanish), 10 x Installation report, 2 x Flat spanner SW 7 and the relevant approvals	1

## ACCESSORIES



Cleaning brush with thread M 8

Item	Art.-No.	Colour	Length [mm]	Sales unit [pcs]
<b>BSB for drill-Ø 12 mm</b>	<b>001490</b>	white	180	1
<b>BSB for drill-Ø 14 mm</b>	<b>001491</b>	blue	180	1
<b>BSB for drill-Ø 16 mm</b>	<b>001492</b>	red	180	1
<b>BSB for drill-Ø 18 mm</b>	<b>001493</b>	yellow	180	1
<b>BSB for drill-Ø 20 mm</b>	<b>001494</b>	green	180	1
<b>BSB for drill-Ø 25 mm</b>	<b>001495</b>	black	180	1
<b>BSB for drill-Ø 30 mm</b>	<b>090063</b>	grey	180	1
<b>BSB for drill-Ø 35 mm</b>	<b>090071</b>	brown	180	1
<b>BSB for drill-Ø 40 mm</b>	<b>505061</b>	-	180	1
<b>BSB for drill-Ø 45 mm</b>	<b>506254</b>	-	180	1
<b>BSB for drill-Ø 55 mm</b>	<b>505062</b>	-	180	1
<b>FIS brush extension</b>	<b>508791</b>	-	420	1
<b>SDS Chuck</b>	<b>530332</b>	-	-	1

## ACCESSORIES



Injection adapter  
for drill Ø 12 - 25 mm



Injection adapter  
for drill Ø 30 - 55 mm



Extension tube

Item	Art.-No.	Colour	Length [mm]	Sales unit [pcs]
<b>Injection-adapter (Ø 9) for drill-Ø 12 mm</b>	<b>001497</b>	ecru	-	10
<b>Injection-adapter (Ø 9) for drill-Ø 14 mm</b>	<b>001498</b>	blue	-	10
<b>Injection-adapter (Ø 9) for drill-Ø 16 mm</b>	<b>001499</b>	red	-	10
<b>Injection-adapter (Ø 9) for drill-Ø 18 mm</b>	<b>001483</b>	yellow	-	10
<b>Injection-adapter (Ø 9) for drill-Ø 20 mm</b>	<b>001506</b>	green	-	10
<b>Injection-adapter (Ø 15) for drill-Ø 20 mm</b>	<b>001508</b>	green	-	10

1) Delivery time on request.

## ACCESSORIES



Injection adapter  
for drill Ø 12 - 25 mm



Injection adapter  
for drill Ø 30 - 55 mm

 Extension tube

Item	Art.-No.		Colour	Length [mm]	Sales unit [pcs]
Injection-adapter (Ø 9) for drill-Ø 25 mm	001507		black	-	10
Injection-adapter (Ø 15) for drill-Ø 25 mm	001509		black	-	10
Injection-adapter (Ø 9) for drill-Ø 30 mm	090689		grey	-	10
Injection-adapter (Ø 15) for drill-Ø 30 mm	090700		grey	-	10
Injection-adapter (Ø 9) for drill-Ø 35 mm	090699		brown	-	10
Injection-adapter (Ø 15) for drill-Ø 35 mm	090701		brown	-	10
Injection-adapter (Ø 9) for drill-Ø 40 mm	505077		red	-	10
Injection-adapter (Ø 15) for drill-Ø 40 mm	505079		red	-	10
Injection-adapter (Ø 9) for drill-Ø 45 mm	508909 <sup>1)</sup>		yellow	-	10
Injection-adapter (Ø 15) for drill-Ø 45 mm	508910 <sup>1)</sup>		yellow	-	10
Injection-adapter (Ø 9) for drill-Ø 55 mm	505078		ecru	-	10
Injection-adapter (Ø 15) for drill-Ø 55 mm	505080		ecru	-	10
FIS Extension tube	048983		-	1000	10
FIS EXT Ø 15	530800		transparent	10000	1

<sup>1)</sup> Delivery time on request.

## ACCESSORIES



Drilling aid

Item	Art.-No.				Sales unit [pcs]
Drilling aid 3pcs.	090819				1

## ACCESSORIES



SDS-max scrubbing tool to  
roughen the connection surface

Item	Art.-No.		Match	Dimensions [mm]	Sales unit [pcs]
Stocker	001253		Chuck type SDS max	45 x 240	1

## ACCESSORIES



Compressed air nozzle

Item	Art.-No.		Match		Sales unit [pcs]
Compressed air nozzle D12-D15	511956		Drill diameter Ø 12 - 15 mm		2
Compressed air nozzle D16-D19	511957		Drill diameter Ø 16 - 19 mm		2
Compressed air nozzle D20-D25	511958		Drill diameter Ø 20 - 25 mm		2
Compressed air nozzle D30-D35	511959		Drill diameter Ø 30 - 35 mm		2
Compressed air nozzle D40-D55	511960		Drill diameter Ø 40 - 45 mm		2

## LOADS

Injection systems FIS EM Plus, FIS RC, FIS SB, FIS V and FIS VS LOW SPEED with reinforcing steel B500B<sup>5)</sup> in accordance with rebar theory

Design resistances and permissible loads <sup>1) 6)</sup> of single, post-installed rebars in cracked or non-cracked normal concrete of the strength class C20/25 <sup>2)</sup>						
Reinforcing steel B500B $f_{yk} / f_{uk} =$ 500 / 540 N/mm <sup>2</sup>	Basic value for the anchorage length for FIS EM Plus  $l_{b,rqd}^{4)}$ [mm]	Basic value for the anchorage length for FIS SB  $l_{b,rqd}^{4)}$ [mm]	Basic value for the anchorage length for FIS V FIS VS LOW SPEED  $l_{b,rqd}^{4)}$ [mm]	Maximum anchorage depth  $l_{v,max}$ [mm]	Maximum design resistance for axial tensile load  $N_{Rd,s}^{3)}$ [kN]	Maximum permissible tensile load  $N_{perm,s}^{3)}$ [kN]
Ø 8 mm	378	378	378	1800 (3000) <sup>8)</sup>	21,9	15,6
Ø 10 mm	473	473	473	1800 (3000) <sup>8)</sup>	34,1	24,4
Ø 12 mm	567	567	567	1800 (3000) <sup>8)</sup>	49,2	35,1
Ø 14 mm	662	662	662	1800 (3000) <sup>8)</sup>	66,9	47,8
Ø 16 mm	756	756	756	1800 (3000) <sup>8)</sup>	87,4	62,4
Ø 20 mm	945	945	945	1800 (3000) <sup>8)</sup>	136,6	97,6
Ø 22 mm <sup>7)</sup>	1040	-	-	2000	165,3	118,1
Ø 24 mm <sup>7)</sup>	1134	-	-	2000	196,7	140,5
Ø 25 mm	1181	1181	1181	2000 (3000) <sup>8)</sup>	213,4	152,4
Ø 26 mm <sup>7)</sup>	1229	-	-	2000	230,8	164,9
Ø 28 mm	1323	1323	1323	2000 (3000) <sup>8)</sup>	267,7	191,2
Ø 30 mm <sup>7)</sup>	1418	-	-	2000	307,3	219,5
Ø 32 mm <sup>9)</sup>	1512	1512	-	2000 (3000) <sup>8)</sup>	349,7	249,8
Ø 34 mm <sup>7)</sup>	1607	-	-	2000	394,7	282,0
Ø 36 mm <sup>7)</sup>	1701	-	-	2000	442,6	316,1
Ø 40 mm <sup>7)</sup>	1890	-	-	2000	546,4	390,3

For planning and design the complete European Technical Assessments ETA-17/1056 (FIS EM Plus), ETA-13/0651 (FIS SB) or resp. ETA-08/0266 (FIS V and FIS VS LOW SPEED) have to be considered. For determination of the installation parameters (minimum concrete cover, distances, etc.) as well as required transverse reinforcement see EN 1992-1-1 and general installation rules of the assessments.

<sup>1)</sup> The partial safety factors for resistance taken from the European standard EN 1992-1-1 as well as a partial safety factor for action of  $\gamma_F = 1,4$  are considered.

<sup>2)</sup> The ETAs for FIS EM Plus, FIS SB, FIS V and FIS VS LOW SPEED permit post-installed rebar connections in concrete C12/15 up to C50/60. The above mentioned basic value for anchorage length changes depending on the relevant concrete strength class.

<sup>3)</sup> For utilisation of the full steel capacity.

<sup>4)</sup> Basic value of the anchorage length in accordance with EN 1992-1-1, section 8.4.3 for concrete strength class C20/25 and good bond conditions.

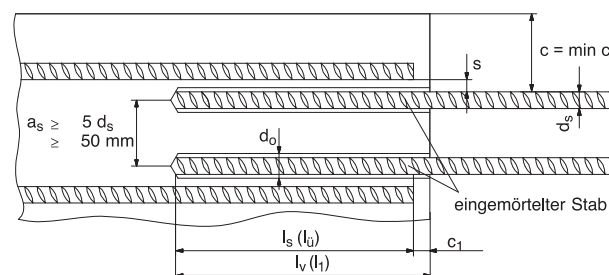
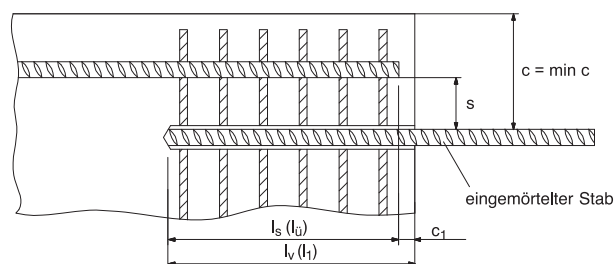
<sup>5)</sup> Reinforcing steel with characteristic yield strength  $f_{yk} = 400 - 600$  N/mm<sup>2</sup> in accordance with EN 1992-1-1 Annex C, Table C.1 and C.2N is approved. The above mentioned basic value for the anchorage length as well as maximum steel resistance (see foot not 3) will change accordingly.

<sup>6)</sup> With FIS EM Plus, FIS SB, FIS V or FIS VS LOW SPEED post-installed rebars are approved in dry or wet concrete with temperatures up to +50 °C (resp. short term up to +80 °C) and drill hole cleaning in accordance with ETA.

<sup>7)</sup> Only FIS EM Plus.

<sup>8)</sup> Values in brackets apply for FIS SB.

<sup>9)</sup> Only FIS EM Plus or FIS SB.



## LOADS

Design resistances and permissible loads<sup>1) 5)</sup> of single, post-installed Rebar anchor in cracked or non-cracked normal concrete of the strength class C20/25<sup>2)</sup>

Design resistances and permissible loads <sup>1) 5)</sup> of single, post-installed Rebar anchor in cracked or non-cracked normal concrete of the strength class C20/25 <sup>2)</sup>						
Type	Basic value for the anchorage length $l_{b,rqd}^{4)}$ [mm]	Maximum anchorage depth $l_{v,max}$ [mm]	Maximum embedment depth $l_{e,ges,max}$ [mm]	Maximum torque moment $T_{inst}$ [Nm]	Maximum design resistance for axial tensile load $N_{Rd,s}^{3)}$ [kN]	Maximum permissible tensile load $N_{perm,s}^{3)}$ [kN]
<b>FRA 12/900 M12</b>	567	800	900	$\leq 50$	49,2	35,1
<b>FRA 16/1100 M16</b>	756	1000	1100	$\leq 100$	87,4	62,4
<b>FRA 20/1400 M20</b>	945	1300	1400	$\leq 150$	136,6	97,6

For planning and design the complete European Technical Assessments ETA-17/1056 (FIS EM Plus), ETA-13/0651 (FIS SB) or resp. ETA-08/0266 (FIS V and FIS VS LOW SPEED) have to be considered. For determination of the installation parameters (minimum concrete cover distances, etc.) as well as required transverse reinforcement see EN 1992-1-1 and general installation rules of the assessments.

<sup>1)</sup> The partial safety factors for resistance taken from the European standard EN 1992-1-1 as well as a partial safety factor for action of  $\gamma_F = 1,4$  are considered.

<sup>2)</sup> The ETAs for FIS EM Plus, FIS SB, FIS V and FIS VS LOW SPEED permit post-installed rebar connections in concrete C12/15 up to C50/60. The above mentioned basic value for anchorage length changes depending on the relevant concrete strength class.

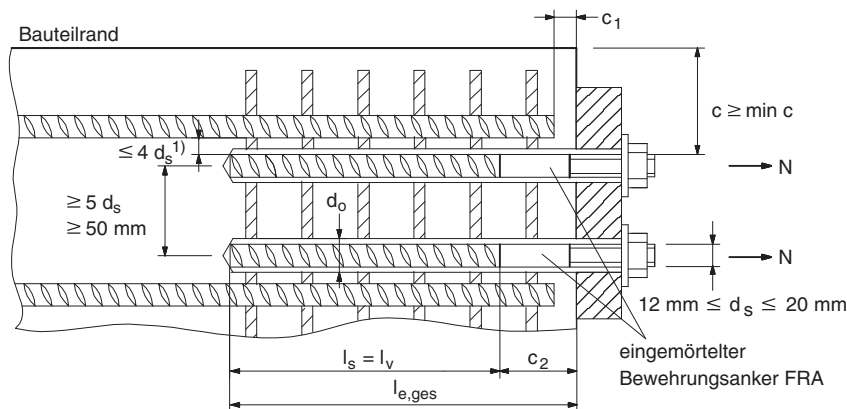
<sup>3)</sup> For utilisation of the full steel capacity.

<sup>4)</sup> Basic value of the anchorage length in accordance with EN 1992-1-1, section 8.4.3 for concrete strength class C20/25 and good bond conditions.

<sup>5)</sup> With FIS EM Plus, FIS SB, FIS V or FIS VS LOW SPEED post-installed Rebar anchors are approved in dry or wet concrete with temperatures up to +50 °C (resp. short term up to +80 °C) and drill hole cleaning in accordance with ETA.

## General rules of constructions

- The Rebar anchor FRA is permitted to transfer tension loads in direction of the axis of the rebar only.
- $l_v$  and  $l_s$  according to approval.
- According to approval it has to be proved that sufficient transverse reinforcement is available.

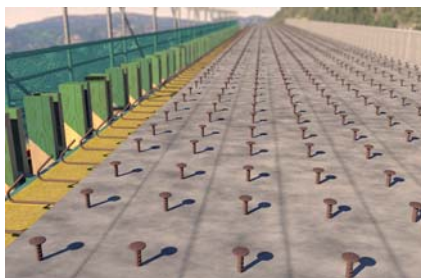


<sup>1)</sup> If the clear distance of the lapped bars is larger than  $4 \times d_s$ , EC2 has to be applied.

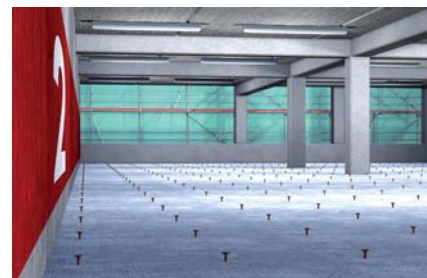
- c Concrete cover of the post-installed rebar anchor
- c<sub>1</sub> Concrete cover of the front side of the existing rebar
- c<sub>2</sub> Concrete cover above the welding
- min c Minimum concrete cover acc. to approval
- d<sub>s</sub> Diameter of the post-installed rebar anchor
- l<sub>s</sub> Lap length
- l<sub>v</sub> Effective anchorage depth of the rebar anchor
- l<sub>e,ges</sub> Embedment depth of the rebar anchor
- d<sub>0</sub> Nominal drill diameter



## The approved system for building renovation



Upgrade of bridges



Reinforcement of ceilings

### VERSIONS

- Zinc-plated concrete steel bar B500B

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked
- Fixing in old concrete B 25 to B 55

### CERTIFICATES



### ADVANTAGES

- Due to its geometry and ease of installation, FCC is the rapid and economic alternative compared to the conventional installation method with bent iron.
- Dimensioning of the anchorage is possible thanks to the building approval. Thus, the system offers maximum security.
- Variable anchoring depths allow for ideal adaptation to the load to be applied, and ensure an optimised installation time and use of materials.
- Depending on site conditions, the FCC can be anchored, in compliance with the approval, with the injection mortars FIS SB or FIS EM Plus.
- In conjunction with FIS EM Plus, FCC is also approved for use in diamond-drilled drill holes.

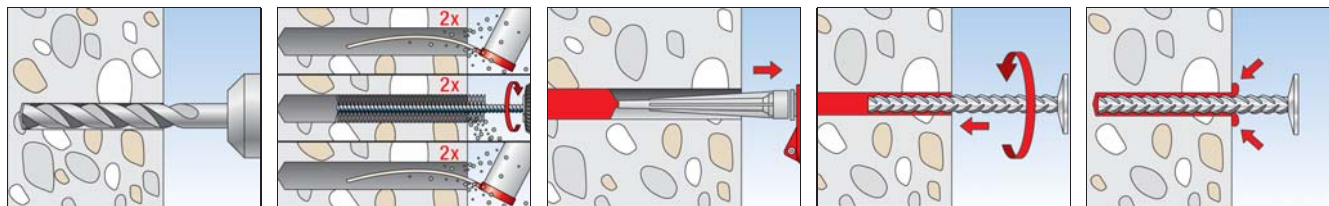
### APPLICATIONS

- Bridge repairs
- Increasing load capacity of bridges
- Increasing loads of ceilings during conversion, for example
- Reinforcement of foundations, piers, columns and walls
- Renovation of car park ceilings following corrosion damage

### FUNCTIONING

- The system consists of injection mortar (FIS SB or FIS EM Plus) and the concrete-concrete shear connector FCC.
- The mortar is injected bubble-free from the drill hole base.
- The mortar adheres the drill hole wall to the shear connector FCC.
- The shear connector is set manually, by lightly rotating it until it reaches the drill hole base.
- The tensile and shear forces arising in the joints between the old and new concrete are absorbed by the FCC-H and safely redirected.

## INSTALLATION IN CONCRETE WITH FIS SB OR FIS EM PLUS AND FCC-H



## TECHNICAL DATA



Concrete-Concrete Shear Connector **FCC-H**

	Art.-No.	Approval DIBt	Drill hole diameter d <sub>0</sub> [mm]	Rebar diameter [mm]	Anchor length [mm]	Min. / standard anchorage depth [mm]	Min. / standard fill quantity e.g. FIS SB [scale units]	Sales unit [pcs]
Item								
<b>FCC-H 10 x 180</b>	<b>520081</b>	●	12	10	180	60/120	2/4	100
<b>FCC-H 12 x 230</b>	<b>520082</b> <sup>1)</sup>	●	14	12	230	70/155	3/7	100
<b>FCC-H 14 x 290</b>	<b>520083</b> <sup>1)</sup>	●	18	14	290	75/195	6/14	50
<b>FCC-H 16 x 360</b>	<b>520085</b> <sup>1)</sup>	●	20	16	360	80/240	7/20	25

<sup>1)</sup> Delivery time on request.

## The professional façade repair for two-leaf cavity walls



Repairing outer leafs



Detail: Repairing outer leafs

### VERSIONS

- Stainless steel

### BUILDING MATERIALS

- Facing masonry with and without an air layer

### CERTIFICATES



### ADVANTAGES

- The expansion-force-free fixing prevents splitting and cracks. This means that VBS 8 can be used even in old and sensitive masonry.
- The drill bit diameter of just 8 mm means that a minimal amount of mortar is required for each fixing point. Thus VBS 8 is particularly economical.
- The installation is approved anywhere along the entire bed joint, thus ensuring a high level of installation safety.
- The grey colour of the injection mortar is similar to the colour of the bed joint. This means that the fixing is almost invisible to the eye.

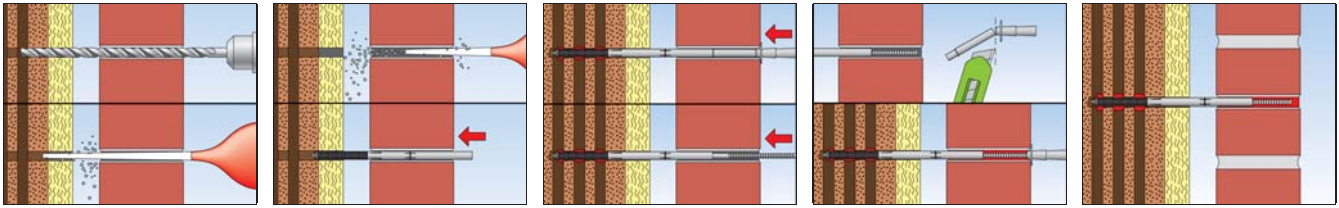
### APPLICATIONS

- Post-installation needling of two-skin cavity walls

### FUNCTIONING

- The remedial wall tie VBS 8 comprises a perforated plastic sleeve and a profiled A4 stainless steel tie Ø 4 mm.
- VBS 8 is used together with the injection mortar FIS V.
- The anchor is inserted in the bed joint of the outer leaf using push-through installation.

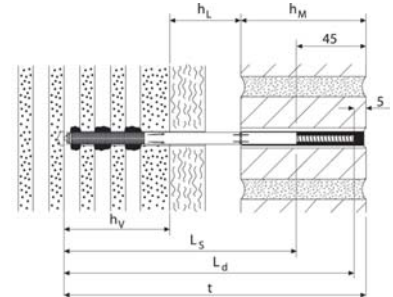
## INSTALLATION IN FACING MASONRY WITH FIS V AND VBS 8



## TECHNICAL DATA



Remedial wall tie **VBS 8**



	Stainless steel	Approval	Cavity or insulation	Drill hole diameter	Outer leaf	Depth = embedment depth	Fixing length	Anchorage depth	Fill quantity FIS V bearing wall	Sales unit
	Art.-No.	DIBt	[mm]	$d_0$ [mm]	[mm]	$h_0 = h_s$ [mm]	$l$ [mm]	$h_{ef}$ [mm]	[scale units]	[pcs]
Item	<b>A4</b>									
<b>VBS 8/20</b>	<b>078763</b> 1)2)	●	0 - 20	8	$\geq 90$	195	188	$>60$	4	100
<b>VBS 8/50</b>	<b>078799</b> 1)2)	●	20 - 50	8	$\geq 90$	225	218	$>60$	4	100
<b>VBS 8/80</b>	<b>078800</b> 1)2)	●	50 - 80	8	$\geq 90$	255	248	$>60$	4	100
<b>VBS 8/120</b>	<b>078801</b> 1)2)	●	80 - 120	8	$\geq 90$	295	288	$>60$	6	100
<b>VBS 8/150</b>	<b>078802</b> 1)2)	●	120 - 150	8	$\geq 90$	325	318	$>60$	6	100

1) Product consisting of perforated plastic sleeve, profiled wire A4 and injection nozzle.

2) For the closing of the curtain walling about 2-3 additional scale units of mortar FISV are required.

## ACCESSORIES



Compressed-air cleaning tool      Hammer drill SDS-Plus Pointer, DIN 8039

Item	Art.-No.	Technical details	Sales unit
			[pcs]
<b>VBS 8 cleaning set</b>	<b>090241</b>	content: cleaning brush and extension tube for blow-out pump	1
<b>Compressed-air cleaning tool</b>	<b>093286</b>	for professional cleaning of the drill hole	1
<b>SDS-Plus Pointer 8,0 / 460 mm</b>	<b>074330</b>	Hammer drill with self-centring drill bit and relief-ground drill grooving	1

## The economical solution for the repair of triple-skin outer wall panels



Repairing weather shells



Detail: Repairing weather shells

### VERSIONS

- Stainless steel

### BUILDING MATERIALS

- Triple-skin outer wall panels made of concrete  $\geq$  C12/15

### CERTIFICATES



### ADVANTAGES

- The FWS II achieves a high shear load-bearing capacity due to its large anchor diameter. This reduces the number of reconstruction anchors needed for each plate to a minimum, thus saving costs.
- The drill hole can be drilled in one step using standard diamond drill bits. This ensures quick progress is made.
- Installation is already approved from a sub-base thickness  $\geq$  80 mm.
- Approval with a new measuring strategy allows a safer and economically static calculation while making it possible to document loads from temperature changes.

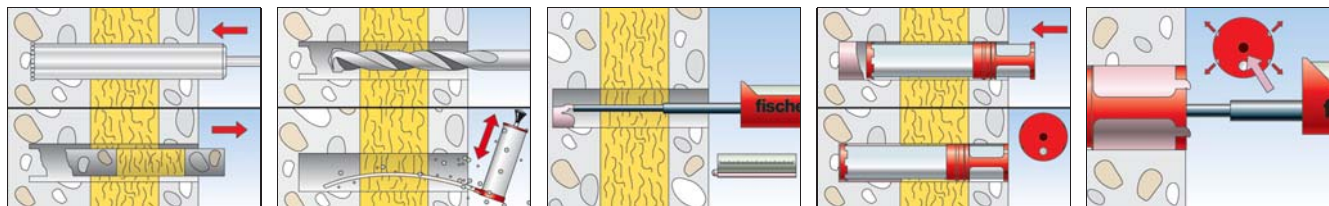
### APPLICATIONS

- For post-installation securing of triple-skin outer wall panels
- Strengthening outer wall panels for additional exterior insulation

### FUNCTIONING

- The FWS II weather facing reconstruction anchors can be bedded in mortar into the load-bearing skin and weather shell with the FIS V, FIS VW or FIS VS injection mortar.
- The red plastic coating protects the insulation from being penetrated with mortar.
- You can see the correct anchor filling with the weather shell through the inspection openings on the head of the anchor.

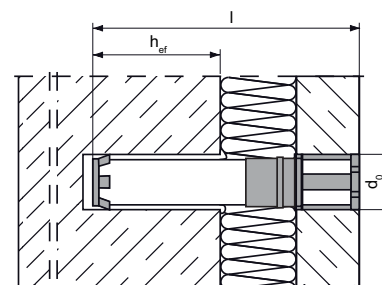
## INSTALLATION IN TRIPLE-SKIN OUTER WALL PANELS WITH FIS V AND FWS II-A



## TECHNICAL DATA



Weather facing reconstruction system  
**FWS II - A**



	Art.-No.	Approval DIBt	Total length l [mm]	Nom. drill diameter d <sub>0</sub> [mm]	Effect. anchorage depth in the load-bearing skin h <sub>ef</sub> [mm]	Anchors per cartridge FIS V / FIS VS / FIS VW 360 ml	Sales unit [pcs]
Item							
<b>FWS II - A 180</b>	<b>532883</b>	●	180	40 - 41	70	5	5
<b>FWS II - A 205</b>	<b>532884</b>	●	205	40 - 41	70	5	5
<b>FWS II - A 230</b>	<b>532885</b>	●	230	40 - 41	70	5	5

## TECHNICAL DATA



Injection mortar **FIS V 360 S**

	Art.-No.	Approval DIBt	ETA	Languages on the cartridge	Scale unit	Contents	Sales unit
Item							[pcs]
<b>FIS V 360 S</b>	<b>094404</b>	●	■	DE, FR, NL, TR, HU, AR	180	1 cartridge 360 ml, 2 x FIS MR Plus	6

## LOADS

### Weather facing reconstruction system FWS II

Highest permissible shear loads<sup>1) 5)</sup> for a single anchor in a load-bearing skin made of concrete ≥ C12/15.

For the design the complete approval Z-2 1.8-2029 has to be considered.

Type	Effective anchorage depth in the load bearing skin h <sub>ef</sub> ≥ [mm]	Thickness of load-bearing layer h <sub>T</sub> ≥ [mm]	Thickness of thermal insulation <sup>2)</sup> h <sub>D</sub> ≤ [mm]	Thickness of outer leaf h <sub>w</sub> ≥ [mm]	Permissible bending moment M <sub>perm</sub> [Nm]	Cracked or non-cracked concrete	
						Permissible shear load <sup>4)</sup> V <sub>perm</sub> [kN]	Minimum edge distance <sup>3)</sup> c <sub>min</sub> (c <sub>w</sub> , c <sub>T</sub> ) [mm]
<b>FWS II - A 180</b>	70	80	70	40	1310	11,5	150
<b>FWS II - A 205</b>	70	80	95	40	1310	9,5	150
<b>FWS II - A 230</b>	70	80	120	40	1310	8,1	150

<sup>1)</sup> Required safety factors are considered. The given loads are valid under the pre-condition that an additional thermal insulation will be applied on the weather facing.

<sup>2)</sup> For bigger insulation thicknesses special lengths are possible.

<sup>3)</sup> For exact arrangement of the bolts as well as for eventually needed additional proofs see approval.

<sup>4)</sup> The determination of the permissible shear load for special lengths is done according Annex 3 and 4 of the approval.

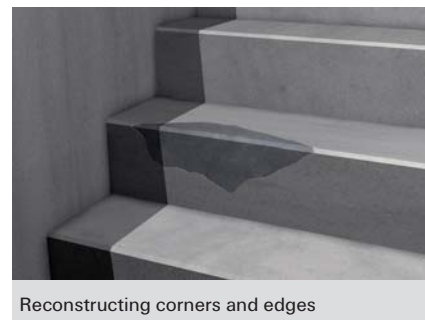
<sup>5)</sup> The given loads are valid for fixations in dry and humid concrete for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drillhole cleaning according to approval.



## The epoxy resin for repair work



Filling cracks



Reconstructing corners and edges

### BUILDING MATERIALS

Suitable for:

- Concrete

### ADVANTAGES

- The FCS based on epoxy resin has a high bond strength and a low shrinkage value. This guarantees a high performance and opens up a wide range of applications.
- The two product variants, FCS Liquid (low viscosity = liquid) and FCS (high viscosity = paste-like), allow for use both in horizontal situations and on walls and ceilings. Therefore, there is always the right product for every occasion.

### APPLICATIONS

- Filling holes and cracks in concrete and similar surfaces
- Reconstructing chipped corners and edges

### FUNCTIONING

- The resin and hardener are stored in two separate containers.
- The hardener is added to the resin and mixed thoroughly until the material is the same colour throughout.
- Note: The quality of the mixing of components and the proper filling of the holes (without air pockets) has an effect on the load-bearing capacity of the system!
- FCS Liquid can be poured into holes or cracks, or applied using a brush.
- FCS can be applied with a palette knife.
- Once mixed, the material can be used until the maximum open time is reached.

## INSTALLATION FCS



## INSTALLATION FCS LIQUID



## TECHNICAL DATA



fischer Can System **FCS**



fischer Can System **FCS liquid**

Item		Languages on the can	Sales unit [pcs]
<b>FCS - fischer Can System</b>	<b>043676</b>	EN, ES, PT	12
<b>FCS Liquid - fischer Can System</b>	<b>043917</b>	EN, ES, PT	12

## CURING TIME

Temperature	Gelling time	Curing time
+ 5°C	70 min.	60 hrs.
+10°C	60 min.	30 hrs.
+20°C	45 min.	24 hrs.
+30°C	30 min.	20 hrs.
+40°C	15 min.	16 hrs.

The gelling time starts when the components get in contact. Stir the components thoroughly until the colour of the mortar is evenly. This is essential to achieve the full performance of the mortar.

## Liquid plugs and repair compounds for serious cases



Repairing damaged drill holes



Repairing damaged hinges

### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Wooden materials
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Panel building materials
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

### ADVANTAGES

- The Fill & Fix injection fixing works whatever the drill hole size and building material. As a result, a number of applications can be completed with just one product.
- Wood screws can be screwed directly into the hardened injection fixing. This allows for a fast and simple installation.
- Due to the special formulation, the screw can be screwed into the injection fixing and removed. Thus, components can be reattached to the same point.
- Fill & Fix can be sanded and painted, and is suitable for filling drill holes that are no longer needed prior to painting.

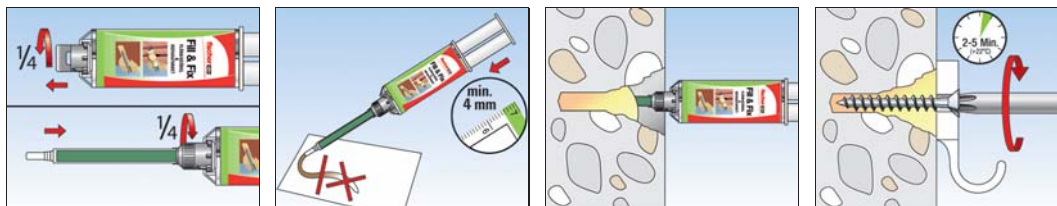
### APPLICATIONS

- Repairing cracked or over-sized drill holes
- Repairing broken furniture hinges etc.
- Fixing lightweight objects in difficult or damaged building materials (old buildings)
- Fixing lightweight objects in internal and UV-protected external areas

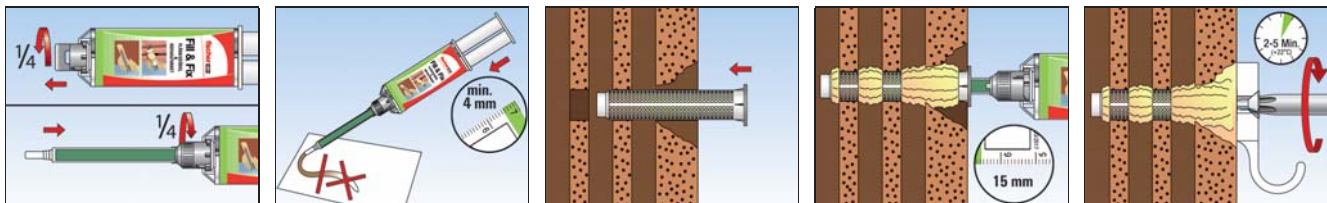
### FUNCTIONING

- Fill & Fix is a 2-component, solvent-free injection compound based on polyurethane. It is applied into the drill hole, where it foams lightly and sets quickly.
- The increase in volume during the setting process guarantees a secure hold, even in dilapidated or difficult building materials.
- After approx. 2 minutes, screws, hooks, eye screws etc. with a diameter of up to 6 mm that are normally used in wood can be screwed into and removed from the set material without pre-drilling.
- Use the perforated sleeves (included) for hollow and board building materials.

## INSTALLATION IN SOLID BUILDING MATERIALS



## INSTALLATION IN HOLLOW AND PANEL BUILDING MATERIALS



## TECHNICAL DATA



Fill & Fix Injection fixing

Item	Art.-No.	Contents	Languages on the cartridge	Sales unit [pcs]
Fill & Fix K (D)	051097	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	DE	4
Fill & Fix K (D/F)	503227	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	D, F	8
Fill & Fix K (F)	513500	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	F	8
Fill & Fix K (I)	051098	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	I	8
Fill & Fix K (S/DK)	505083	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	S, DK	8
Fill & Fix K (GR)	505084	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	GR	8
Fill & Fix Static mixer	502735	6 static mixer	-	1

## LOADS

### Fill & Fix

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for chipboard screws with the specified diameters.

Type			Fill & Fix		
Diameter of chipboard screw	Ø	[mm]	4,0	5,0	6,0
Nominal drill diameter	d <sub>0</sub>	[mm]	10	10	10
Anchorage depth	h <sub>ef</sub> ≥	[mm]	45	45	45
Drill hole depth	h <sub>1</sub> ≥	[mm]	50	50	50
Anchorage in solid substrates					
Recommended load <sup>2)</sup> in concrete	≥ C12/15	[kN]	0,50	0,60	0,70
Recommended load <sup>2)</sup> in sand-lime bricks	≥ KS 20 a. ≥ NF	[kN]	0,50	0,60	0,70
Anchorage in perforated bricks/hollow blocks using the perforated sleeve					
Recommended load <sup>2)</sup> in vertically perforated bricks	≥ HLz 12, ρ ≥ 0,9 kg/dm3 a. ≥ 16DF	[kN]	0,20	0,25	0,30
Recommended load <sup>2)</sup> in per forated sand-lime bricks	≥ KSL 12, ρ ≥ 1,4 kg/dm3 a. ≥ 5DF	[kN]	0,20	0,25	0,30
Recommended load <sup>2)</sup> in lightweight concrete hollow blocks		[kN]	0,20	0,25	0,30
Anchorage in aerated concrete					
Recommended load <sup>2)</sup> in aerated concrete	≥ PP2	[kN]	0,10	0,15	0,20
Anchorage in board materials using the perforated sleeve					
Recommended load <sup>2)</sup> in gypsum plasterboard	12,5 mm	[kN]	0,12	0,12	0,12
Recommended load <sup>2)</sup> in gypsum plasterboard	25 mm (= 2 × 12,5 mm)	[kN]	0,20	0,20	0,20
Recommended load <sup>2)</sup> in gypsum fibreboard	12,5 mm	[kN]	0,21	0,21	0,21









<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.











## Dispensers and Mortars

3

Chemical fixings

								Page
FIS ... 150 T	FIS ... 300 T	FIS ... 345 S	FIS ... 360 S	FIS ... 380/410 C	FIS ... 390 S	FIS ... 585 S	FIS ... 1500 S	

### Dispensers / Mortars

 FIS DMS (511118)	■	■	■	■		■		196
 FIS AM (58000)	■	■	■	■		■		196
 KP M1 (53115)	■	■						196
 KP M2 (53117)	■	■						196
 FIS AC (96497)					■			196
 FIS DMS-L (510992)							■	196
 FIS DCD S (543629)		■	■	■		■		197
 FIS AP (58027)	■	■	■	■		■		197
 FIS DP-S L (511125)							■	197
 FIS DP-S XL (512401)							■	197

## FIS DMS (511118)



### APPLICATIONS

- Shuttle cartridges with 345, 360 and 390 ml content
- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

### ADVANTAGES

- The 3-fold push rod distributes the extrusion forces equal over the cartridge and prevents the cartridge from tearing up.
- The robust glass fiber reinforced plastic housing increases the breaking strength of the dispenser and offers a long service life.
- The ergonomic design of the FIS DMS ensures a good balance and allows fatigue-free working.

## FIS AM (58000)



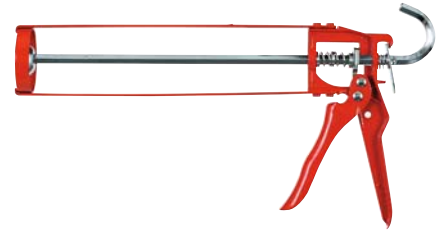
### APPLICATIONS

- Shuttle cartridges with 345, 360 and 390 ml content
- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

### ADVANTAGES

- The robust design can withstand the high requirements of the job site and thus offers a long life.
- The infinitely variable feed allows the exact dosing and thus ensures easy handling.

## KP M1 (53115)



### APPLICATIONS

- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

### ADVANTAGES

- The handy, robust solid metal construction for standard cartridges up to 310 ml bears up against requirements on the construction site and, as such, is also suitable for professional use.
- The continuous in-feed allows for a precise dosage, making it easy to use.
- The slim shape of the device allows for an exact application, even in difficult to reach spots, thus offering a high level of flexibility

## KP M2 (53117)



### APPLICATIONS

- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

### ADVANTAGES

- The 18:1 transmission ratio enables the fast, low-energy application of even highly viscous materials, thus ensuring stress-free work.
- The robust design with the special, hardened drive block meets the tough requirements of a construction site and thus offers a long lifespan.
- The freely accessible cartridge makes it possible to perfectly align the extrusion nozzle, guaranteeing application-orientated work.

## FIS AC (96497)



### APPLICATIONS

- Coaxial cartridges with 380 and 410 ml content

### ADVANTAGES

- The robust design can withstand the high requirements of the job site and thus offers a long life.
- The infinitely variable feed allows the exact dosing and thus ensures easy handling.

## FIS DMS-L (510992)



### APPLICATIONS

- Cartridges with 585 ml content

### ADVANTAGES

- The patented parallel lever of the FIS DM S-L allows a large and even force transmission and ensures fatigue-free working.
- The dropout protection on the cartridge holder provides a secure hold of the cartridge in the dispenser.



## FIS DCD S (543629)



### APPLICATIONS

- Shuttle cartridges with 345, 360 and 390 ml content
- Multibond cartridges with 300 ml content

### ADVANTAGES

- The FIS DCD S has a dosing function which is controlled by a setting wheel. This allows for optimal adaptation to the processing conditions and ensures fast work progress.
- The robust battery dispenser is very light, fits comfortably in the hand and allows fatigue-free working.

## FIS AP (58027)



### APPLICATIONS

- Shuttle cartridges with 345, 360 and 390 ml content
- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

### ADVANTAGES

- The fast venting minimises cartridge after-run, which facilitates clean work at the site.
- The reducing valve in the handle enables the optimum adjustment of the volume flow in line with the processing conditions.
- Due to the ergonomically formed handle, the dispensers fit nicely in your hand and make work less tiring.

## FIS DP-S L (511125)



### APPLICATIONS

- Cartridges with 585 ml content

### ADVANTAGES

- The fast venting minimises cartridge after-run, which facilitates clean work at the site.
- The reducing valve in the handle enables the optimum adjustment of the volume flow in line with the processing conditions.
- Due to the ergonomically formed handle, the dispensers fit nicely in your hand and make work less tiring.

## FIS DP-S XL (512401)



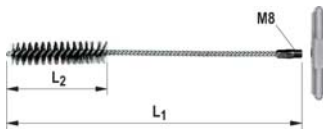
### APPLICATIONS

- Cartridges with 1500 ml content

### ADVANTAGES

- The fast venting minimises cartridge after-run, which facilitates clean work at the site.
- The reducing valve in the handle enables the optimum adjustment of the volume flow in line with the processing conditions.
- Due to the ergonomically formed handle, the dispensers fit nicely in your hand.
- In addition the dispenser has a carrying strap around which make work less tiring.

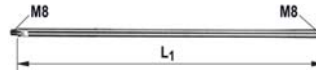
## ACCESSORIES DRILL HOLE CLEANING



Cleaning brush **BS**



SDS-Adapter M8



Brush extension

Item	Art.-No.	Length L1 [mm]	Length L2 [mm]	Brush diameter [mm]	For drill diameter [mm]	Sales unit [pcs]
<b>BS ø 8</b>	<b>078177</b>	120	50	9	8	1
<b>BS ø 10</b>	<b>078178</b>	120	50	11	10	1
<b>BS ø 12</b>	<b>078179</b>	150	80	13	12	1
<b>BS ø 14</b>	<b>078180</b>	250	80	16	14	1
<b>BS ø 16/18</b>	<b>078181</b>	250	80	20	16/18	1
<b>BS ø 20/22</b>	<b>052277</b>	180	80	25	20/22	1
<b>BS ø 24</b>	<b>078182</b>	300	100	26	24	1
<b>BS ø 25</b>	<b>097806</b>	300	100	27	25	1
<b>FIS brush extension</b>	<b>508791</b>	410	-	-	-	1
<b>Compressed air nozzle D16-D19</b>	<b>511957</b>	-	-	-	-	2
<b>Compressed air nozzle D20-D25</b>	<b>511958</b> <sup>1)</sup>	-	-	-	-	2

1) Delivery time on request.



Compressed-air cleaning tool



Blow-out pump **AB G**



Centring wedge

Item	Art.-No.	Contents	Total length [mm]
<b>Compressed-air cleaning tool</b>	<b>093286</b>	—	—
<b>Blow-out pump AB G</b>	<b>089300</b>	—	370
<b>Centring wedge</b>	<b>093076</b>	10 wedges for overhead installation, from M16	—

## ACCESSORIES



Machine setting tool **RA-SDS**



Adapter **SDS plus 1/2" VK**



Adapter **SDS max 1/2" VK**



Adapter **SK SW 8 1/2" VK**



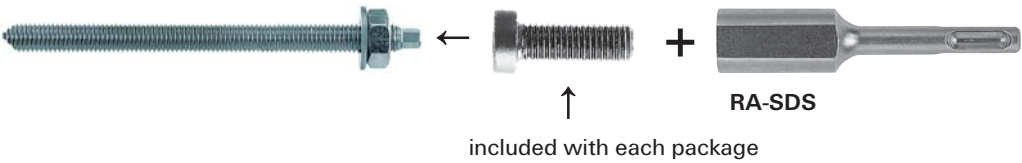
Adapter **SDS max 3/4" VK**

Item	Art.-No.	Match	Sales unit [pcs]
<b>RA-SDS</b>	<b>062420</b>	Adapter suitable fits set screw	1
<b>SK SW 8 1/2</b>	<b>001536</b>	Adapter suitable fits threaded rods M8 - M22	1
<b>SDS plus 1/2</b>	<b>001537</b>	Adapter suitable fits threaded rods M8 - M16	1
<b>SDS max 1/2</b>	<b>001538</b>	Adapter suitable fits threaded rods M16 - M20	1
<b>SDS max 3/4</b>	<b>001539</b>	Adapter suitable fits threaded rods M20 - M30	1

SETTING TOOLS

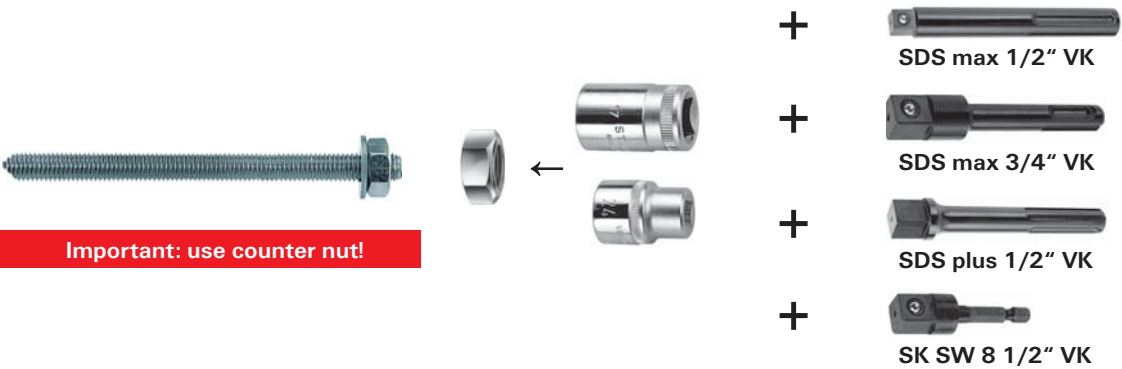
Setting tool with SDS adapter

For simple installation of bonded anchors for example Resin anchor RM II, Highbond anchor FHB II, Superbond resin capsule RSB.



Adapter for installing threaded rods

Threaded rods without external hex-drive (special lengths).



ACCESSORIES



Item	Art.-No.	Approval	Match	Contents	Sales unit [pcs]
Cone drill PBB	090634	■	M8 - M12; FIS E	1x cone drill PBB	1
Centring sleeve PBZ	090671	■	M8 - M12; FIS E	10x centring sleeve PBZ, 5x injection adapter	10

















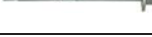
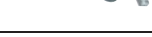


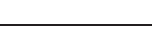






# 4 High performance steel anchors

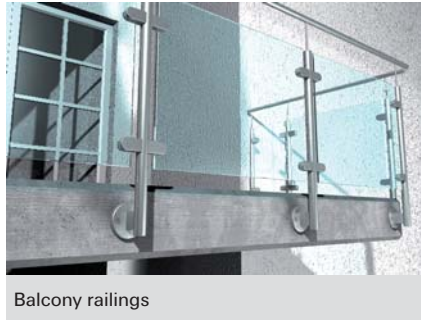
Page

Bolt anchor FAZ II		202
High performance anchor FH II		209
High performance anchor FH II-I		217
ZYKON undercut anchor FZA		220
ZYKON hammerset anchor FZEA II		228
Concrete screw ULTRACUT FBS II 8-14		232
Concrete screw ULTRACUT FBS II 6		242
Hammerset anchor EA II		247
Hammerset anchor EA-N		252
Nail anchor FNA II		256
Nail anchor FNA II RB		260
Ceiling nail FDN II		263
Ceiling nail FDZ		265
Bolt anchor FBN II		267
Heavy-duty anchor TA M		272
Heavy-duty anchor TA M-T		276
Sleeve anchor FSA		278
Fixing set for Diamond Drills FDBB		281
Wall screw MR		283
Hollow-ceiling anchor FHY		285
Aircrete anchor FPX-I		288

4

High performance steel anchors

**For highest demands. Powerful and flexible.**



Balcony railings



Steel girders

## VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

## BUILDING MATERIALS

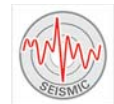
### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

### Also suitable for:

- Concrete C12/15
- Concrete C80/95
- Natural stone with dense structure

## CERTIFICATES



## ADVANTAGES

- According to the new assessment (ETA) the tensile load capacities are decisively increased. This requires less anchors.
- The variable anchorage depths for the sizes M8 to M16 allow for the first time a millimeter-accurate adjustment to the loads.
- The design with cap nut offers a visually attractive anchoring and protects against injuries due to the round head shape.
- The first bolt anchor M6 with ETA Assessment for Option 1, for secure and approved anchorage.
- The international approvals guarantees maximum safety and the best performance.
- Approved for diamond-drilled holes.

## APPLICATIONS

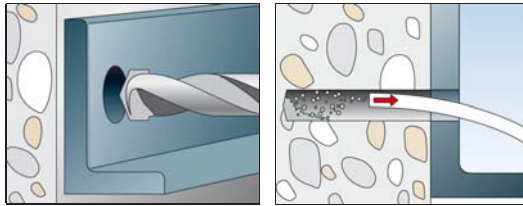
- Steel constructions
- Guard rails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades
- Timber constructions

## FUNCTIONING

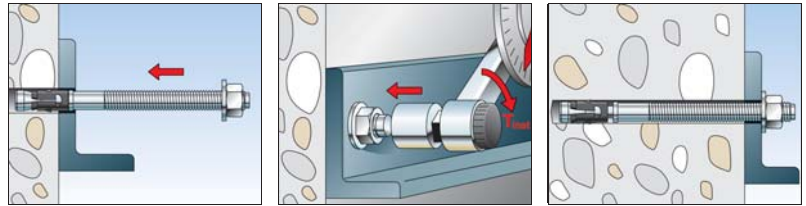
- The FAZ II is suitable for pre-positioned and push-through installation and is also ideal for stand-off installation thanks to the long thread.
- When applying the torque, the cone bolt is pulled into the expansion sleeve and expand it against the drill hole wall.
- The anchor is set in line with the approval once the preset installation torque is achieved.
- In the case of series installation, we recommend using the FABS anchor bolt setting tool.



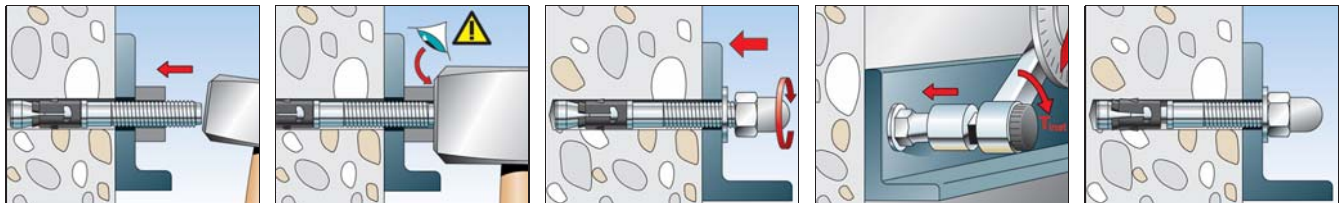
## DRILL HOLE PREPARATION



## PUSH-THROUGH INSTALLATION WITH HEXAGON NUT



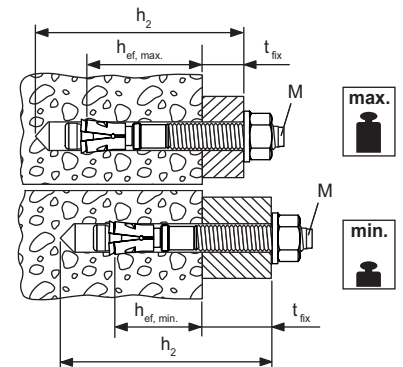
## PUSH-THROUGH INSTALLATION OF THE CUP NUT VERSION WITH SETTING GAUGE



## TECHNICAL DATA



Bolt anchor FAZ II



Item	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval		Seismic Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	ICC		d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	Ø x length [mm]	○ SW [mm]	[pcs]
	gvz	A4	C										
FAZ II 6/10	542621	542623	—	■	—	—	6	60	65	10/-	M 6 x 25	10	50
FAZ II 6/20	542622	542624	—	■	—	—	6	70	75	20/-	M 6 x 35	10	50
FAZ II 8/10	094871 <sup>1)</sup>	501396 <sup>1)</sup>	—	■	▲	C1	8	65	75	10/20	M 8 x 38	13	50
FAZ II 8/10	—	—	501428 <sup>1)</sup>	■	▲	C1	8	65	75	10/20	M 8 x 38	13	10
FAZ II 8/30	094877 <sup>1)</sup>	501399 <sup>1)</sup>	—	■	▲	C1	8	85	95	30/40	M 8 x 58	13	50
FAZ II 8/30	—	—	501429 <sup>1)</sup>	■	▲	C1	8	85	95	30/40	M 8 x 58	13	10
FAZ II 8/50	094878 <sup>1)</sup>	501401	—	■	▲	C1	8	105	115	50/60	M 8 x 78	13	50
FAZ II 8/100	094879 <sup>1)</sup>	—	—	■	▲	C1	8	155	165	100/110	M 8 x 128	13	25
FAZ II 8/160	503251 <sup>1)</sup>	—	—	■	▲	C1	8	215	225	160/170	M 8 x 100	13	20
FAZ II 10/10	094981	501403	—	■	▲	C1 / C2	10	85	95	10/30	M 10 x 53	17	50
FAZ II 10/10	—	—	501430	■	▲	C1	10	85	95	10/30	M 10 x 53	17	10
FAZ II 10/20	094982	—	—	■	▲	C1 / C2	10	95	105	20/40	M 10 x 63	17	25
FAZ II 10/20	—	501406	—	■	▲	C1 / C2	10	95	105	20/40	M 10 x 63	17	50
FAZ II 10/30	094983	—	—	■	▲	C1 / C2	10	105	115	30/50	M 10 x 73	17	25
FAZ II 10/30	—	501407	—	■	▲	C1 / C2	10	105	115	30/50	M 10 x 73	17	50
FAZ II 10/30	—	—	503185	■	▲	C1	10	105	115	30/50	M 10 x 73	17	10
FAZ II 10/50	094984	501409	—	■	▲	C1 / C2	10	125	135	50/70	M 10 x 93	17	20
FAZ II 10/70	—	501410	—	■	▲	C1 / C2	10	145	155	70/90	M 10 x 113	17	20
FAZ II 10/80	094985	—	—	■	▲	C1 / C2	10	155	165	80/100	M 10 x 123	17	20
FAZ II 10/100	—	501411	—	■	▲	C1 / C2	10	175	185	100/120	M 10 x 100	17	20
FAZ II 10/100	094986	—	—	■	▲	C1 / C2	10	175	185	100/120	M 10 x 143	17	20
FAZ II 10/160	—	501412	—	■	▲	—	10	235	245	160/180	M 10 x 100	17	20
FAZ II 10/160	503252	—	—	■	▲	—	10	235	245	160/180	M 10 x 193	17	20
FAZ II 12/10	095419	501413	—	■	▲	C1 / C2	12	100	110	10/30	M 12 x 61	19	20

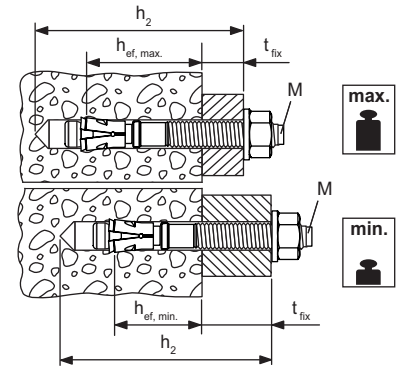
<sup>1)</sup> With minimum embedment depth only for statically indeterminate systems

Approval Seismic C1/C2 only with maximum embedment depth

## TECHNICAL DATA



Bolt anchor FAZ II



	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	ICC		d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	Ø x length [mm]	○ SW [mm]	[pcs]
Item	gvz	A4	C										
FAZ II 12/10	—	—	503186	■	▲	C1	12	100	110	10/30	M 12 x 61	19	10
FAZ II 12/20	095420	501415	—	■	▲	C1 / C2	12	110	120	20/40	M 12 x 71	19	20
FAZ II 12/30	095421	501416	—	■	▲	C1 / C2	12	120	130	30/50	M 12 x 81	19	20
FAZ II 12/30	—	—	501431	■	▲	C1	12	120	130	30/50	M 12 x 81	19	10
FAZ II 12/50	095446	501419	—	■	▲	C1 / C2	12	140	150	50/70	M 12 x 101	19	20
FAZ II 12/60	—	501420	—	■	▲	C1 / C2	12	150	160	60/80	M 12 x 111	19	20
FAZ II 12/80	095454	—	—	■	▲	C1 / C2	12	170	180	80/100	M 12 x 131	19	20
FAZ II 12/100	095470	501421	—	■	▲	C1 / C2	12	190	200	100/120	M 12 x 151	19	20
FAZ II 12/160	503253	—	—	■	▲	—	12	250	260	160/180	M 12 x 186	19	10
FAZ II 12/160	—	503180	—	■	▲	—	12	250	260	160/180	M 12 x 100	19	20
FAZ II 12/200	095605	—	—	■	▲	—	12	290	300	200/220	M 12 x 186	19	10
FAZ II 16/5	522124	—	—	■	▲	C1 / C2	16	115	128	5/25	M 16 x 64	24	10
FAZ II 16/5	—	522125	—	■	▲	C1 / C2	16	115	128	5/25	M 16 x 64	24	20
FAZ II 16/25	—	501423	—	■	▲	C1 / C2	16	135	148	25/45	M 16 x 84	24	20
FAZ II 16/25	—	—	501432	■	▲	C1	16	135	148	25/45	M 16 x 84	24	10
FAZ II 16/25	095836	—	—	■	▲	C1 / C2	16	135	148	25/45	M 16 x 84	24	10
FAZ II 16/50	095864	—	—	■	▲	C1 / C2	16	160	173	50/70	M 16 x 109	24	10
FAZ II 16/50	—	—	503187	■	▲	C1	16	160	173	50/70	M 16 x 109	24	10
FAZ II 16/50	—	501424	—	■	▲	C1 / C2	16	160	173	50/70	M 16 x 109	24	20
FAZ II 16/100	095865	501425	—	■	▲	C1 / C2	16	210	223	100/120	M 16 x 159	24	10
FAZ II 16/160	503254	—	—	■	▲	C1 / C2	16	270	283	160/180	M 16 x 189	24	10
FAZ II 16/200	095967	—	—	■	▲	—	16	310	323	200/220	M 16 x 189	24	10
FAZ II 16/250	095968	—	—	■	▲	—	16	360	373	250/270	M 16 x 100	24	10
FAZ II 16/300	096188	—	—	■	▲	—	16	410	423	300/320	M 16 x 100	24	10
FAZ II 20/30	046632	—	—	■	▲	C1 / C2	20	155	172	30/-	M 20 x 54	30	5
FAZ II 20/30	—	501426	—	■	▲	C1 / C2	20	155	172	30/-	M 20 x 54	30	4
FAZ II 20/60	046633	—	—	■	▲	C1 / C2	20	185	202	60/-	M 20 x 84	30	5
FAZ II 20/60	—	503183	—	■	▲	C1 / C2	20	185	202	60/-	M 20 x 84	30	4
FAZ II 20/160	503255	—	—	■	▲	C1 / C2	20	285	302	160/-	M 20 x 100	30	5
FAZ II 24/30	046635	—	—	■	▲	C1	24	185	205	30/-	M 24 x 58	36	5
FAZ II 24/30	—	501427	—	■	▲	C1	24	185	205	30/-	M 24 x 58	36	4
FAZ II 24/60	046636	—	—	■	▲	C1	24	215	235	60/-	M 24 x 88	36	5
FAZ II 24/60	—	503184	—	■	▲	C1	24	215	235	60/-	M 24 x 88	36	4

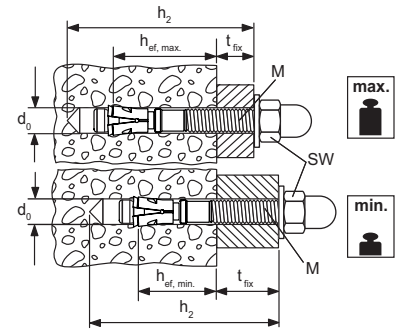
1) With minimum embedment depth only for statically indeterminate systems

Approval Seismic C1/C2 only with maximum embedment depth

## TECHNICAL DATA



Bolt anchor **FAZ II H**



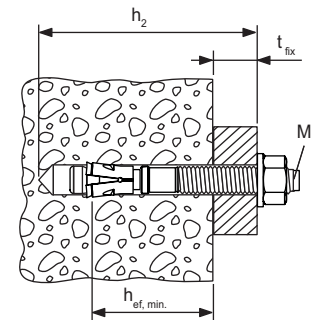
	Zinc-plated steel	Stainless steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	ETA	ICC		d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	Ø x length [mm]	○ SW [mm]	[pcs]
Item	gvz	A4										
FAZ II 10/10 H	543392	543396	■	—	C1 / C2	10	87	95	10/30	M 10 x 53	17	20
FAZ II 10/20 H	543393	543397	■	—	C1 / C2	10	97	105	20/40	M 10 x 63	17	20
FAZ II 12/10 H	543394	543398	■	—	C1 / C2	12	99	109	10/30	M 12 x 61	19	20
FAZ II 12/20 H	543395	543399	■	—	C1 / C2	12	109	119	20/40	M 12 x 71	19	20

Approval Seismic C1/C2 only with maximum embedment depth

## TECHNICAL DATA



Bolt anchor **FAZ II K**



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Usable length (hef min.)	Thread	Washer (outer diameter x thickness)	Sales unit
	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	Ø x length [mm]	[mm]	[pcs]
Item	gvz	A4								
FAZ II 8/5 K	538989	538990	■	8	45	60	5	M 8 x 23	16 x 1,6	50
FAZ II 10/10 K	522108	522116	■	10	65	75	10	M 10 x 33	20 x 2	50
FAZ II 10/20 K	522110	—	■	10	75	85	20	M 10 x 43	20 x 2	25
FAZ II 10/20 K	—	522117	■	10	75	85	20	M 10 x 43	20 x 2	50
FAZ II 12/10 K	522118	522122	■	12	80	90	10	M 12 x 41	24 x 2,5	20
FAZ II 12/20 K	522119	522123	■	12	90	100	20	M 12 x 51	24 x 2,5	20
FAZ II 10/10 K GS	522115	—	■	10	65	75	10	M 10 x 33	25 x 3	50
FAZ II 12/10 K GS	522121	—	■	12	80	90	10	M 12 x 41	30 x 3	20

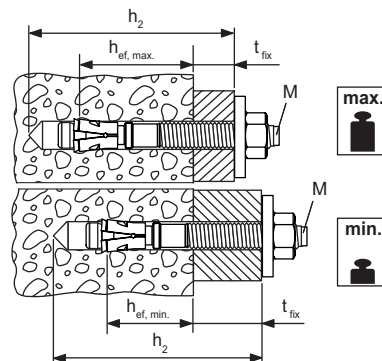
## TECHNICAL DATA



Bolt anchor **FAZ II GS** (with large washer)



Bolt anchor **FAZ II HBS** (washer compliant to wood construction standard DIN 1052)



	Steel, zinc-plated, with large washer	Stainless steel, with large washer	Approval	Seismic- Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./ hef,min.	Thread	Width across nut	Washer (outer diameter x thickness)	Sales unit
	Art.-No.	Art.-No.	ETA		d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	Ø x length [mm]	○ SW [mm]	[mm]	[mm]
Item	gvz	A4										
FAZ II 8/10 GS	094872	501398	■	C1	8	65	75	10/20	M 8 x 38	13	22 x 2,5	50
FAZ II 8/30 GS	096189	501400	■	C1	8	85	95	30/40	M 8 x 58	13	22 x 2,5	50
FAZ II 10/10 GS	096291	501405	■	C1 / C2	10	85	95	10/30	M 10 x 53	17	25 x 3	50
FAZ II 10/30 GS	096297	—	■	C1 / C2	10	105	115	30/50	M 10 x 73	17	25 x 3	25
FAZ II 10/30 GS	—	501408	■	C1 / C2	10	105	115	30/50	M 10 x 73	17	25 x 3	50
FAZ II 12/10 GS	096303	501414	■	C1 / C2	12	100	110	10/30	M 12 x 61	19	30 x 3	20
FAZ II 12/20 GS	502530	—	■	C1 / C2	12	110	120	20/40	M 12 x 71	19	30 x 3	20
FAZ II 12/30 GS	096340	501418	■	C1 / C2	12	120	130	30/50	M 12 x 81	19	30 x 3	20
FAZ II 12/50 GS	502531	—	■	C1 / C2	12	140	150	50/70	M 12 x 101	19	30 x 3	20
FAZ II 12/80 GS	538430	—	■	C1 / C2	12	170	180	80/100	M 12 x 131	19	44 x 4	20
FAZ II 12/100 GS	502532	—	■	C1 / C2	12	190	200	100/120	M 12 x 151	19	30 x 3	20
FAZ II 12/100 GS	538702	—	■	C1 / C2	12	190	200	100/120	M 12 x 151	19	44 x 4	20
FAZ II 12/120 GS	096367	—	■	C1 / C2	12	210	220	120/140	M 12 x 171	19	30 x 3	20
FAZ II 12/120 GS	538703	—	■	C1 / C2	12	210	220	120/140	M 12 x 171	19	44 x 4	20
FAZ II 12/140 GS	538433	—	■	C1 / C2	12	230	240	140/160	M 12 x 186	19	44 x 4	20
FAZ II 12/160 GS	538431	—	■	C1 / C2	12	250	260	160/180	M 12 x 186	19	44 x 4	20
FAZ II 12/160 GS	—	503181	■	—	12	250	260	160/180	M 12 x 186	19	44 x 4	20
FAZ II 12/180 GS	538434	—	■	C1 / C2	12	270	280	180/200	M 12 x 186	19	44 x 4	20
FAZ II 12/200 GS	538432	—	■	C1 / C2	12	290	300	200/220	M 12 x 186	19	44 x 4	20
FAZ II 16/160 GS	503261	—	■	C1 / C2	16	270	283	160/180	M 16 x 189	24	56 x 5	10
FAZ II 16/160 GS	—	503182	■	C1 / C2	16	270	283	160/180	M 16 x 100	24	56 x 5	4
FAZ II 16/200 GS	096370	—	■	—	16	310	323	200/220	M 16 x 189	24	56 x 5	10
FAZ II 12/100 HBS	522951	—	■	C1 / C2	12	190	205	100/120	M 12 x 151	19	58 x 6	20
FAZ II 12/120 HBS	522952	—	■	C1 / C2	12	210	225	120/140	M 12 x 171	19	58 x 6	20
FAZ II 16/160 HBS	522953	—	■	C1 / C2	16	270	278	160/180	M 16 x 189	24	68 x 6	10
FAZ II 16/200 HBS	522954	—	■	—	16	310	328	200/220	M 16 x 189	24	68 x 6	10

## ACCESSORIES



fischer Anchor bolt setting tool **FABS**

Item	Art.-No.	Matching anchor type	Sales unit [pcs]
FABS	077937	FAZ II, FBZ, FBN II for diameter from M8 - M12	1

## LOADS

### Bolt anchor FAZ II, FAZ II K and FAZ II GS (HBS)

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 9)</sup>										Minimum spacings while reducing the load						
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance					
		$h_{min}$ [mm]	$h_{ef}$ <sup>4)</sup> [mm]	$T_{inst}$ [Nm]	$N_{perm}$ <sup>6)</sup> [kN]	$V_{perm}$ <sup>6)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s [mm]	$s_{min}$ <sup>7)</sup> [mm]	$c_{min}$ <sup>7)</sup> [mm]					
FAZ II 6	gvz	80	40	8	0,7	3,4	45	80	120	35	45					
	A4					5,0		125								
	C															
FAZ II 8	gvz	80	35 <sup>5)</sup>	20	2,6	7,8	40	200	105	35	40					
		90	45		3,8		45	185	135							
	A4	80	35 <sup>5)</sup>		2,6	8,9	40	235	105							
		90	45		3,8	9,6	45		135							
	C	80	35 <sup>5)</sup>		2,6	8,9	40		105							
		90	45		3,8	9,6	45		135							
	FAZ II 10	gvz	90		40	45	4,3	11,3	60			275	120	40	45	
			110		60		6,2	12,2	65			255	180			
A4		90	40	4,3	11,3		60	275	120							
		110	60	6,2	15,1		65	325	180							
C		90	40	4,3	11,3		60	275	120							
		110	60	6,2	15,1		65	325	180							
FAZ II 12		gvz	100	50	60		6,1	17,5	75	400	150	50	55			
			120	70			9,5		100	350	210					
	A4	100	50	6,1		18,8	75	435	150							
		120	70	9,5		21,9	100	450	210							
	C	100	50	6,1		18,8	75	435	150							
		120	70	9,5		21,9	100	450	210							
	FAZ II 16	gvz	140	65		110	9,0	28,7	100	545	195			65	65	
				85			13,4	31,4	130	585	255					
A4		65		9,0	28,7		100	545	195							
		85		13,4	39,9		130	760	255							
C		65		9,0	28,7		100	545	195							
		85		13,4	39,9		130	760	255							
FAZ II 20		gvz		170	100		200	17,1	44,6	150	745	300	95			85
		A4														
	C															
FAZ II 24	gvz	210	125	270	24,0	57,5	170	840	375	100	100					
	A4															
	C															

For the design the complete assessment ETA-05/0069, issue date 03.07.2017 has to be considered.<sup>9)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor under tension load and shear load without edge influence counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Concerning shear loads under edge influence and accurate data see ETA.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling, hollow drilling resp. Diamond drilling.

<sup>4)</sup> Eff. anchorage depth: min. anchorage depth, max. anchorage depth.

<sup>5)</sup> The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

<sup>6)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA.

<sup>7)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>8)</sup> The given loads refer to the European Technical Assessment ETA-05/0069, issue date 03.07.2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>9)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$ .

## LOADS

### Bolt anchor FAZ II, FAZ II K and FAZ II GS (HBS)

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>									Minimum spacings while reducing the load		
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		h <sub>min</sub> [mm]	h <sub>ef</sub> <sup>4)</sup> [mm]	T <sub>inst</sub> [Nm]	N <sub>perm</sub> <sup>6)</sup> [kN]	V <sub>perm</sub> <sup>6)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s [mm]	s <sub>min</sub> <sup>7)</sup> [mm]	c <sub>min</sub> <sup>7)</sup> [mm]
FAZ II 6	gvz	80	40	8	3,6	3,4	45	55	120	35	45
	A4				5,0	5,0	50	85			
	C										
FAZ II 8	gvz	80	35 <sup>5)</sup>	20	5,0	7,8	85	140	105	40	40
		90	45		6,7		80	125	135		
	A4	80	35 <sup>5)</sup>		5,0	9,6	85	175	105		
		90	45		6,7		80	160	135		
	C	80	35 <sup>5)</sup>		5,0		85	175	105		
		90	45		6,7		80	160	135		
FAZ II 10	gvz	90	40	45	6,1	12,2	80	205	120	40	45
		110	60		9,5		75	175	180		
	A4	90	40		6,1	15,1	80	260	120		
		110	60		9,5		75	220	180		
	C	90	40		6,1		80	260	120		
		110	60		9,5		75	220	180		
FAZ II 12	gvz	100	50	60	8,5	17,5	100	275	150	50	55
		120	70		10,5		80	240	210		
	A4	100	50		8,5	21,9	100	350	150		
		120	70		10,5		80	305	210		
	C	100	50		8,5		100	350	150		
		120	70		10,5		80	305	210		
FAZ II 16	gvz	140	65	110	12,6	31,4	130	410	195	65	65
			85		18,8		170	400	255		
	A4		65		12,6	39,9	130	535	195		
			85		18,8		170	520	255		
	C		65		12,6		130	535	195		
			85		18,8		170	520	255		
FAZ II 20	gvz	170	100	200	24,0	46,5	230	530	300	95	95
	A4					60,7	515				
	C										
FAZ II 24	gvz	210	125	270	33,6	62,9	265	630	375	100	135
	A4					80,7	835				
	C										

For the design the complete assessment ETA-05/0069, issue date 03.07.2017 has to be considered.<sup>8)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor under tension load and shear load without edge influence counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Concerning shear loads under edge influence and accurate data see ETA.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling, hollow drilling resp. Diamond drilling.

<sup>4)</sup> Eff. anchorage depth: min. anchorage depth, max. anchorage depth.

<sup>5)</sup> The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

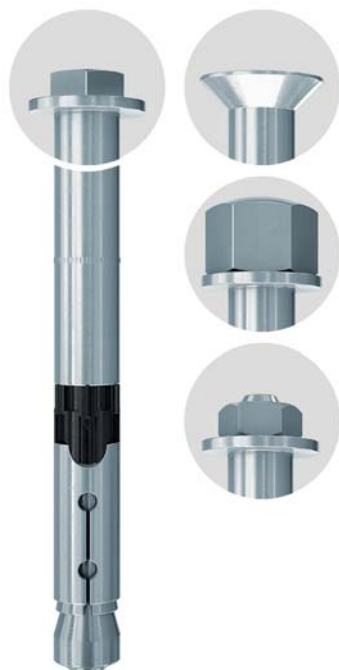
<sup>6)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA.

<sup>7)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>8)</sup> The given loads refer to the European Technical Assessment ETA-05/0069, issue date 03.07.2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).



## Strong, secure and aesthetic anchoring



Steel girders



Banisters

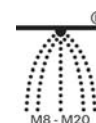
### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

- Concrete C20/25, cracked and non-cracked

### CERTIFICATES



### ADVANTAGES

- The international approvals guarantee maximum safety and the best performance. These approvals even cover use in earthquake zones (seismic C1 and C2).
- The anchor is designed with different head styles for fixing points with aesthetic design.
- The design between the bolt and the sleeve ensures high shear load-bearing capacity. Thus, fewer fixing points are required.
- The optimised geometry minimises the energy required for installation and thus allows for fast installation.
- The use of hollow drills is included in the approval.

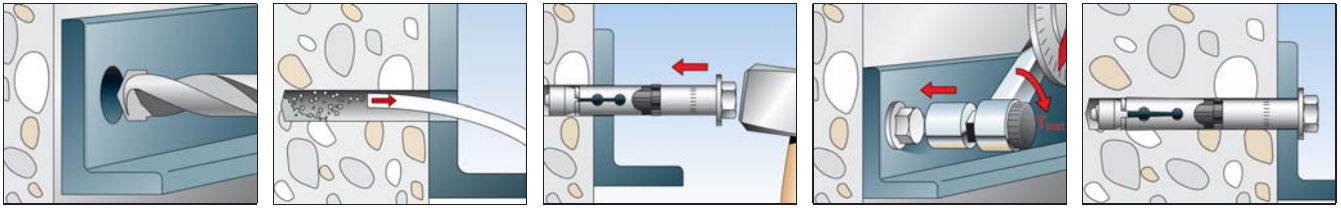
### APPLICATIONS

- Guard rails
- Staircases
- Consoles
- Steel constructions
- Ladders
- Cable trays
- Machines
- Gates
- Façades
- Gratings

### FUNCTIONING

- The FH II is suitable for push-through installation.
- When the torque is applied, the cone is pulled into the expansion sleeve which is forced against the drill hole wall.
- The black plastic ring prevents rotation when tightening the anchor and acts as a crumple zone to take the torque slippage, so that the fixture of pulled onto the substrate.
- Alternative head designs for flexible design solutions: Hexagon head (type S), countersunk head (type SK), bolt version with nut and washer (type B) and cap nut (type H).

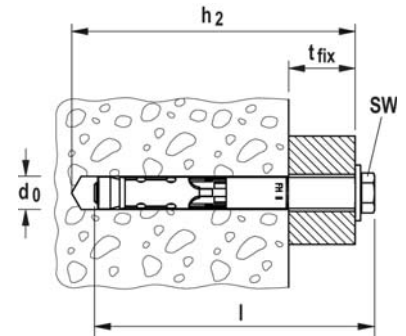
## INSTALLATION



## TECHNICAL DATA



High performance anchor **FH II-S**  
with hexagonal head

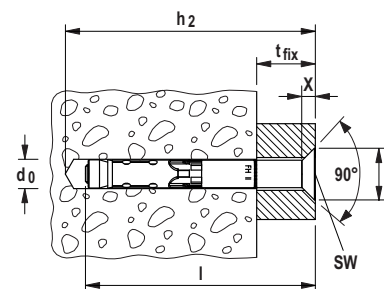


	Zinc-plated steel	Stainless steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	ETA	ICC		d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	M	○ SW [mm]	[pcs]
Item	gvz	A4										
FH II 10/10 S	503133	—	■	—	—	10	65	70	10	M 6	10	50
FH II 10/10 S	—	510923	■	—	—	10	65	69	10	M 6	10	50
FH II 10/25 S	503134	—	■	—	—	10	80	85	25	M 6	10	50
FH II 10/25 S	—	510924	■	—	—	10	80	84	25	M 6	10	50
FH II 10/50 S	503135	—	■	—	—	10	105	110	50	M 6	10	50
FH II 12/10 S	044884	—	■	▲	C1 / C2	12	90	90	10	M 8	13	50
FH II 12/10 S	—	510925	■	—	C1 / C2	12	90	90	10	M 8	13	50
FH II 12/25 S	044885	—	■	▲	C1 / C2	12	105	105	25	M 8	13	50
FH II 12/25 S	—	510926	■	—	C1 / C2	12	105	105	25	M 8	13	20
FH II 12/50 S	044886	—	■	▲	C1 / C2	12	130	130	50	M 8	13	25
FH II 15/10 S	044887	—	■	▲	C1 / C2	15	100	106	10	M 10	17	25
FH II 15/10 S	—	510927	■	—	C1 / C2	15	100	107	10	M 10	17	50
FH II 15/25 S	044888	—	■	▲	C1 / C2	15	115	121	25	M 10	17	25
FH II 15/25 S	—	510928	■	—	C1 / C2	15	115	122	25	M 10	17	20
FH II 15/50 S	044889	—	■	▲	C1 / C2	15	140	146	50	M 10	17	25
FH II 18/10 S	046847	—	■	▲	C1 / C2	18	115	118	10	M 12	19	20
FH II 18/25 S	044894	—	■	▲	C1 / C2	18	130	132	25	M 12	19	20
FH II 18/25 S	—	510929	■	—	C1 / C2	18	130	133	25	M 12	19	10
FH II 18/50 S	044896	—	■	▲	C1 / C2	18	155	157	50	M 12	19	20
FH II 24/25 S	044898	—	■	▲	C1 / C2	24	150	160	25	M 16	24	10
FH II 24/25 S	—	502711	■	—	C1 / C2	24	150	160	25	M 16	24	8
FH II 24/50 S	044900	—	■	▲	C1 / C2	24	175	185	50	M 16	24	10
FH II 28/30 S	044901	—	■	▲	C1 / C2	28	185	192	30	M 20	30	4
FH II 28/60 S	044902	—	■	▲	C1 / C2	28	215	222	60	M 20	30	4
FH II 32/30 S	044903	—	■	▲	C1 / C2	32	210	215	30	M 24	36	4
FH II 32/60 S	044904	—	■	▲	C1 / C2	32	240	245	60	M 24	36	4

## TECHNICAL DATA



High performance anchor **FH II-SK**  
with countersunk head



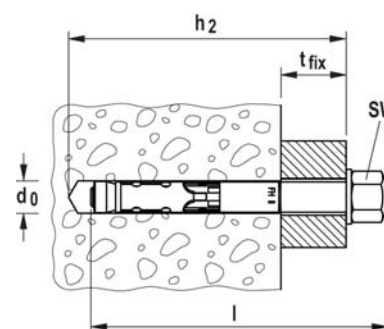
	X [mm]	ØD [mm]
FH II 10/... SK	5,0	19,5
FH II 12/... SK	5,8	22
FH II 15/... SK	5,8	25
FH II 18/... SK	8,0	32

Item	Zinc-plated steel	Stainless steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut (hexagon socket)	Sales unit
	Art.-No.	Art.-No.	ETA	ICC		d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	M	○ SW [mm]	[pcs]
	gvz	A4										
FH II 10/15 SK	503136	—	■	—	—	10	70	65	15	M 6	4	50
FH II 10/25 SK	503137	—	■	—	—	10	80	75	25	M 6	4	50
FH II 10/50 SK	503138	—	■	—	—	10	105	100	50	M 6	4	50
FH II 12/15 SK	—	510931	■	—	—	12	95	90	15	M 8	5	25
FH II 12/15 SK	044917	—	■	—	C1 / C2	12	95	90	15	M 8	5	25
FH II 12/25 SK	044918	—	■	—	C1 / C2	12	105	100	25	M 8	5	25
FH II 12/30 SK	—	510932	■	—	C1 / C2	12	110	105	30	M 8	5	25
FH II 12/50 SK	044919	510933	■	—	C1 / C2	12	130	125	50	M 8	5	25
FH II 15/15 SK	044920	510934	■	▲	C1 / C2	15	105	100	15	M 10	6	25
FH II 15/25 SK	044921	—	■	▲	C1 / C2	15	115	110	25	M 10	6	25
FH II 15/50 SK	044922	—	■	▲	C1 / C2	15	140	135	50	M 10	6	25
FH II 18/15 SK	044923	—	■	▲	C1 / C2	18	120	115	15	M 12	8	20
FH II 18/25 SK	044924	—	■	▲	C1 / C2	18	130	125	25	M 12	8	20
FH II 18/30 SK	—	510935	■	—	C1 / C2	18	135	130	30	M 12	8	20
FH II 18/50 SK	044925	—	■	▲	C1 / C2	18	155	150	50	M 12	8	20

## TECHNICAL DATA



High performance anchor **FH II-H**  
with cap nut

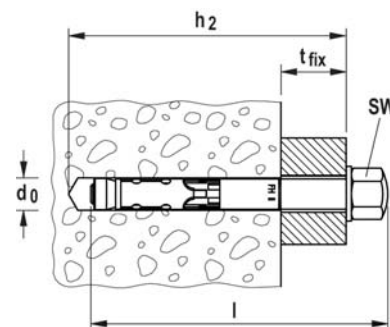


Item	Zinc-plated steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	ETA	ICC		d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	M	○ SW [mm]	[pcs]
	gvz										
FH II 10/10 H	503139	■	—	—	10	65	75	10	M 6	13	50
FH II 10/25 H	503140	■	—	—	10	80	90	25	M 6	13	50
FH II 10/50 H	503141	■	—	—	10	105	115	50	M 6	13	50
FH II 12/10 H	044905	■	—	C1 / C2	12	90	100	10	M 8	17	50
FH II 12/25 H	044906	■	—	C1 / C2	12	105	115	25	M 8	17	50
FH II 12/50 H	044907	■	—	C1 / C2	12	130	140	50	M 8	17	25
FH II 15/10 H	044908	■	▲	C1 / C2	15	100	115	10	M 10	17	25

## TECHNICAL DATA



High performance anchor **FH II-H**  
with cap nut

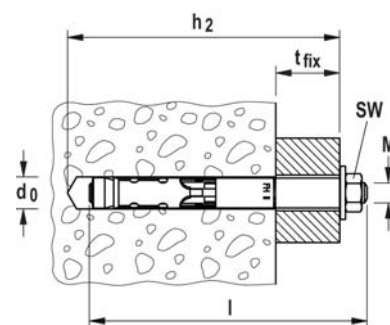


	Zinc-plated steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	ETA	ICC		$d_0$ [mm]	$h_2$ [mm]	$l$ [mm]	$t_{fix}$ [mm]	M	○ SW [mm]	[pcs]
Item	gvz										
<b>FH II 15/25 H</b>	<b>044909</b>	■	▲	C1 / C2	15	115	130	25	M 10	17	25
<b>FH II 15/50 H</b>	<b>044910</b>	■	▲	C1 / C2	15	140	155	50	M 10	17	25
<b>FH II 18/25 H</b>	<b>044915</b>	■	▲	C1 / C2	18	130	145	25	M 12	19	20
<b>FH II 18/50 H</b>	<b>044916</b>	■	▲	C1 / C2	18	155	170	50	M 12	19	20

## TECHNICAL DATA



High performance anchor **FH II-B** with hexa-  
gon nut and threaded bolt



	Zinc-plated steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	ETA	ICC		$d_0$ [mm]	$h_2$ [mm]	$l$ [mm]	$t_{fix}$ [mm]	M	○ SW [mm]	[pcs]
Item	gvz										
<b>FH II 10/10 B</b>	<b>503142</b>	■	—	—	10	65	70	10	M 6	10	50
<b>FH II 10/25 B</b>	<b>503143</b>	■	—	—	10	80	85	25	M 6	10	50
<b>FH II 10/50 B</b>	<b>503144</b>	■	—	—	10	105	110	50	M 6	10	50
<b>FH II 12/10 B</b>	<b>048773</b>	■	▲	C1 / C2	12	90	95	10	M 8	13	50
<b>FH II 12/100 B</b>	<b>046832</b>	■	▲	C1 / C2	12	180	185	100	M 8	13	25
<b>FH II 12/25 B</b>	<b>048774</b>	■	▲	C1 / C2	12	105	110	25	M 8	13	50
<b>FH II 12/50 B</b>	<b>048775</b>	■	▲	C1 / C2	12	130	135	50	M 8	13	25
<b>FH II 15/10 B</b>	<b>048776</b>	■	▲	C1 / C2	15	100	110	10	M 10	17	25
<b>FH II 15/100 B</b>	<b>046835</b>	■	▲	C1 / C2	15	190	200	100	M 10	17	20
<b>FH II 15/25 B</b>	<b>048777</b>	■	▲	C1 / C2	15	115	125	25	M 10	17	25
<b>FH II 15/50 B</b>	<b>048778</b>	■	▲	C1 / C2	15	140	150	50	M 10	17	25
<b>FH II 18/100 B</b>	<b>046841</b>	■	▲	C1 / C2	18	205	215	100	M 12	19	10
<b>FH II 18/25 B</b>	<b>048779</b>	■	▲	C1 / C2	18	130	140	25	M 12	19	20
<b>FH II 18/50 B</b>	<b>048780</b>	■	▲	C1 / C2	18	155	165	50	M 12	19	20
<b>FH II 24/100 B</b>	<b>046842</b>	■	▲	C1 / C2	24	225	242	100	M 16	24	5
<b>FH II 24/25 B</b>	<b>048886</b>	■	▲	C1 / C2	24	150	167	25	M 16	24	10
<b>FH II 24/50 B</b>	<b>048887</b>	■	▲	C1 / C2	24	175	192	50	M 16	24	10
<b>FH II 28/30 B</b>	<b>047547</b>	■	▲	C1 / C2	28	185	199	30	M 20	30	4
<b>FH II 28/60 B</b>	<b>047548</b>	■	▲	C1 / C2	28	215	229	60	M 20	30	4
<b>FH II 32/30 B</b>	<b>047549</b>	■	▲	C1 / C2	32	210	231	30	M 24	36	4
<b>FH II 32/60 B</b>	<b>047550</b>	■	▲	C1 / C2	32	240	261	60	M 24	36	4

## LOADS

### High performance anchor FH II-S

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FH II 10 S	gvz	80	40	10	3,6	4,3	50	105	120	40	40
	A4			15							
FH II 12 S	gvz	120	60	22,5	5,7	15,9	60	320	180	50	50
	A4			25							
FH II 15 S	gvz	140	70	40	7,6	20,1	75	365	210	60	60
	A4										
FH II 18 S	gvz	160	80	80	11,9	24,5	120	410	240	70	70
	A4			100							
FH II 24 S	gvz	200	100	160	17,1	34,3	150	495	300	80	80
	A4										
FH II 28 S <sup>4)</sup>	gvz	250	125	180	24,0	47,9	190	610	375	100	100
FH II 32 S <sup>4)</sup>	gvz	300	150	200	31,5	63,0	225	720	450	120	120

For the design the complete assessment ETA-07/0025 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling.

<sup>4)</sup> Drill method hollow drilling is not permitted for this size.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$ .

## LOADS

### High performance anchor FH II-SK

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FH II 10 SK <sup>4)</sup>	gvz	80	40	10	3,6	4,3	50	105	120	40	40
FH II 12 SK	gvz	120	60	22,5	5,7	15,9	60	320	180	50	50
	A4										
FH II 15 SK	gvz	140	70	40	7,6	20,1	75	365	210	60	60
	A4										
FH II 18 SK	gvz	160	80	80	11,9	24,5	120	410	240	70	70
	A4			100							

For the design the complete assessment ETA-07/0025 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling.

<sup>4)</sup> Drill method hollow drilling is not permitted for this size.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$ .

## LOADS

### High performance anchor FH II-H

zinc plated steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 7)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
<b>FH II 10 H</b>	gvz	80	40	10	3,6	4,3	50	105	120	40	40
<b>FH II 12 H</b>	gvz	120	60	22,5	5,7	15,5	60	315	180	50	50
<b>FH II 15 H</b>	gvz	140	70	40	7,6	20,1	75	365	210	60	60
<b>FH II 18 H</b>	gvz	160	80	80	11,9	24,5	120	410	240	70	70

For the design the complete assessment ETA-07/0025 has to be considered.<sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

<sup>7)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$ .

## LOADS

### High performance anchor FH II-B

zinc plated steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
<b>FH II 10 B</b>	gvz	80	40	10	3,6	4,3	50	105	120	40	40
<b>FH II 12 B</b>	gvz	120	60	17,5	5,7	15,5	60	315	180	50	50
<b>FH II 15 B</b>	gvz	140	70	38	7,6	20,1	75	365	210	60	60
<b>FH II 18 B</b>	gvz	160	80	80	11,9	24,5	120	410	240	70	70
<b>FH II 24 B</b>	gvz	200	100	120	17,1	34,3	150	495	300	80	80
<b>FH II 28 B <sup>4)</sup></b>	gvz	250	125	180	24,0	47,9	190	610	375	100	100
<b>FH II 32 B <sup>4)</sup></b>	gvz	300	150	200	31,5	63,0	225	720	450	120	120

For the design the complete assessment ETA-07/0025 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling.

<sup>4)</sup> Drill method hollow drilling is not permitted for this size.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$ .



## LOADS

### High performance anchor FH II-S

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FH II 10 S	gvz	80	40	10	6,1	6,1	95	100	120	40	40
	A4			15							
FH II 12 S	gvz	120	60	22,5	11,2	18,9	150	265	180	60	60
	A4			25	9,5	17,7	125	245			
FH II 15 S	gvz	140	70	40	14,1	28,2	160	365	210	70	70
	A4										
FH II 18 S	gvz	160	80	80	17,2	34,4	170	405	240	80	80
	A4			100							
FH II 24 S	gvz	200	100	160	24,0	48,1	190	495	300	100	100
	A4										
FH II 28 S <sup>4)</sup>	gvz	250	125	180	33,6	67,2	240	605	375	120	120
FH II 32 S <sup>4)</sup>	gvz	300	150	200	44,2	88,4	285	715	450	160	180

For the design the complete assessment ETA-07/0025 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling.

<sup>4)</sup> Drill method hollow drilling is not permitted for this size.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

## LOADS

### High performance anchor FH II-SK

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]			Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FH II 10 SK <sup>4)</sup>	gvz	80	40	10	6,1	6,1	95	100	120	40	40
FH II 12 SK	gvz	120	60	22,5	11,2	18,9	150	265	180	60	60
	A4										
FH II 15 SK	gvz	140	70	40	14,1	28,2	160	365	210	70	70
	A4										
FH II 18 SK	gvz	160	80	80	17,2	34,4	170	405	240	80	80
	A4			100							

For the design the complete assessment ETA-07/0025 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling.

<sup>4)</sup> Drill method hollow drilling is not permitted for this size.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

## LOADS

### High performance anchor FH II-H

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
<b>FH II 10 H</b>	gvz	80	40	10	6,1	6,1	95	100	120	40	40
<b>FH II 12 H</b>	gvz	120	60	22,5	11,2	15,5	150	215	180	60	60
<b>FH II 15 H</b>	gvz	140	70	40	14,1	24,5	160	310	210	70	70
<b>FH II 18 H</b>	gvz	160	80	80	17,2	34,4	170	405	240	80	80

For the design the complete assessment ETA-07/0025 has to be considered.<sup>6)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling.

<sup>4)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>5)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

<sup>6)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

## LOADS

### High performance anchor FH II-B

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
<b>FH II 10 B</b>	gvz	80	40	10	6,1	6,1	95	100	120	40	40
<b>FH II 12 B</b>	gvz	120	60	17,5	11,2	15,5	150	215	180	60	60
<b>FH II 15 B</b>	gvz	140	70	38	14,1	24,5	160	310	210	70	70
<b>FH II 18 B</b>	gvz	160	80	80	17,2	34,4	170	405	240	80	80
<b>FH II 24 B</b>	gvz	200	100	120	24,0	48,1	190	495	300	100	100
<b>FH II 28 B<sup>4)</sup></b>	gvz	250	125	180	33,6	67,2	240	605	375	120	120
<b>FH II 32 B<sup>4)</sup></b>	gvz	300	150	200	44,2	88,4	285	715	450	160	180

For the design the complete assessment ETA-07/0025 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling.

<sup>4)</sup> Drill method hollow drilling is not permitted for this size.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

## Strong, secure and aesthetic with internal thread for the removal option of the attachment



Stadium seating



Air conditioning units

### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

#### Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

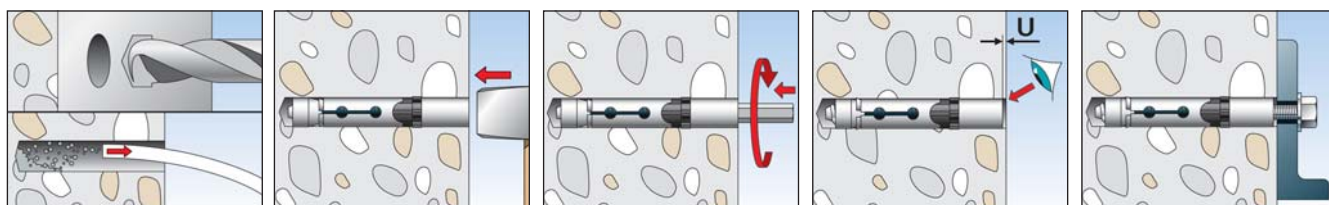
- The international approvals guarantee maximum safety and the best performance. The European Technical Assessment even cover use in earthquake zones (seismic C1 and C2).
- The internal threaded anchor allows the removal of the attachment and the fixing point can be reused.
- The design between the bolt and the sleeve ensures high shear load-bearing capacity. Thus, fewer fixing points are required.
- The optimised geometry intelligently reduces the energy required for assembly.
- The approval regulates the use of hollow drills.

### APPLICATIONS

- Steel constructions
- Guard rails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Pipeline routes
- Ventilation systems
- Sprinkler systems

### FUNCTIONING

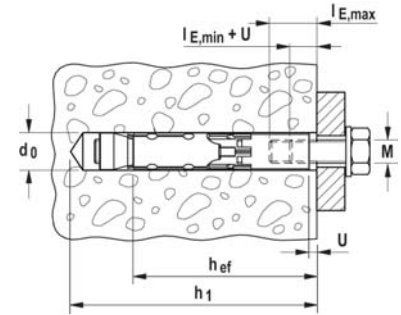
- The FH II-I is suitable for pre-positioned installation.
- When a hexagon wrench is used for installation, the internal thread bolt starts to rotate. This pulls the cone into the expansion sleeve and expands it against the drill-hole wall. At the same time, the anchor is tightened through compression of the black plastic ring. A gap U to the concrete surface is created (see image 4).
- The anchor is set according to the approval when the gap U is 3-5 mm. Alternatively, an installation torque of  $T_{inst}$  can also be applied.



## TECHNICAL DATA



High performance anchor **FH II-I**



	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for pre- positioned installation $h_1$ [mm]	Anchor length $l$ [mm]	Thread $M$	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Sales unit [pcs]
Item	Art.-No.	Art.-No.	ETA							
	gvz	A4								
<b>FH II 12/M6 I</b>	<b>520358</b>	<b>520360</b>	■	12	85	77.5	M 6	11 + U	25	25
<b>FH II 12/M8 I</b>	<b>520359</b>	<b>520361</b>	■	12	85	77.5	M 8	13 + U	25	25
<b>FH II 15/M10 I</b>	<b>519014</b>	<b>519018</b>	■	15	95	90	M 10	10 + U	25	25
<b>FH II 15/M12 I</b>	<b>519015</b>	<b>519019</b>	■	15	95	90	M 12	12 + U	25	20

## ACCESSORIES



Setting tool **FH II-I**

Item	Art.-No.	Matching anchor type	Sales unit [pcs]
<b>Setting tool FH II-I M6-M10</b>	<b>532780</b>	FH II 12/M6 I, FH II 15/M 10 I	10
<b>Setting tool FH II-I M8-M12</b>	<b>532781</b>	FH II 12/M8 I, FH II 15/M 12 I	10

## LOADS

### High performance anchor with internal thread FH II-I

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 6)</sup>										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness $h_{min}$ [mm]	Effective anchorage depth $h_{ef}$ [mm]	Installation torque $T_{inst}$ [Nm]	Permissible tensile load $N_{perm}^{4)}$ [kN]	Permissible shear load $V_{perm}^{4)}$ [kN]	Required edge distance (with one edge) for		Required spacing for Max. Load $s$ [mm]	Min. spacing $s_{min}$ [mm]	Min. edge distance $c_{min}$ [mm]
							Max. tension load $c$ [mm]	Max. shear load $c$ [mm]			
<b>FH II 12/M 6 I</b>	5.8	130	60	15	4,3	2,9	55	55	180	50	50
	8.8					4,6		80			
	A4-70					3,2		60			
<b>FH II 12/M 8 I</b>	5.8	130	60	15	4,3	5,1	55	90	180	50	50
	8.8					8,0		145			
	A4-70					6,0		105			
<b>FH II 15/M 10 I</b>	5.8	150	70	25	5,7	8,6	65	135	210	60	60
	8.8					13,1		220			
	A4-70					9,2		145			
<b>FH II 15/M 12 I</b>	5.8	150	70	25	5,7	12,0	65	200	210	60	60
	8.8										
	A4-70					13,7		230			

For the design the complete assessment ETA-07/0025 has to be considered.<sup>5)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_F = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method Hammer drilling resp. hollow drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.

<sup>5)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>6)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$  begrenzt.

## LOADS

### High performance anchor with internal thread FH II-I

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]			Max. Load s [mm]	$s_{min}$ [mm]	$c_{min}$ [mm]
FH II 12/M 6 I	5.8	130	60	15	4,8	2,9	60		180	60	60
	8.8				7,6	4,6	85	60			
	A4-70				5,3	3,2	60				
FH II 12/M 8 I	5.8	130	60	15	9,0	5,1	115	65	180	60	60
	8.8				9,5	8,0	125	100			
	A4-70					6,0		75			
FH II 15/M 10 I	5.8	150	70	25	13,8	8,6	160	95	210	70	70
	8.8				14,1	13,1		150			
	A4-70					9,2		100			
FH II 15/M 12 I	5.8	150	70	25	14,1	12,0	160	135	210	70	70
	8.8										
	A4-70					13,7		155			

For the design the complete assessment ETA-07/0025 has to be considered.<sup>5)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_F = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025..

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

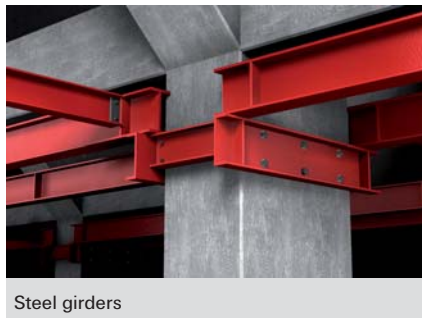
<sup>3)</sup> Drill method Hammer drilling resp. hollow drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.

<sup>5)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## The fixing system with the highest safety in cracked concrete

High performance steel anchors 4



### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

#### Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

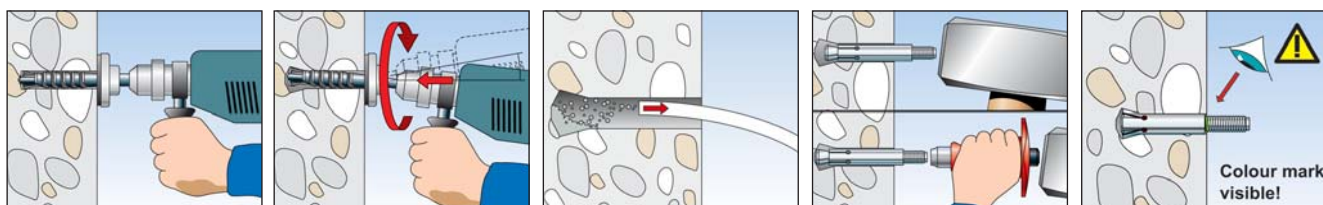
- The special ZYKON undercut technology allows for a positive fit connection and ensures maximum safety, even in large cracks.
- The almost expansion-free installation of the anchor allows small edge distances and axial spacing, and thereby enables flexible use.
- The FZUB special drill allows for a fast installation by creating the undercut without having to change tools.
- The drill hole geometry allows for a very low setting energy, thus reducing the energy required for installation.
- The ideal interaction of threaded bolts and sleeve with FZA-D allows for a high shear load and therefore fewer fixing points.

### APPLICATIONS

- Steelwork constructions
- Guard rails
- Consoles
- Step irons (FZA-ST)
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades

### FUNCTIONING

- The FZA and FZA-I is suitable for pre-positioned installation, whereas the FZA-D is suitable for push-through installation.
- The undercut drill hole is created using the special FZUB drill.
- Once the anchor has been placed in the drill hole, the expansion sleeve is driven over the cone using the FZE Plus setting tool, and the undercut drill hole is filled with a positive fit.

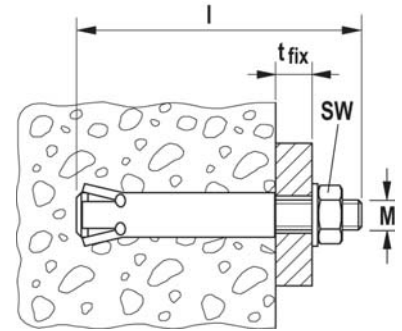




## TECHNICAL DATA



ZYKON Bolt anchor **FZA**

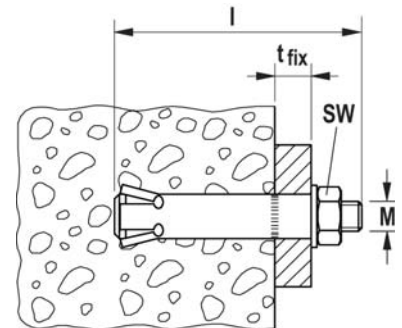


	Zinc-plated steel	Stainless steel	Approval	Seismic-Approval	Required drill bit FZUB	Required setting tool FZE plus	Bolt length l [mm]	Max. fixture thickness t <sub>fix</sub> [mm]	Thread M	Width across nut ○ SW [mm]	Sales unit [pcs]
	Art.-No.	Art.-No.	ETA								
Item	gvz	A4									
FZA 10 x 40 M6/10	060712	060772	■	—	10 x 40	FZE 10 plus	60	10	M 6	10	25
FZA 12 x 40 M 8/15	060715	060775	■	—	12 x 40	FZE 12 plus	69	15	M 8	13	25
FZA 12 x 50 M 8/15	060716	060776	■	—	12 x 50	FZE 12 plus	79	15	M 8	13	20
FZA 12 x 50 M 8/50	—	060774	■	—	12 x 50	FZE 12 plus	114	50	M 8	13	20
FZA 14 x 40 M10/25	060718	—	■	C1	14 x 40	FZE 14 plus	79	25	M 10	17	25
FZA 14 x 40 M10/25	—	060778	■	C1	14 x 40	FZE 14 plus	79	25	M 10	17	20
FZA 14 x 60 M10/25	060719	060779	■	C1	14 x 60	FZE 14 plus	102	25	M 10	17	10
FZA 14 x 60 M10/50	—	060766	■	C1	14 x 60	FZE 14 plus	126	50	M 10	17	10
FZA 18 x 80 M12/25	060721	060781	■	C1	18 x 80	FZE 18 plus	126	25	M 12	19	10
FZA 18 x 80 M12/55	—	060767	■	C1	18 x 80	FZE 18 plus	156	55	M 12	19	10
FZA 22 x 100 M16/60	060724	060782	■	C1	22 x 100	FZE 22 plus	184	60	M 16	24	10
FZA 22 x 125 M16/60	060725	060768	■	C1	22 x 125	FZE 22 plus	209	60	M 16	24	6

## TECHNICAL DATA



ZYKON Through anchor **FZA-D**

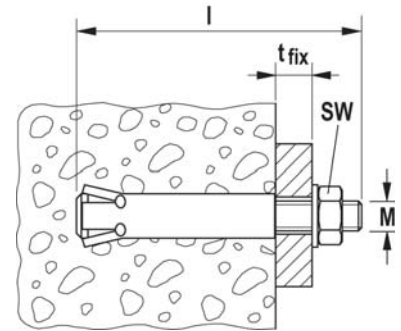


	Zinc-plated steel	Stainless steel	Approval	Seismic-Approval	Required drill bit FZUB	Required setting tool FZE plus	Bolt length l [mm]	Max. fixture thickness t <sub>fix</sub> [mm]	Thread M	Width across nut ○ SW [mm]	Sales unit [pcs]
	Art.-No.	Art.-No.	ETA								
Item	gvz	A4									
FZA 12 x 50 M 8 D/10	060652	060664	■	—	12 x 50	FZE 12 plus	69	10	M 8	13	25
FZA 12 x 60 M 8 D/10	060653	060665	■	—	12 x 60	FZE 12 plus	79	10	M 8	13	25
FZA 12 x 80 M 8 D/30	060654	060666	■	—	12 x 80	FZE 12 plus	99	30	M 8	13	25
FZA 14 x 80 M10 D/20	060657	060669	■	C1	14 x 80	FZE 14 plus	102	20	M 10	17	10
FZA 14 x 100 M 8 D/30	060658	060670	■	C1	14 x 100	FZE 14 plus	126	40	M 10	17	10
FZA 18 x 100 M12 D/20	060684	060672	■	C1	18 x 100	FZE 18 plus	126	20	M 12	19	10
FZA 18 x 130 M12 D/50	060685	060673	■	C1	18 x 130	FZE 18 plus	156	50	M 12	19	10
FZA 22 x 125 M16 D/25	060663	060675	■	C1	22 x 125	FZE 22 plus	156	25	M 16	24	10

## TECHNICAL DATA



Zykon anchor for fixing step irons  
**FZA ST A4**



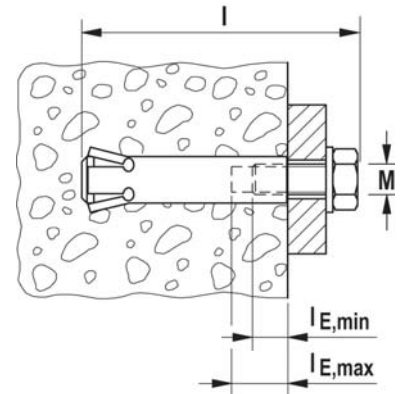
	Stainless steel		Required drill bit FZUB	Required setting tool FZE plus	Max. fixture thickness $t_{fix}$ [mm]	Thread M	Width across nut SW [mm]	Sales unit [pcs]	
Item	Art.-No.	A4							
<b>FZA 14 x 40 ST A4</b>	<b>060686</b> <sup>1)</sup>		14 x 40	FZE 14 plus	30	M 10	16	20	
<b>FZA 14 x 60 ST A4</b>	<b>060687</b> <sup>1)</sup>		14 x 60	FZE 14 plus	30	M 10	16	20	

<sup>1)</sup> According to DIN 1211GS/1212GS.

## TECHNICAL DATA



ZYKON Internally-threaded anchor **FZA-I**



	Zinc-plated steel	Stainless steel	Approval ETA	Required drill bit FZUB	Required setting tool FZE plus	Internal thread A1	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Sales unit [pcs]
Item	Art.-No.	Art.-No.							
	gvz	A4							
<b>FZA 12 x 40 M6 I</b>	<b>060758</b>	<b>060783</b>	■	12 x 40	FZE 12 plus	M 6	10	15	25
<b>FZA 12 x 50 M6 I</b>	—	<b>060784</b>	■	12 x 50	FZE 12 plus	M 6	10	15	25
<b>FZA 14 x 60 M8 I</b>	<b>060760</b>	<b>060786</b>	■	14 x 60	FZE 14 plus	M 8	11	17	20
<b>FZA 18 x 80 M10 I</b>	<b>060761</b>	<b>060787</b>	■	18 x 80	FZE 18 plus	M 10	13	21	10
<b>FZA 22 x 100 M12 I</b>	<b>060763</b>	<b>060788</b>	■	22 x 100	FZE 22 plus	M 12	15	25	10
<b>FZA 22 x 125 M12 I</b>	<b>060769</b>	<b>060770</b>	■	22 x 125	FZE 22 plus	M 12	15	25	10

## ACCESSORIES



Drill bit **FZUB**

Item	Art.-No.	Fits anchor			Sales unit [pcs]
		bolt anchor	push-through anchor	internal thread anchor	
<b>FZUB 10 x 40</b>	<b>060622</b>	FZA 10 x 40 M6	-	-	1
<b>FZUB 12 x 40</b>	<b>060623</b>	FZA 12 x 40 M8	-	FZA 12 x 40 M6 I	1
<b>FZUB 12 x 50</b>	<b>060627</b>	FZA 12 x 50 M8	FZA 12 x 50 M8 D/10	FZA 12 x 50 M6 I	1
<b>FZUB 12 x 60</b>	<b>060625</b>	-	FZA 12 x 60 M8 D/10	-	1
<b>FZUB 12 x 80</b>	<b>060626</b>	-	FZA 12 x 80 M8 D/30	-	1
<b>FZUB 14 x 40</b>	<b>060624</b>	FZA 14 x 40 M10	-	-	1
<b>FZUB 14 x 60</b>	<b>060628</b>	FZA 14 x 60 M10	-	FZA 14 x 60 M8 I	1
<b>FZUB 14 x 80</b>	<b>060629</b>	-	FZA 14 x 80 M10 D/20	-	1
<b>FZUB 14 x 100</b>	<b>060630</b>	-	FZA 14 x 100 M10 D/40	-	1
<b>FZUB 18 x 80</b>	<b>060634</b>	FZA 18 x 80 M12	-	FZA 18 x 80 M10I	1
<b>FZUB 18 x 100</b>	<b>060632</b>	-	FZA 18 x 100 M12 D/20	-	1
<b>FZUB 18 x 130</b>	<b>060633</b>	-	FZA 18 x 130 M12 D/50	-	1
<b>FZUB 22 x 100</b>	<b>060636</b>	FZA 22 x 100 M16	-	FZA 22 x 100 M12 I	1
<b>FZUB 22 x 125</b>	<b>060638</b>	FZA 22 x 125 M16	FZA 22 x 125 M16 D/25	FZA 22 x 125 M12 I	1

## ACCESSORIES



Setting tool **FZE plus**

Item	Art.-No.	Fits anchor			Sales unit [pcs]
		bolt anchor	push-through anchor	internal thread anchor	
<b>FZE 10 plus</b>	<b>044637</b> <sup>1)</sup>	FZA 10 x ... M6	-	-	1
<b>FZE 12 plus</b>	<b>044638</b>	FZA 12 x ... M8	FZA 12 x ... M8 D	FZA 12 x ... M6 I	1
<b>FZE 14 plus</b>	<b>044639</b>	FZA 14 x ... M10	FZA 14 x ... M10 D	FZA 14 x ... M8 I	1
<b>FZE 18 plus</b>	<b>044640</b>	FZA 18 x ... M12	FZA 18 x ... M12 D	FZA 18 x ... M10 I	1
<b>FZE 22 plus</b>	<b>044641</b>	FZA 22 x ... M16	FZA 22 x ... M16 D	FZA 22 x ... M12 I	1

1) Without centring pin.

## LOADS

### ZYKON Bolt anchor FZA

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s$ [mm]	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]
FZA 10 x 40 M6	gvz	100	40	8,5	2,4	4,6	35	95	120	40	35
	A4					3,2		65			
FZA 12 x 40 M8	gvz	100	40	20	2,4	5,6	40	120	120	40	40
	A4										
FZA 12 x 50 M8	gvz	110	50	20	4,3	7,9	45	160	150	50	45
	A4					5,9		115			
FZA 14 x 40 M10	gvz	100	40	40	2,4	5,6	70	115	120	70	70
	A4										
FZA 14 x 60 M10	gvz	130	60	40	5,7	13,3	60	245	180	60	55
	A4					9,3		165			
FZA 18 x 80 M12	gvz	160	80	60	9,5	19,3	85	315	240	80	70
	A4					13,5		210			
FZA 22 x 100 M16	gvz	200	100	100	17,1	34,3	150	500	300	100	100
	A4					25,2		355			
FZA 22 x 125 M16	gvz	250	125	100	19,0	35,9	140	450	375	125	125
	A4					25,2		300			

For the design the complete assessment ETA-98/0004 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-98/0004.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## LOADS

### ZYKON-Bolt anchor FZA

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s$ [mm]	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]
FZA 10 x 40 M6	gvz	100	40	8,5	3,6	4,6	40	65	120	40	35
	A4					3,2		50			
FZA 12 x 40 M8	gvz	100	40	20	3,6	7,9	40	120	120	40	40
	A4					5,9		85			
FZA 12 x 50 M8	gvz	110	50	20	5,7	8,4	45	115	150	50	45
	A4					5,9		75			
FZA 14 x 40 M10	gvz	100	40	40	3,6	7,9	70	115	120	70	70
	A4										
FZA 14 x 60 M10	gvz	130	60	40	9,5	13,3	75	170	180	60	55
	A4					9,3		110			
FZA 18 x 80 M12	gvz	160	80	60	14,3	19,3	95	210	240	80	70
	A4					13,5		140			
FZA 22 x 100 M16	gvz	200	100	100	19,0	35,9	110	355	300	100	100
	A4					25,2		235			
FZA 22 x 125 M16	gvz	250	125	100	19,0	35,9	125	300	375	125	125
	A4					25,2		195			

For the design the complete assessment ETA-98/0004 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-98/0004.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## LOADS

### ZYKON Through anchor FZA-D

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	[mm]	[mm]	Max. Load s [mm]	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]
FZA 12 x 50 M8 D	gvz	100	40	20	2,4	5,6	35	120	120	40	35
	A4										
FZA 12 x 60 M8 D	gvz	110	50	20	4,3	7,9	45	160	150	50	45
	A4					5,9		115			
FZA 14 x 80 M10 D	gvz	130	60	40	5,7	13,3	60	245	180	60	55
	A4					9,3		165			
FZA 18 x 100 M12 D	gvz	160	80	60	9,5	19,3	85	315	240	80	70
	A4					13,5		210			
FZA 22 x 125 M16 D	gvz	200	100	100	17,1	34,3	150	500	300	100	100
	A4					25,2		355			

For the design the complete assessment ETA-98/0004 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-98/0004.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$ .

## LOADS

### ZYKON Through anchor FZA-D

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	[mm]	[mm]	Max. Load s [mm]	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]
FZA 12 x 50 M8 D	gvz	100	40	20	3,6	7,9	40	120	120	40	35
	A4					5,9		85			
FZA 12 x 60 M8 D	gvz	110	50	20	5,7	8,4	45	115	150	50	45
	A4					5,9		75			
FZA 14 x 80 M10 D	gvz	130	60	40	9,5	13,3	75	170	180	60	55
	A4					9,3		110			
FZA 18 x 100 M12 D	gvz	160	80	60	14,3	19,3	95	210	240	80	70
	A4					13,5		140			
FZA 22 x 125 M16 D	gvz	200	100	100	19,0	35,9	110	355	300	100	100
	A4					25,2		235			

For the design the complete assessment ETA-98/0004 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-98/0004.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).



## LOADS

### ZYKON-Internally-threaded anchor FZA-I

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness  $h_{min}$ [mm]	Effective anchorage depth  $h_{ef}$ [mm]	Installation torque  $T_{inst}$ [Nm]	Permissible tensile load  $N_{perm}^{4)}$ [kN]	Permissible shear load  $V_{perm}^{4)}$ [kN]	Required edge distance (with one edge) for		Required spacing for  Max. Load s [mm]	Min. spacing  $s_{min}^{5) 6)}$ [mm]	Min. edge distance  $c_{min}^{5) 6)}$ [mm]
							Max. tension load c [mm]	Max. shear load c [mm]			
FZA 12 x 40 M6 I	8.8	100	40	8,5	2,4	4,1	35	85	120	40	35
	A4-70							65			
FZA 12 x 50 M6 I	A4-70	110	50	8,5	4,3	3,2	45	65	150	50	45
FZA 14 x 60 M8 I	8.8	130	60	15	5,7	5,4	60	90	180	60	55
	A4-70					4,3		75			
FZA 18 x 80 M10 I	8.8	160	80	30	9,5	5,6	85	85	240	80	70
	A4-70				9,0	5,4	80	80			
FZA 22 x 100 M12 I	8.8	200	100	60	17,1	13,2	150	165	300	100	100
	A4-70					12,7		155			
FZA 22 x 125 M12 I	8.8	250	125	60	19,0	13,2	140	150	375	125	125
	A4-70					12,7		145			

For the design the complete assessment ETA-98/0004 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-98/0004.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$ .

## LOADS

### ZYKON-Internally-threaded anchor FZA-I

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness  $h_{min}$ [mm]	Effective anchorage depth  $h_{ef}$ [mm]	Installation torque  $T_{inst}$ [Nm]	Permissible tensile load  $N_{perm}^{4)}$ [kN]	Permissible shear load  $V_{perm}^{4)}$ [kN]	Required edge distance (with one edge) for		Required spacing for  Max. Load s [mm]	Min. spacing  $s_{min}^{5) 6)}$ [mm]	Min. edge distance  $c_{min}^{5) 6)}$ [mm]
							Max. tension load c [mm]	Max. shear load c [mm]			
FZA 12 x 40 M6 I	8.8	100	40	8,5	3,6	4,1	40	60	120	40	35
	A4-70					3,2		50			
FZA 12 x 50 M6 I	A4-70	110	50	8,5	5,4	3,2	45	50	150	50	45
FZA 14 x 60 M8 I	8.8	130	60	15	9,3	5,4	75	70	180	60	55
	A4-70				7,1	4,3	55	60			
FZA 18 x 80 M10 I	8.8	160	80	30	9,6	5,6	70	70	240	80	70
	A4-70				9,0	5,4		70			
FZA 22 x 100 M12 I	8.8	200	100	60	19,0	13,2	110	120	300	100	100
	A4-70					12,7		115			
FZA 22 x 125 M12 I	8.8	250	125	60	19,0	13,2	125	125	375	125	125
	A4-70					12,7		125			

For the design the complete assessment ETA-98/0004 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-98/0004.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## The internally threaded anchor with low anchoring depth for individual fixings in cracked concrete



Emergency exit signs in tunnels



Air conditioning units

### VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

#### Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

### CERTIFICATES



Option 1 for cracked concrete



### ADVANTAGES

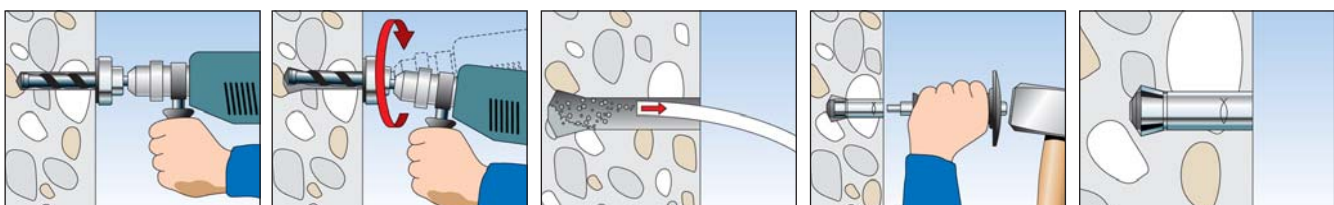
- Hammerset anchor with Zykon undercut technology for individual fixings in cracked and non-cracked concrete.
- The combination of hammerset and ZYKON undercut anchor allows for individual fixings in cracked concrete.
- The special ZYKON undercut technology reduces the energy required for installation.
- The FZUB special drill allows for a fast installation by creating the undercut without having to change tools.
- The embossing that is applied when expanding the anchor secures the simple control of the anchoring.
- The almost expansion-free installation of the anchor allows small edge distances and axial spacing, thereby enabling flexible use.

### APPLICATIONS

- Pipelines
- Ventilation systems
- Sprinkler systems
- Cable trays
- Suspended ceilings

### FUNCTIONING

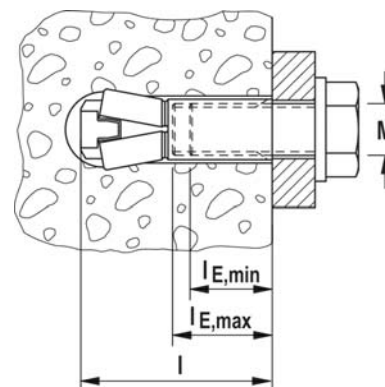
- The FZEA II is suitable for pre-positioned installation.
- The undercut drill hole is created using the special FZUB drill.
- Once the anchor has been placed in the drill hole, the expansion sleeve is expanded by the driving in of the internal expansion pin with the FZED Plus setting tool, and the undercut drill hole is filled with a positive fit.



## TECHNICAL DATA



Zykron-Hammerset anchor **FZEA II**



	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Required drill bit FZUB	Required setting tool FZED plus	Length l [mm]	Internal thread A1	Max. bolt penetration l <sub>E,max</sub> [mm]	Min. bolt penetration l <sub>E,min</sub> [mm]	Sales unit
Item	Art.-No.	Art.-No.	Art.-No.	ETA							[pcs]
<b>FZEA II 10 x 40 M 8</b>	<b>047303</b>	<b>047306</b>	<b>047309</b> 1)	■	10 x 40	FZED 10 plus	43	M 8	17	11	100
<b>FZEA II 12 x 40 M10</b>	<b>047304</b>	<b>047307</b>	<b>047310</b> 1)	■	12 x 40	FZED 12 plus	43	M 10	19	13	100
<b>FZEA II 14 x 40 M12</b>	<b>047305</b>	<b>047308</b>	—	■	14 x 40	FZED 14 plus	43	M 12	21	15	50

1) Delivery on request.

## ACCESSORIES



Drill bit **FZUB**

Item	Art.-No.	Matching anchor type			Sales unit
					[pcs]
<b>FZUB 10 x 40</b>	<b>060622</b>	FZEA II 10 x 40, FZA 10 x 40 M6			1
<b>FZUB 12 x 40</b>	<b>060623</b>	FZEA II 12 x 40, FZA 12 x 40 M8			1
<b>FZUB 14 x 40</b>	<b>060624</b>	FZEA II 14 x 40, FZA 14 x 40			1

## ACCESSORIES



Setting tool **FZED plus**

Item	Art.-No.	Matching anchor type			Sales unit
					[pcs]
<b>FZED 10 plus</b>	<b>044642</b>	FZEA II 10 x 40 M8			1
<b>FZED 12 plus</b>	<b>044643</b>	FZEA II 12 x 40 M10			1
<b>FZED 14 plus</b>	<b>044644</b>	FZEA II 14 x 40 M12			1

## LOADS

### ZYKON Hammerset Anchor FZEA II

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>										Minimum spacings while reducing the load					
Type	Screw material resp. screw surface	Minimum member thickness	Effective anchorage depth	Maximum installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance				
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s [mm]	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]				
FZEA II 10 x 40 M8	5.6	80	40	10	1,6	3,7	40	85	120	40	40				
	5.8			4,7		115									
	8.8			5,6		135									
	A4-70			15											
	C-70														
FZEA II 12 x 40 M10	5.6	80	40	15	3,0	5,6	65	135	120	45	45				
	5.8														
	8.8			20											
	A4-70														
	C-70														
FZEA II 14 x 40 M12	5.6	80	40	20	3,6	5,6	85	130	120	50	50				
	5.8														
	8.8			40											
	A4-70														
	C-70														

For the design the complete assessment ETA-06/0271 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-06/0271 as well as a partial safety factor for load actions of  $\gamma_F = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-06/0271.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-06/0271.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-06/0271.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-06/0271, issue date 30/11/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3\text{mm}$ .

## LOADS

### ZYKON Hammerset Anchor FZEA II

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load			
Type	Screw material resp. screw surface	Minimum member thickness	Effective anchorage depth	Maximum installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance		
		h <sub>min</sub> [mm]	h <sub>ef</sub> [mm]	T <sub>max</sub> [Nm]	N <sub>perm</sub> <sup>4)</sup> [kN]	V <sub>perm</sub> <sup>4)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s [mm]	s <sub>min</sub> <sup>5) 6)</sup> [mm]	c <sub>min</sub> <sup>5) 6)</sup> [mm]		
FZEA II 10 x 40 M8	5.6	80	40	10	3,6	3,7	55	60	120	40	40		
	5.8					4,7		75					
	8.8					5,7		95					
	A4-70			15									
	C-70												
FZEA II 12 x 40 M10	5.6	80	40	15	3,6	6,1	55	100	120	45	45		
	5.8					7,8		130					
	8.8					7,9		135					
	A4-70			20									
	C-70												
FZEA II 14 x 40 M12	5.6	80	40	20	3,6	7,9	55	130	120	50	50		
	5.8												
	8.8												
	A4-70			40									
	C-70												

For the design the complete assessment ETA-06/0271 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-06/0271 as well as a partial safety factor for load actions of  $\gamma_F = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-06/0271.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

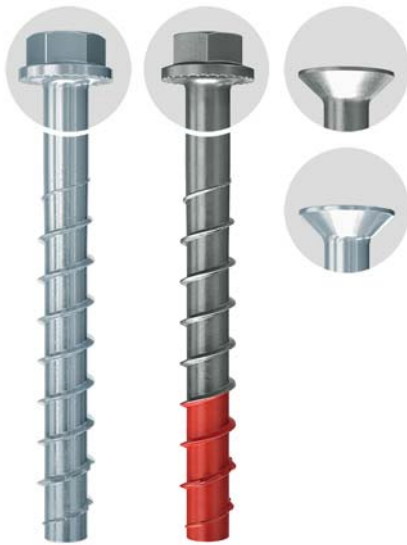
<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-06/0271.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-06/0271.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-06/0271, issue date 30/11/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## The high-performance concrete screw for absolute installation ease



Inclined supports



Banisters

### VERSIONS

- Zinc-plated steel
- Stainless steel A4

### BUILDING MATERIALS

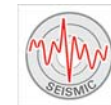
#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

#### Also suitable for:

- Concrete C12/15
- Solid building materials
- Masonry with a dense structure

### CERTIFICATES



### ADVANTAGES

- With up to 3 embedment depths, the ULTRACUT FBS II allows for the same screw to be used for different component thicknesses.
- Unique saw-tooth geometry cuts quickly into the concrete - also in multiple use and reinforced concrete.
- The short ULTRACUT FBS II, with a reduced embedment depth, allows for a short drill hole depth and fast installation which makes it an efficient choice for many applications.
- The performance categories seismic C1 and C2 ensure that the strictest of safety standards and earthquake specifications can be fulfilled.
- For the zinc-plated steel version the checking gauge allows for reuse covered by the approval.
- The specially hardened red tip of the stainless steel A4 version provides faster and more secure installation.
- The stainless steel concrete screw guarantees a high level of corrosion resistance especially for wet conditions and in outdoor areas.

### APPLICATIONS

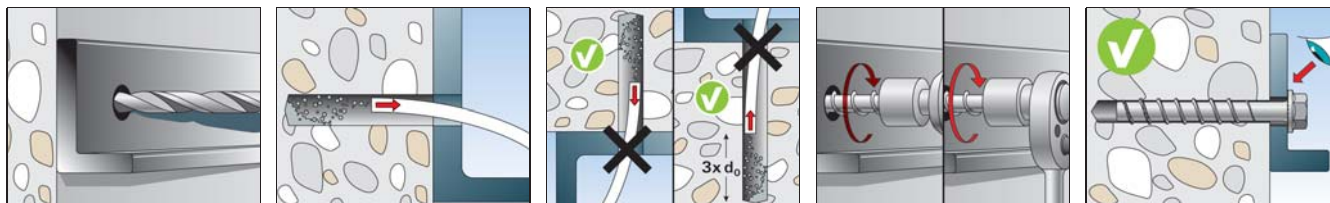
- Guard rails
- Consoles/Base plates
- Metal profiles
- Steel constructions
- Façades
- Protection barriers
- Results/beam anchors
- Shuttering props (only FBS II zinc-plated steel)
- Temporary anchoring, e.g. of building site equipment (only FBS II zinc-plated steel)

### FUNCTIONING

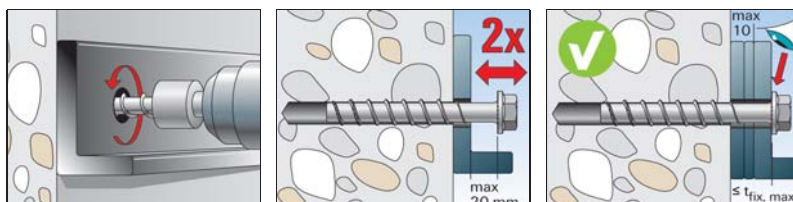
- The ULTRACUT FBS II is recommended for the push-through installation.
- Drill holes do not need to be cleaned during vertical installation (ceiling and floor). For floor fixings the hole must be drilled 3x drill hole diameter deeper.
- The approved adjustment for the concrete screws allows the screw to be unscrewed twice for a total length of 20 mm, to place maximum 10 mm packing below the base plates or to align the attached part, and then to tighten the screw again.
- We recommend using a tangential impact screwdriver with a suitable impact screwdriver socket or an internal torx drive.
- The screw is installed correctly when the screw head sits flush on the fixture (visual setting control).



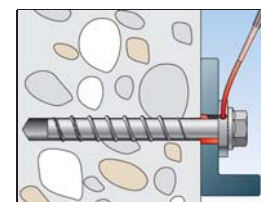
## INSTALLATION



## FIXTURE ADJUSTMENT



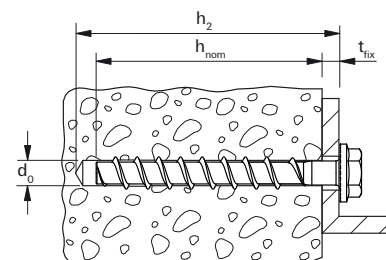
## ADDITIONAL FOR SEISMIC



## TECHNICAL DATA



ULTRACUT FBS II US - hexagon head with integral washer

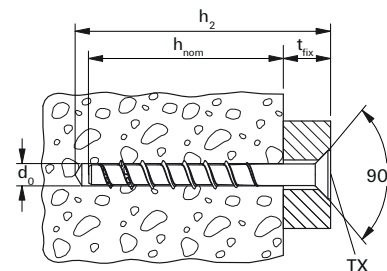


		Approval	Drill hole diameter	Min. drill hole depth for fixings	Screw	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Drive	Sales unit
	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	d <sub>a</sub> x l <sub>s</sub> [mm]	h <sub>nom1</sub> / t <sub>fix</sub> [mm]	h <sub>nom2</sub> / t <sub>fix</sub> [mm]	h <sub>nom3</sub> / t <sub>fix</sub> [mm]		[pcs]
Item	gvz									
ULTRACUT FBS II 8x55 5/- US TX	536851	■	8	65	10 x 55	50 / 5	- / -	- / -	TX40/SW13	50
ULTRACUT FBS II 8x70 20/5 US TX	536852	■	8	80	10 x 70	50 / 20	- / -	65 / 5	TX40/SW13	50
ULTRACUT FBS II 8x80 30/15 US TX	536853	■	8	90	10 x 80	50 / 30	- / -	65 / 15	TX40/SW13	50
ULTRACUT FBS II 8x90 40/25 US TX	536854	■	8	100	10 x 90	50 / 40	- / -	65 / 25	TX40/SW13	50
ULTRACUT FBS II 8x100 50/35 US TX	536855	■	8	110	10 x 100	50 / 50	- / -	65 / 35	TX40/SW13	50
ULTRACUT FBS II 8x110 60/45 US TX	536856	■	8	120	10 x 110	50 / 60	- / -	65 / 45	TX40/SW13	50
ULTRACUT FBS II 8x130 80/65 US TX	536857	■	8	140	10 x 130	50 / 80	- / -	65 / 65	TX40/SW13	50
ULTRACUT FBS II 10x60 5/-/- US	536858	■	10	70	12 x 60	55 / 5	- / -	- / -	SW 15	50
ULTRACUT FBS II 10x70 15/5/- US	536859	■	10	80	12 x 70	55 / 15	65 / 5	- / -	SW 15	50
ULTRACUT FBS II 10x80 25/15/- US	536860	■	10	90	12 x 80	55 / 25	65 / 15	- / -	SW 15	50
ULTRACUT FBS II 10x90 35/25/5 US	536861	■	10	100	12 x 90	55 / 35	65 / 25	85 / 5	SW 15	50
ULTRACUT FBS II 10x100 45/35/15 US	536862	■	10	110	12 x 100	55 / 45	65 / 35	85 / 15	SW 15	50
ULTRACUT FBS II 10x120 65/55/35 US	536863	■	10	130	12 x 120	55 / 65	65 / 55	85 / 35	SW 15	50
ULTRACUT FBS II 10x140 85/75/55 US	536864	■	10	150	12 x 140	55 / 85	65 / 75	85 / 55	SW 15	50
ULTRACUT FBS II 10x160 105/95/75 US	536865	■	10	170	12 x 160	55 / 105	65 / 95	85 / 75	SW 15	50
ULTRACUT FBS II 10x200 145/135/115 US	536866	■	10	210	12 x 200	55 / 145	65 / 135	85 / 115	SW 15	20
ULTRACUT FBS II 10x230 175/165/145 US	536867	■	10	240	12 x 230	55 / 175	65 / 165	85 / 145	SW 15	20
ULTRACUT FBS II 10x260 205/195/175 US	536868	■	10	270	12 x 260	55 / 205	65 / 195	85 / 175	SW 15	20
ULTRACUT FBS II 12x70 10/-/- US	536869	■	12	80	14 x 70	60 / 10	- / -	- / -	SW 17	20
ULTRACUT FBS II 12x85 25/10/- US	536870	■	12	95	14 x 85	60 / 25	75 / 10	- / -	SW 17	20
ULTRACUT FBS II 12x110 50/35/10 US	536871	■	12	120	14 x 110	60 / 50	75 / 35	100 / 10	SW 17	20
ULTRACUT FBS II 12x130 70/55/30 US	536872	■	12	140	14 x 130	60 / 70	75 / 55	100 / 30	SW 17	20
ULTRACUT FBS II 12x150 90/75/50 US	536873	■	12	160	14 x 150	60 / 90	75 / 75	100 / 50	SW 17	20
ULTRACUT FBS II 14x75 10/-/- US	536874	■	14	90	16 x 75	65 / 10	- / -	- / -	SW 21	20
ULTRACUT FBS II 14x95 30/10/- US	536875	■	14	110	16 x 95	65 / 30	85 / 10	- / -	SW 21	20
ULTRACUT FBS II 14x100 35/15/- US	536876	■	14	115	16 x 100	65 / 35	85 / 15	- / -	SW 21	20
ULTRACUT FBS II 14x125 60/40/10 US	536877	■	14	140	16 x 125	65 / 60	85 / 40	115 / 10	SW 21	10
ULTRACUT FBS II 14x150 85/65/35 US	536878	■	14	165	16 x 150	65 / 85	85 / 65	115 / 35	SW 21	10

## TECHNICAL DATA



ULTRACUT FBS II SK - countersunk head



		Approval	Drill hole diameter	Min. drill hole depth for through fixings	Screw	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Drive	Sales unit
	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	d <sub>a</sub> x l <sub>s</sub> [mm]	h <sub>nom1</sub> / t <sub>fix</sub> [mm]	h <sub>nom2</sub> / t <sub>fix</sub> [mm]	h <sub>nom3</sub> / t <sub>fix</sub> [mm]		[pcs]
Item	gvz									
ULTRACUT FBS II 8x60 10/- SK	536880	■	8	70	10 x 60	50 / 10	- / -	- / -	TX40	50
ULTRACUT FBS II 8x80 30/15 SK	536881	■	8	90	10 x 80	50 / 30	- / -	65 / 15	TX40	50
ULTRACUT FBS II 8x90 40/25 SK	536882	■	8	100	10 x 90	50 / 40	- / -	65 / 25	TX40	50
ULTRACUT FBS II 10x65 10/-/- SK	536884	■	10	75	12 x 65	55 / 10	- / -	- / -	TX50	50
ULTRACUT FBS II 10x80 25/15/- SK	536885	■	10	90	12 x 80	55 / 25	65 / 15	- / -	TX50	50
ULTRACUT FBS II 10x95 40/30/10 SK	536886	■	10	105	12 x 95	55 / 40	65 / 30	85 / 10	TX50	50
ULTRACUT FBS II 10x100 45/35/15 SK	536887	■	10	110	12 x 100	55 / 45	65 / 35	85 / 15	TX50	50
ULTRACUT FBS II 10x120 65/55/35 SK	536888	■	10	130	12 x 120	55 / 65	65 / 55	85 / 35	TX50	50

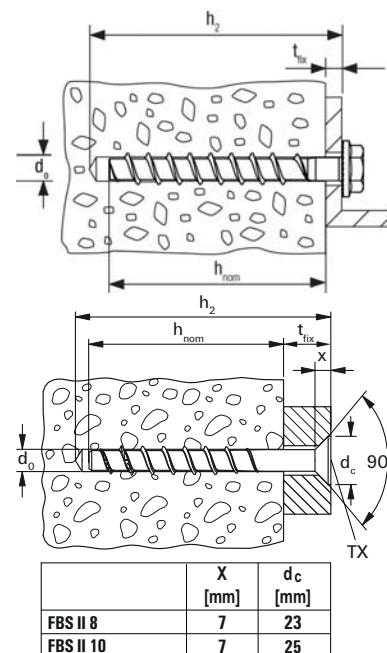
## TECHNICAL DATA



**ULTRACUT FBS II US A4** - hexagon head with molded washer, stainless steel A4



**ULTRACUT FBS II SK A4** - countersunk head, stainless steel A4



		Approval	Drill hole diameter	Min. drill hole depth for through fixings	Screw length	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Drive	Sales unit
	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l <sub>s</sub> [mm]	h <sub>nom1</sub> / t <sub>fix</sub> [mm]	h <sub>nom3</sub> / t <sub>fix</sub> [mm]	h <sub>nom2</sub> / t <sub>fix</sub> [mm]		[pcs]
Item	A4									
FBS II 8 x 60 10/- US A4	543565	■	8	70	60	50 / 10	- / -	- / -	SW 13	50
FBS II 8 x 70 5/- US A4	543566	■	8	80	70	50 / 20	65 / 5	- / -	SW 13	50
FBS II 8 x 80 15/- US A4	543567	■	8	90	80	50 / 30	65 / 15	- / -	SW 13	50
FBS II 8 x 90 25/- US A4	543568	■	8	100	90	50 / 40	65 / 25	- / -	SW 13	50
FBS II 10 x 60 5/-/- US A4	543569	■	10	70	60	55 / 5	- / -	- / -	SW 15	50
FBS II 10 x 70 15/5/- US A4	543570	■	10	80	70	55 / 15	- / -	65 / 5	SW 15	50
FBS II 10 x 80 25/15/- US A4	543571	■	10	90	80	55 / 25	- / -	65 / 15	SW 15	50
FBS II 10 x 90 5/- US A4	543572	■	10	100	90	55 / 35	85 / 5	65 / 25	SW 15	50
FBS II 10 x 100 15/- US A4	543573	■	10	110	100	55 / 45	85 / 15	65 / 35	SW 15	50
FBS II 10 x 120 35/- US A4	543574	■	10	130	120	55 / 65	85 / 35	65 / 55	SW 15	50
FBS II 12 x 70 10/-/- US A4	543575	■	12	80	70	60 / 10	- / -	- / -	SW 17	20
FBS II 12 x 85 25/10/- US A4	543576	■	12	95	85	60 / 25	- / -	75 / 10	SW 17	20
FBS II 12 x 110 10/- US A4	543577	■	12	120	110	60 / 50	100 / 10	75 / 35	SW 17	50
FBS II 12 x 130 30/- US A4	543578	■	12	140	130	60 / 70	100 / 30	75 / 55	SW 17	20
FBS II 8 x 60 10/- SK A4	543579	■	8	70	60	50 / 10	- / -	- / -	TX40	50
FBS II 8 x 80 15/- SK A4	543580	■	8	90	80	50 / 30	65 / 15	- / -	TX40	50
FBS II 8 x 90 25/- SK A4	543581	■	8	100	90	50 / 40	65 / 25	- / -	TX40	50
FBS II 10 x 65 10/-/- SK A4	543582	■	10	75	65	55 / 10	- / -	- / -	TX50	50
FBS II 10 x 80 25/15/- SK A4	543583	■	10	90	80	55 / 25	- / -	65 / 15	TX50	50
FBS II 10 x 95 10/- SK A4	543584	■	10	105	95	55 / 40	85 / 10	65 / 30	TX50	50
FBS II 10 x 100 15/- SK A4	543585	■	10	110	100	55 / 45	85 / 15	65 / 35	TX50	50
FBS II 10 x 120 35/- SK A4	543586	■	10	130	120	55 / 65	85 / 35	65 / 55	TX50	50

## ACCESSORIES



Checking gauge **FUP**



FMB T40 Maxx Bit



Nut **SW**



Profi-bit **FPB T50 5/16"**



Nut **TX**

Item	Art.-No.	Internal diameter D [mm]	Drive	Match	Sales unit [pcs]
Checking gauge FUP 8	537200	9,9	—	FBS II 8	1
Checking gauge FUP 10	537201	12,0	—	FBS II 10	1
Checking gauge FUP 12	537202	13,0	—	FBS II 12	1
Checking gauge FUP 14	537203	15,0	—	FBS II 14	1
Nut SW13	538578	—	1/2" / SW13	FBS II 8	1
Nut SW15	538579	—	1/2" / SW15	FBS II 10	1
Nut SW17	538580	—	1/2" / SW17	FBS II 12	1
Nut SW21	538581	—	1/2" / SW21	FBS II 14	1
Nut TX40	538575 1)	—	1/2" - 1/4"	FBS II 8 / FBS II 8 SK	1
Nut TX50	538576 2)	—	1/2" - 5/16"	FBS II 10 / FBS II 10 SK	1
FMB T40 Maxx Bit W 5	533159	—	TX40	FBS II 8 / FBS II 8 SK	10
FPB Profi-Bit T50 5/16"	538574	—	TX50	FBS II 10 SK	1

1) Suitable for FMB T40 Maxx Bit

2) Suitable for FPB Profi-Bit T50 5/16"

## ACCESSORIES



Filling washer **FFD**

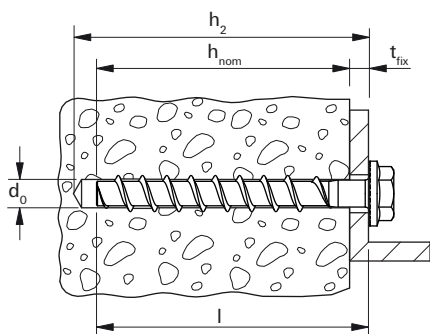


Washer **U**

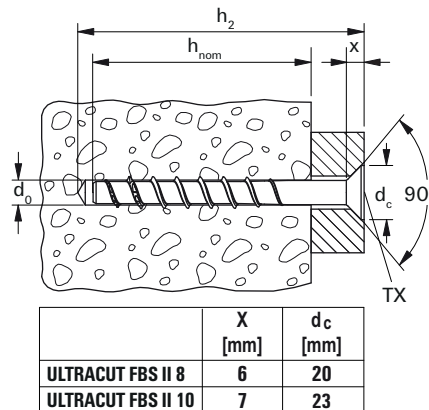
Item	Art.-No.	Internal diameter D [mm]	External-Ø d [mm]	Match	Sales unit [pcs]
FFD 22 x 9 x 6	547515	9,0	22	FBS II 6	4
FFD 26 x 12 x 6	538458	12,0	26	FBS II 8	4
FFD 30 x 14 x 6	538459	14,2	30	FBS II 10 / FBS II 12	4
FFD 38 x 19 x 7	538460	19,2	38	FBS II 14	4
FFD 30x14x6 A4	541987	14,0	30	FBS II 10 A4 / FBS II 12 A4	4
Washer for FBS 10	520471	13,5	44	FBS II 10	50

## INSTALLATION DATA - CONCRETE C20/25 - C50/60

Type US



Type SK



Concrete screw ULTRACUT FBS II 8-14			8	10	12	14
Drill hole diameter	d0	[mm]	8	10	12	14
Nominal screw-in depth	hnom1	[mm]	50	55	60	65
	hnom2	[mm]	-	65	75	85
	hnom3	[mm]	65	85	100	115
Drill hole depth (push-through installation)	h2 ≥	[mm]	l + 10	l + 10	l + 10	l + 15
Clearance hole diameter	df		10,6 - 12	12,8 - 14	14,8 - 16	16,9 - 18
Max. torque for installation with impact screw driver in concrete	Timp, max		600	650	650	650
Width across flat	SW		13	15	17	21
Drive	Torx		T40 (SK a. US)	T50 (SK)	-	-

## INSTALLATION DATA - MASONRY

Concrete screw ULTRACUT FBS II 8-14					
Building material	Compressive strength class [N/mm <sup>2</sup> ]	Size	[mm]	8	10
		hnom	[mm]	65	85
Solid clay brick (EN771-1)	≥ 12	Tinst	[Nm]	10	10
Solid sand-lime brick (EN771-2)	≥ 12	Tinst	[Nm]	15	15
Aerated concrete (EN771-4)	≥ 6	Tinst	[Nm]	5	5

## INSTALLATION OF CONCRETE SCREWS (USE A CORDLESS OR CABLED IMPACT WRENCH)

Concrete screw ULTRACUT FBS II 8-14	Maximum torque gvz [Nm]	Maximum torque A4 [Nm]
FBS II 8	600	450
FBS II 10	650	450
FBS II 12	650	650
FBS II 14	650	-

<sup>a)</sup> The values apply to concrete strength of approx. 40N/mm<sup>2</sup>, for other concrete strength classes the values may differ.  
The conversion of nominal output into effective tightening torque varies from machine to machine - always therefore use torque control.

## LOADS

### Concrete screw ULTRACUT FBS II

zinc plated steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 10)</sup>											Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Maximum installation torque	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
								Max. tension load	Max. shear load			
		$h_{min}$	$h_{nom}$	$T_{max}$	$T_{imp,max}^{6)}$	$N_{perm}^{7)}$	$V_{perm}^{7)}$	c	c	Max. Load $s_{cr}$	$s_{min}^{8)}$	$c_{min}^{8)}$
		[mm]	[mm]	[Nm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FBS II 6x40 <sup>5)</sup>	gvz	80	40	10	450	1,2	4,3	35	110	100	35	35
FBS II 6x45 <sup>5)</sup>	gvz	90	45	10	450	1,7	4,3	35	105	110	35	35
FBS II 6x50 <sup>5)</sup>	gvz	90	50	10	450	1,9	4,3	35	100	120	35	35
FBS II 6x55 <sup>5)</sup>	gvz	100	55	10	450	2,4	6,3	35	145	135	35	35
FBS II 8x50	gvz	100	50	0	600	2,9	4,3	35	90	120	35	35
FBS II 8x65	gvz	120	65	0	600	5,7	9,0	70	180	160	35	35
FBS II 10x55	gvz	100	55	0	650	4,3	4,8	55	100	130	40	40
FBS II 10x65	gvz	120	65	0	650	5,7	12,5	70	250	155	40	40
FBS II 10x85	gvz	140	85	0	650	9,6	16,6	105	305	205	40	40
FBS II 12x60	gvz	110	60	0	650	5,5	11,0	70	230	145	50	50
FBS II 12x75	gvz	130	75	0	650	8,0	15,2	90	290	180	50	50
FBS II 12x100	gvz	150	100	0	650	12,5	20,3	125	355	245	50	50
FBS II 14x65	gvz	120	65	0	650	6,1	12,1	75	235	150	60	60
FBS II 14x85	gvz	140	85	0	650	9,4	18,8	100	340	205	60	60
FBS II 14x115	gvz	180	115	0	650	15,4	29,4	140	465	280	60	60

For the design the complete assessment ETA-15/0352 has to be considered.<sup>9)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-15/0352.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

<sup>4)</sup> The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

<sup>5)</sup> Diamond drilling not permitted.

<sup>6)</sup> Maximum allowable torque for installation with any tangential impact screw driver.

<sup>7)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>10)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

### Concrete screw ULTRACUT FBS II

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>											Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Maximum installation torque	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
								Max. tension load	Max. shear load			
		$h_{min}$	$h_{nom}$	$T_{max}$	$T_{imp,max}^{6)}$	$N_{perm}^{7)}$	$V_{perm}^{7)}$	c	c	Max. Load $s_{cr}$	$s_{min}^{8)}$	$c_{min}^{8)}$
		[mm]	[mm]	[Nm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FBS II 6x40 <sup>5)</sup>	gvz	80	40	10	450	3,8	4,3	40	75	100	35	35
FBS II 6x45 <sup>5)</sup>	gvz	90	45	10	450	4,8	4,3	50	70	110	35	35
FBS II 6x50 <sup>5)</sup>	gvz	90	50	10	450	5,7	4,3	55	70	120	35	35
FBS II 6x55 <sup>5)</sup>	gvz	100	55	10	450	6,4	6,3	60	100	135	35	35
FBS II 8x50	gvz	100	50	0	600	6,1	6,1	60	90	120	35	35
FBS II 8x65	gvz	120	65	0	600	9,0	9,0	80	125	160	35	35
FBS II 10x55	gvz	100	55	0	650	6,8	6,8	65	100	130	40	40
FBS II 10x65	gvz	120	65	0	650	8,8	14,0	80	195	155	40	40
FBS II 10x85	gvz	140	85	0	650	13,5	16,6	105	210	205	40	40
FBS II 12x60	gvz	110	60	0	650	7,7	15,2	70	220	145	50	50
FBS II 12x75	gvz	130	75	0	650	11,2	15,2	90	195	180	50	50
FBS II 12x100	gvz	150	100	0	650	17,5	20,3	125	240	245	50	50



## LOADS

### Concrete screw ULTRACUT FBS II

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>											Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Maximum installation torque	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{nom}$ [mm]	$T_{max}$ [Nm]	$T_{imp,max}^{6)}$ [Nm]	$N_{perm}^{7)}$ [kN]	$V_{perm}^{7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{8)}$ [mm]	$c_{min}^{8)}$ [mm]
<b>FBS II 14x65</b>	gvz	120	65	0	650	8,5	17,0	75	235	150	60	60
<b>FBS II 14x85</b>	gvz	140	85	0	650	13,2	22,1	100	275	205	60	60
<b>FBS II 14x115</b>	gvz	180	115	0	650	21,6	29,4	140	315	280	60	60

For the design the complete assessment ETA-15/0352 has to be considered.<sup>9)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-15/0352.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

<sup>4)</sup> The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

<sup>5)</sup> Diamond drilling not permitted.

<sup>6)</sup> Maximum allowable torque for installation with any tangential impact screw driver.

<sup>7)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## LOADS

### Concrete screw with hexagon head and washer ULTRACUT FBS II A4 US

stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>									Minimum spacings while reducing the load		
Type	Material fixing element	Minimum member thickness	Screw-in depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{nom}$ [mm]	$T_{imp,max}$ <sup>4)</sup> [Nm]	$N_{perm}$ <sup>5)</sup> [kN]	$V_{perm}$ <sup>5)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}$ <sup>6)</sup> [mm]	$c_{min}$ <sup>6)</sup> [mm]
FBS II 8x50	A4	100	50	450	1,9	4,3	35	90	120	35	35
FBS II 8x65	A4	120	65	450	4,3	6,4	45	125	160	35	35
FBS II 10x55	A4	100	55	450	2,1	4,8	40	100	130	40	40
FBS II 10x65	A4	120	65	450	2,9	6,2	40	115	155	40	40
FBS II 10x85	A4	140	85	450	7,6	19,2	75	360	205	40	40
FBS II 12x60	A4	110	60	650	2,1	5,5	50	105	145	50	50
FBS II 12x75	A4	130	75	650	5,2	15,9	50	305	180	50	50
FBS II 12x100	A4	150	100	650	12,5	25,0	125	445	245	50	50

For the design the complete assessment ETA-17/0740 has to be considered.<sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of  $\gamma_F = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-17/0740.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-17/0740.

<sup>4)</sup> Maximum allowable torque for installation with any tangential impact screw driver.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

### Concrete screw with hexagon head and washer ULTRACUT FBS II A4 US

stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{nom}$ [mm]	$T_{imp,max}^{4)}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
<b>FBS II 8x50</b>	A4	100	50	450	3,3	6,1	35	90	120	35	35
<b>FBS II 8x65</b>	A4	120	65	450	6,7	9,0	55	120	160	35	35
<b>FBS II 10x55</b>	A4	100	55	450	4,0	6,8	40	100	130	40	40
<b>FBS II 10x65</b>	A4	120	65	450	6,7	8,8	55	115	155	40	40
<b>FBS II 10x85</b>	A4	140	85	450	13,5	20,9	105	270	205	40	40
<b>FBS II 12x60</b>	A4	110	60	650	4,8	7,7	50	105	145	50	50
<b>FBS II 12x75</b>	A4	130	75	650	5,7	22,4	50	300	180	50	50
<b>FBS II 12x100</b>	A4	150	100	650	17,5	26,2	125	320	245	50	50

For the design the complete assessment ETA-17/0740 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of  $\gamma_F = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-17/0740.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-17/0740.

<sup>4)</sup> Maximum allowable torque for installation with any tangential impact screw driver.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## LOADS

### Concrete screw with countersunk head ULTRACUT FBS II A4 SK

stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{nom}$ [mm]	$T_{imp,max}^{4)}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
<b>FBS II 8x50</b>	A4	100	50	450	1,9	4,3	35	90	120	35	35
<b>FBS II 8x65</b>	A4	120	65	450	4,3	6,4	45	125	160	35	35
<b>FBS II 10x55</b>	A4	100	55	450	2,1	4,8	40	100	130	40	40
<b>FBS II 10x65</b>	A4	120	65	450	2,9	6,2	40	115	155	40	40
<b>FBS II 10x85</b>	A4	140	85	450	7,6	19,2	75	360	205	40	40

For the design the complete assessment ETA-17/0740 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of  $\gamma_F = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-17/0740.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling. For further allowable drill methods see ETA-17/0740.

<sup>4)</sup> Maximum allowable torque for installation with any tangential impact screw driver.

<sup>5)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>6)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>8)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.

## LOADS

## Concrete screw with countersunk head ULTRACUT FBS II A4 SK

stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{nom}$ [mm]	$T_{imp,max}^{4)}$ [Nm]	$N_{perm}^{5)}$ [kN]	$V_{perm}^{5)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load $s_{cr}$ [mm]	$s_{min}^{6)}$ [mm]	$c_{min}^{6)}$ [mm]
FBS II 8x50	A4	100	50	450	3,3	6,1	35	90	120	35	35
FBS II 8x65	A4	120	65	450	6,7	9,0	55	120	160	35	35
FBS II 10x55	A4	100	55	450	4,0	6,8	40	100	130	40	40
FBS II 10x65	A4	120	65	450	6,7	8,8	55	115	155	40	40
FBS II 10x85	A4	140	85	450	13,5	20,9	105	270	205	40	40

<sup>1)</sup> For the design the complete assessment ETA-17/0740 has to be considered. <sup>7)</sup>

<sup>2)</sup> The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of  $\gamma_F = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-17/0740.

<sup>3)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>4)</sup> Drill method hammer drilling. For further allowable drill methods see ETA-17/0740.

<sup>5)</sup> Maximum allowable torque for installation with any tangential impact screw driver.

<sup>6)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>7)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>8)</sup> The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## LOADS

## Concrete screw ULTRACUT FBS II

Highest recommended loads <sup>1) 3)</sup> for a single anchor, resp. a fixing point <sup>4) 5) 6)</sup> in solid brick masonry.

Base material	Compressive strength [N/mm²]	Type		ULTRACUT	
		Size		FBS II 8	FBS II 10
		Anchoring depth h <sub>nom</sub>	[mm]	65	85
Solid clay brick <sup>9)</sup> (EN771-1) ≥ 240x113x115 mm	≥ 12	F <sub>rec</sub> <sup>2 3)</sup>	[kN]	1,1	1,4
	≥ 20	F <sub>rec</sub> <sup>2 3 7)</sup>	[kN]	1,6	1,6
Solid sand-lime brick <sup>9)</sup> (EN771-2) ≥ 240x71x115 mm	≥ 12	F <sub>rec</sub> <sup>2 3 7)</sup>	[kN]	1,2	1,2
	≥ 20	F <sub>rec</sub> <sup>2 3 7)</sup>	[kN]	1,2	1,2
Aerated concrete (EN771-4) ≥ 499x249x120 mm	≥ 6	F <sub>rec</sub> <sup>2 3)</sup>	[kN]	0,7	0,9
Minimum spacing within anchor groups of 2 or 4 anchors		s <sub>min</sub>	[mm]	80	
Minimum spacing between single anchors, resp. anchor groups		s <sub>min</sub>	[mm]	80	
Minimum distance to the horizontal joint		c <sub>min,v</sub> <sup>8)</sup>	[mm]	20	
Minimum distance to the vertical joint		c <sub>min,h</sub> <sup>8)</sup>	[mm]	40	
Minimum distance to the free edge		c <sub>min,free edge</sub> <sup>8)</sup>	[mm]	200	
Tightening torque <sup>10)</sup>	Solid clay brick <sup>9)</sup>	T <sub>tighten</sub>	[Nm]	10	
	Solid sandlime brick <sup>9)</sup>			15	
	Aerated concrete			5	

<sup>1)</sup> An appropriate safety factor is considered.

<sup>2)</sup> The given loads apply to the given brick measures for masonry with superimposed load. Bigger brick sizes are minimum equal in case of the loads.

<sup>3)</sup> The loads only apply to multiple fixings of non-load-bearing systems and are valid for tensile load, shear load and oblique load under any angle.

<sup>4)</sup> On-site screw testing is recommended to validate technical data. If the joints are not visible 100% anchor testing is recommended due to the screws are only working in the bricks and not in the mortar joints.

<sup>5)</sup> A fixing point can be a single anchor, 2 anchors or 4 anchors with a minimum spacing  $s_{min}$ . Anchor groups of 4 anchors are arranged in rectangular disposition.

<sup>6)</sup> The fixing points have to be arranged in this way that there will be always maximum one fixing point arranged in one brick.

<sup>7)</sup> Brick pull-out is decisive.

<sup>8)</sup> The values  $c_{min,v}$  and  $c_{min,h}$  are only valid if the mortar joints are filled proper. Otherwise the joints has to be considered as free edges and  $c_{min,free}$  is decisive. Minimum mortar strenght is M2.5

<sup>9)</sup> The values are valid for unperforated solid bricks.

<sup>10)</sup> The screw is screwed in with a cordless screwdriver, an impact screwdriver or by hand. The screwing process must be finished immediately when the screw head is in contact with the assembled object. The specified tightening torque must then be applied with a torque wrench.

## The high-performance concrete screw for absolute installation ease



Light, suspended pipelines



Suspended air-conditioners

### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

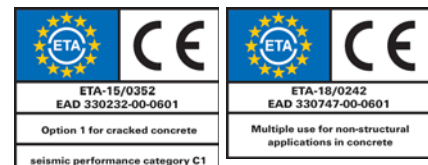
#### Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked
- Prestressed hollow concrete ceilings C30/37 to C50/60 for the multiple use of non-load bearing systems

#### Also suitable for:

- Concrete C12/15
- Solid building materials
- Masonry with dense structure

### CERTIFICATES



### ADVANTAGES

- The first concrete screw with diameter 6 with variable embedment depth offers a flexible adaption of the embedment depth to the loads.
- The ETA assessment option 1 includes the use in cracked and non-cracked concrete for highest safety requirements.
- The first 6 mm diameter concrete screw with an ETA assessment for the C1 seismic performance category for additional safety standards.
- Different head designs offer a maximum of flexibility and a perfect adaptation to the application.
- The ULTRACUT FBS II 6 is approved for multiple use of non-load bearing systems and thereby ideal for the installation of pipe routes, cable trays and prestressed hollow concrete ceilings.

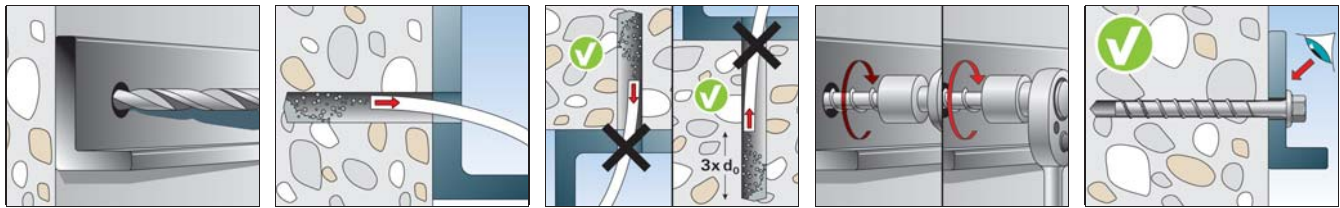
### APPLICATIONS

- Pipeline routes
- Suspension for individual pipes
- Suspended mounting rails
- Prestressed concrete hollow core ceilings
- Cable trays
- Ventilation ducts
- Perforated tapes
- Air conditioning units

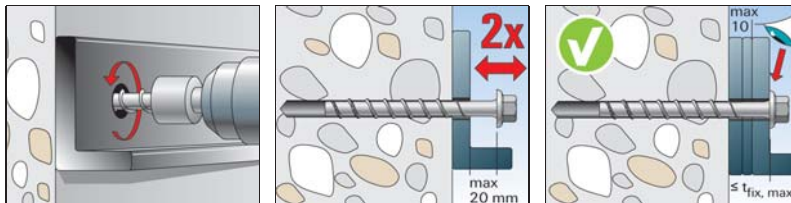
### FUNCTIONING

- The ULTRACUT FBS II is recommended for the push-through / pre-positioned installation.
- Drill holes do not need to be cleaned during vertical installation (ceiling and floor). For floor fixings the hole must be drilled 3x drill hole diameter deeper.
- The approved adjustment for the concrete screws allows the screw to be unscrewed twice for a total length of 20 mm, to place maximum 10 mm packing below the base plates or to align the attached part, and then to tighten the screw again.
- We recommend using a tangential impact screwdriver with a suitable impact screwdriver socket or an internal torx drive.
- The screw is installed correctly when the screw head sits flush on the fixture (visual setting control).

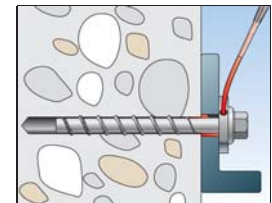
## INSTALLATION



## FIXTURE ADJUSTMENT



## ADDITIONAL FOR SEISMIC



## TECHNICAL DATA



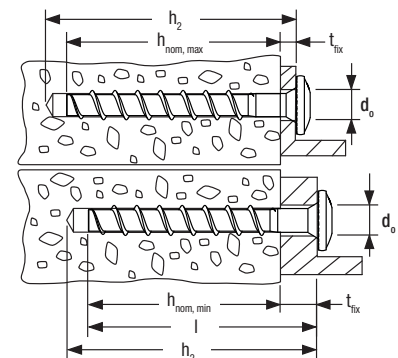
ULTRACUT FBS II 6 P - panhead



ULTRACUT FBS II 6 SK - panhead



ULTRACUT FBS II 6 US - hexagon head  
with molded washer



		Approval	Drill hole diameter	Min. drill hole depth for through fixings	Screw length	Head-Ø	Screw-in depth	Usable length	Drive	Sales unit
	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l <sub>s</sub> [mm]	d <sub>K</sub> [mm]	h <sub>nom, min</sub> - h <sub>nom, max</sub> [mm]	t <sub>fix, min</sub> - t <sub>fix, max</sub> [mm]		[pcs]
Item	gvz									
FBS II 6 x 30/5 P	546377	■	6	40	30	14.4	25	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 40/5 P	546378	■	6	50	40	14.4	25 - 35	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 40/5 LP	546379	■	6	50	40	17.5	25 - 35	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 60/5 P	546380	■	6	70	60	14.4	25 - 55	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 80/25 P	546381	■	6	90	80	14.4	25 - 55	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 30/5 SK	546382	■	6	40	30	13.5	25	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 40/5 SK	546383	■	6	50	40	13.5	25 - 35	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 60/5 SK	546384	■	6	70	60	13.5	25 - 55	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 80/25 SK	546385	■	6	90	80	13.5	25 - 55	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 100/45 SK	546386	■	6	110	100	13.5	25 - 55	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 120/65 SK	546387	■	6	130	120	13.5	25 - 55	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 140/85 SK	546388	■	6	150	140	13.5	25 - 55	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 160/105 SK	546389	■	6	170	160	13.5	25 - 55	Screw length - h <sub>nom</sub>	T30	100
FBS II 6 x 40/5 US	546390	■	6	50	40	17	25 - 35	Screw length - h <sub>nom</sub>	SW 10	100
FBS II 6 x 60/5 US	546391	■	6	70	60	17	25 - 55	Screw length - h <sub>nom</sub>	SW 10	100
FBS II 6 x 80/25 US	546392	■	6	90	80	17	25 - 55	Screw length - h <sub>nom</sub>	SW 10	100
FBS II 6 x 100/45 US	546393	■	6	110	100	17	25 - 55	Screw length - h <sub>nom</sub>	SW 10	100
FBS II 6 x 120/65 US	546394	■	6	130	120	17	25 - 55	Screw length - h <sub>nom</sub>	SW 10	100

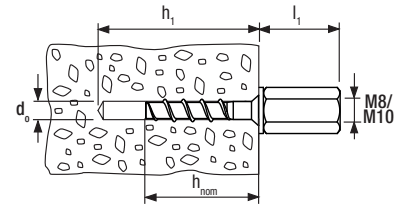
## TECHNICAL DATA



**ULTRACUT FBS II M8/M10**  
- outside diameter



**ULTRACUT FBS II M8/M10 I**  
- internal thread M8/M10



	Art.-No.	Approval ETA	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for pre-positioned installation $h_1$ [mm]	Projection length $l_1$ [mm]	Screw-in depth $h_{nom}$ [mm]	Drive	Sales unit [pcs]	
Item	gvz								
<b>FBS II 6 x 25 M8/19</b>	<b>546395</b>	■	6	35	4	25	SW 10	100	
<b>FBS II 6 x 35 M8/19</b>	<b>546396</b>	■	6	65	4	35	SW 10	100	
<b>FBS II 6 x 55 M8/19</b>	<b>546397</b>	■	6	45	37	55	SW 10	100	
<b>FBS II 6 x 35 M10/21</b>	<b>546398</b>	■	6	45	4	35	SW 13	100	
<b>FBS II 6 x 55 M10/21</b>	<b>546399</b>	■	6	65	5	55	SW 13	100	
<b>FBS II 6 x 35 M8/M10 I</b>	<b>546400</b>	■	6	45	5	35	SW 13	100	
<b>FBS II 6 x 55 M8/M10 I</b>	<b>546401</b>	■	6	65	37	55	SW 13	100	

## LOADS

### Concrete screw ULTRACUT FBS II 6

zinc plated steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 10)</sup>											Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness $h_{min}$ [mm]	Screw-in depth $h_{nom}$ [mm]	Maximum installation torque $T_{max}$ [Nm]	Installation torque $T_{imp,max}^{6)}$ [Nm]	Permissible tensile load $N_{perm}^{7)}$ [kN]	Permissible shear load $V_{perm}^{7)}$ [kN]	Required edge distance (with one edge) for		Required spacing for Max. Load $s_{scr}$ [mm]	Min. spacing $s_{min}^{8)}$ [mm]	Min. edge distance $c_{min}^{8)}$ [mm]
								Max. tension load $c$ [mm]	Max. shear load $c$ [mm]			
<b>FBS II 6x40<sup>5)</sup></b>	gvz	80	40	10	450	1,2	4,3	35	110	100	35	35
<b>FBS II 6x45<sup>5)</sup></b>	gvz	90	45	10	450	1,7	4,3	35	105	110	35	35
<b>FBS II 6x50<sup>5)</sup></b>	gvz	90	50	10	450	1,9	4,3	35	100	120	35	35
<b>FBS II 6x55<sup>5)</sup></b>	gvz	100	55	10	450	2,4	6,3	35	145	135	35	35

For the design the complete assessment ETA-15/0352 has to be considered.<sup>9)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-15/0352.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

<sup>4)</sup> The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

<sup>5)</sup> Diamond drilling not permitted.

<sup>6)</sup> Maximum allowable torque for installation with any tangential impact screw driver.

<sup>7)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>10)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3$  mm.



## LOADS

### Concrete screw ULTRACUT FBS II 6

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>											Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Maximum installation torque	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{nom}$ [mm]	$T_{max}$ [Nm]	$T_{imp, max 6)}$ [Nm]	$N_{perm 7)}$ [kN]	$V_{perm 7)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	Max. Load $s_{cr}$ [mm]	$s_{min 8)}$ [mm]	$c_{min 8)}$ [mm]
<b>FBS II 6x40 <sup>5)</sup></b>	gvz	80	40	10	450	3,8	4,3	40	75	100	35	35
<b>FBS II 6x45 <sup>5)</sup></b>	gvz	90	45	10	450	4,8	4,3	50	70	110	35	35
<b>FBS II 6x50 <sup>5)</sup></b>	gvz	90	50	10	450	5,7	4,3	55	70	120	35	35
<b>FBS II 6x55 <sup>5)</sup></b>	gvz	100	55	10	450	6,4	6,3	60	100	135	35	35

For the design the complete assessment ETA-15/0352 has to be considered.<sup>9)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-15/0352.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

<sup>4)</sup> The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

<sup>5)</sup> Diamond drilling not permitted.

<sup>6)</sup> Maximum allowable torque for installation with any tangential impact screw driver.

<sup>7)</sup> For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

<sup>8)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>9)</sup> The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## LOADS

### Concrete screw ULTRACUT FBS II 6 zinc plated

Highest permissible loads for a single anchor<sup>1)</sup> for multiple use for non-structural applications in cracked concrete C20/25 to C50/60.

Type	Material fixing element	Screw-in depth	Min. member thickness	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{nom}$ [mm]	$h_{min}$ [mm]	$T_{inst, max}$ [Nm]	$N_{perm 3)}$ [kN]	$V_{perm 3)}$ [kN]	Max. tension load $c$ [mm]	Max. shear load $c$ [mm]	$s$ [mm]	$s_{min 2)}$ [mm]	$c_{min 2)}$ [mm]
<b>FBS II 6</b>	gvz	25	80	$\leq 5$	0.7	1.8	35	50	60	35	35
<b>FBS II 6</b>	gvz	30	80	$\leq 5$	1.2	2.3	35	55	70	35	35
<b>FBS II 6</b>	gvz	35	80	$\leq 5$	1.7	4.3	35	100	100	35	35
<b>FBS II 6</b>	gvz	40	80	$\leq 10$	2.4	4.3	35	105	110	35	35
<b>FBS II 6</b>	gvz	45	90	$\leq 10$	2.9	4.3	40	110	115	35	35
<b>FBS II 6</b>	gvz	50	90	$\leq 10$	3.6	4.3	50	115	120	35	35
<b>FBS II 6</b>	gvz	55	100	$\leq 10$	4.0	6.3	50	145	135	35	35

For the design the complete assessment ETA-18/0242, issued 30.10.2018 has to be considered.

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1,5 \times h_{ef}$ . Accurate data see assessment.

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

## LOADS

### Concrete screw ULTRACUT FBS II 6 zinc plated

Highest permissible loads for a single anchor<sup>1)</sup> for multiple use for non-structural applications in non-cracked concrete C20/25 to C50/60.

Type	Material fixing element	Screw-in depth $h_{nom}$ [mm]	Min. member thickness $h_{min}$ [mm]	Installation torque $T_{inst, max}$ [Nm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Required edge distance (with one edge) for		Required spacing for $s$ [mm]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
							Max. tension load $c$ [mm]	Max. shear load $c$ [mm]			
<b>FBS II 6</b>	<b>gvz</b>	25	80	≤ 5	1.4	2.3	35	45	60	35	35
<b>FBS II 6</b>	<b>gvz</b>	30	80	≤ 5	2.4	2.3	35	45	70	35	35
<b>FBS II 6</b>	<b>gvz</b>	35	80	≤ 5	3.1	4.3	40	70	100	35	35
<b>FBS II 6</b>	<b>gvz</b>	40	80	≤ 10	3.8	4.3	55	70	110	35	35
<b>FBS II 6</b>	<b>gvz</b>	45	90	≤ 10	4.8	4.3	65	75	115	35	35
<b>FBS II 6</b>	<b>gvz</b>	50	90	≤ 10	5.7	4.3	75	75	120	35	35
<b>FBS II 6</b>	<b>gvz</b>	55	100	≤ 10	6.4	6.3	80	100	135	35	35

For the design the complete assessment ETA-18/0242, issued 30.10.2018 has to be considered.

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1.5 \times h_{ef}$ . Accurate data see assessment.

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

## LOADS

### Concrete screw ULTRACUT FBS II 6 zinc plated

Highest permissible loads<sup>1)</sup> for a single anchor for multiple use for non-structural applications in pre-stressed hollow core slabs<sup>4)</sup>

Type			FBS II 6						
Nominal embedment depth		$h_{nom}$	25	30	35	40	45	50	55
<b>Permissible load in the respective bottom flange thickness <math>F_{rec}^{3)}</math></b>									
≥ 25 mm		[kN]	0,23	0,47	0,47	0,47	0,47	0,47	0,47
≥ 30 mm		[kN]	1,64	1,64	1,64	1,64	1,64	1,64	1,64
≥ 35 mm		[kN]	1,64	1,88	2,11	2,35	2,58	2,82	3,05
≥ 40 mm		[kN]	1,64	2,35	2,58	2,82	3,29	3,52	3,76
≥ 50 mm		[kN]	1,64	2,58	3,29	3,76	4,46	5,16	5,63
Installation torque		$T_{inst, max}$	[Nm]	5	5	10	10	10	10
Min. spacing		$s1, s2^{2)}$	[mm]	100	100	100	100	100	100
Min. edge distance		$c1, c2^{2)}$	[mm]	100	100	100	100	100	100

For the design the complete assessment ETA-18/0242, issued 30.10.2018 has to be considered.

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered.

<sup>2)</sup> Minimum possible axial spacings resp. edge distance. For further measures see assessment.

<sup>3)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>4)</sup> Concrete strength class C30/37 up to C50/60.

## The internally threaded anchor with rim for simple hammerset installation



### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

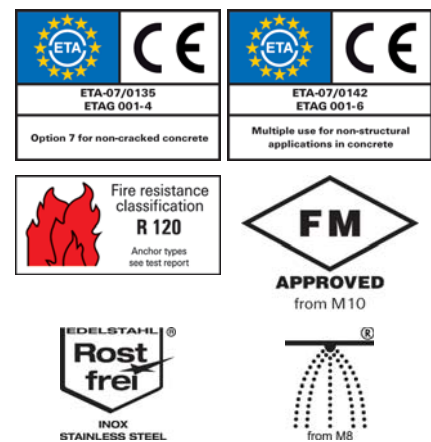
#### Approved for:

- Concrete C20/25 to C50/60, cracked, for the multiple fixings of non-load-bearing systems
- Concrete C20/25 to C50/60, non-cracked

#### Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

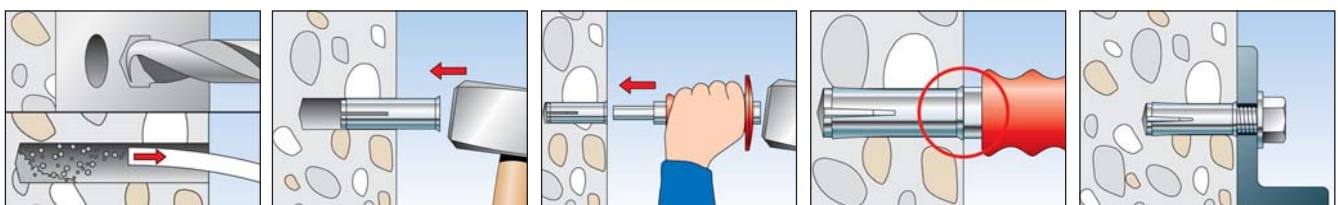
- The embossed rim prevents the anchor sleeve from slipping, thus ensuring a trouble-free hammerset installation.
- The metric internal thread means that it is possible to use standard screws or threaded rods for the ideal adaptation to suit the intended use.
- The EMS machine setting tool allows for effortless installation, particularly in the case of series installations.
- The embossing that is applied when expanding with the EHS Plus setting tool offers a simple control of the anchoring and provides increased safety.
- Fixing point at  $h_{ef}$  25 mm prevents anchor of falling out of the drill hole before being expanded.
- The black fixing point prevents the anchor from falling out of the drill hole during overhead installation.

### APPLICATIONS

- Pipelines and ventilation ducts
- Sprinkler systems
- Cable conduits and wires
- Gratings
- Steel constructions
- Machines
- Consoles
- Shuttering props
- Diamond or core drilling devices (EA II M12 D)

### FUNCTIONING

- The EA II is suitable for pre-positioned installation.
- Position the hammerset anchor in the drill hole and drive in flush to the surface of the anchor base using the hammer.
- The sleeve is then expanded by driving in the internal bolt with the EHS Plus setting tool (alternative: EMS machine setting tool), and expanded against the drill hole wall.
- The setting tools must sit on the rim of the anchor to ensure correct expansion.
- Use the special EA II M12 x 50 D / EA M 12 x 50 N D with thicker sleeve for fixing diamond and core drilling devices.



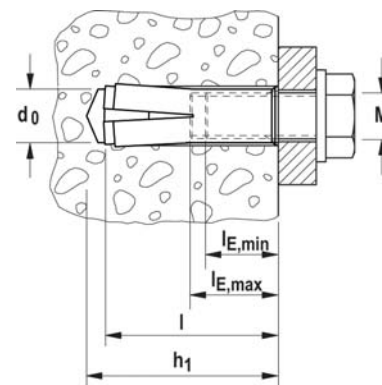
## TECHNICAL DATA



Hammerset anchor **EA II**, with reduced anchorage depth  $h_{ef}$  25 mm.



Hammerset anchor **EA II**. Not suitable for diamond drilling appliances and diamond saws.



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for pre-positioned installation	Anchor length	Internal thread	Min. bolt penetration	Max. bolt penetration	Sales unit
	Art.-No.	Art.-No.	ETA	$d_0$ [mm]	$h_1$ [mm]	$l$ [mm]	M	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[pcs]
Item	gvz	A4								
EA II M 6 x 25	532230	—	■	8	27	25	M 6	6	14	100
EA II M 6 x 30	048264	048410	■	8	32	30	M 6	6	14	100
EA II M 8 x 25	532231	—	■	10	27	25	M 8	8	14	100
EA II M 8 x 30	048284	048411	■	10	33	30	M 8	8	14	100
EA II M 8 x 40	048323	048412	■	10	43	40	M 8	8	14	50
EA II M 10 x 25	532232	—	■	12	27	25	M 10	10	14	50
EA II M 10 x 30	048332	—	■	12	33	30	M 10	10	14	50
EA II M 10 x 40	048339	048414	■	12	43	40	M 10	10	17	50
EA II M 12 x 25	532233	—	■	15	27	25	M 12	12	14	25
EA II M 12 x 50	048406	048415	■	15	54	50	M 12	12	22	25
EA II M 16 x 65	048408	048416	■	20	70	65	M 16	16	28	20
EA II M 20 x 80	048409	048417	■	25	85	80	M 20	20	34	10

Associated setting tool for manual installation (EHS Plus), for installation with hammer drill (EMS)

## TECHNICAL DATA



Hammerset anchor  
**EA II M 12 x 50 D**. Suitable for  
diamond drilling appliances  
and diamond saws.



Hammerset anchor **EA M 12 x 50 N D**. Suitable for diamond  
drilling machines and diamond  
saws.

	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth	Anchor length	Internal thread	Min. bolt penetration	Max. bolt penetration	Sales unit
	Art.-No.	ETA	$d_0$ [mm]	$h_1$ [mm]	$l$ [mm]	M	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[pcs]
Item	gvz								
EA II M 12 x 50 D	048407	■	16	54	50	M 12	12	22	25
EA M 12 x 50 N D	500872	—	16	54	50	M 12	12	22	50

Associated setting tool for manual installation (EHS Plus), for installation with hammer drill (EMS)

## ACCESSORIES



Stop drill **EBB**

Item	Art.-No.	Tool holder	Drill hole diameter	Drill hole depth	Match	Sales unit
			[mm]	[mm]		[pcs]
EBB 8 x 25	532607	SDS plus	8	27	EA II M 6 x 25	1
EBB 10 x 25	532608	SDS plus	10	27	EA II M 8 x 25	1
EBB 12 x 25	532609	SDS plus	12	27	EA II M 10 x 25	1
EBB 15 x 25	532610	SDS plus	15	27	EA II M 12 x 25	1

## ACCESSORIES



Machine setting tool **EMS**

Item	Art.-No.	Tool holder	Match	Sales unit [pcs]
<b>EMS M 6 x 25/30</b>	<b>048065</b>	SDS plus	EA II M 6 x 25, EA II M 6 x 30	1
<b>EMS M 8 x 25/30</b>	<b>048066</b>	SDS plus	EA II M 8 x 25, EA II M 8 x 30	1
<b>EMS M 8 x 40</b>	<b>048067</b>	SDS plus	EA II M 8 x 40	1
<b>EMS M 10 x 25/30</b>	<b>048068</b> <sup>1)</sup>	SDS plus	EA II M 10 x 25, EA II M 10 x 30	1
<b>EMS M 10 x 40</b>	<b>048070</b>	SDS plus	EA II M 10 x 40	1
<b>EMS M 12 x 50</b>	<b>048071</b>	SDS plus	EA II M 12 x 50 D, EA II M 12 x 50, EA M 12 x 50 N D	1
<b>EMS M 16 x 65</b>	<b>048072</b> <sup>1)</sup>	SDS max	EA II M 16 x 65	1
<b>EMS M 20 x 80</b>	<b>048073</b> <sup>1)</sup>	SDS max	EA II M 20 x 80	1

<sup>1)</sup> Delivery time on request.

## ACCESSORIES



Setting tool **EHS Plus** with hand impact protection for your safety and embossing tool.



Setting tool **EA-ST**

Item	Art.-No.	Match	Sales unit [pcs]
<b>EHS M 6 x 25/30 Plus</b>	<b>044630</b>	EA II M 6 x 25, EA II M 6 x 30	1
<b>EHS M 8 x 25/30 Plus</b>	<b>044631</b>	EA II M 8 x 25, EA II M 8 x 30	1
<b>EHS M 8 x 40 Plus</b>	<b>044632</b>	EA II M 8 x 40	1
<b>EHS M 10 x 25/30 Plus</b>	<b>048487</b>	EA II M 10 x 25, EA II M 10 x 30	1
<b>EHS M 12 x 25 Plus</b>	<b>532568</b>	EA II M 12 x 25	1
<b>EHS M 10 x 40 Plus</b>	<b>044633</b>	EA II M 10 x 40	1
<b>EHS M 12 x 50 Plus</b>	<b>044634</b>	EA II M 12 x 50, EA II M 12 x 50 D	1
<b>EHS M 16 x 65 Plus</b>	<b>044635</b>	EA II M 16 x 65	1
<b>EHS M 20 x 80 Plus</b>	<b>044636</b>	EA II M 20 x 80	1
<b>EA-ST 12</b>	<b>504585</b>	EA M 12 x 50 N D	1

## LOADS

### Hammerset anchor EA II

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness	Effective anchorage depth	Maximum installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{max}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]			Max. Load s [mm]	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]
EA II M6 x 30 <sup>8)</sup>	5.8	80	30	4	3,9	2,9	150	150	90	70	150
	8.8					3,9					
	A4-70					3,2					
EA II M8 x 30 <sup>8)</sup>	5.8	80	30	8	3,9	4,9	150	150	90	110	150
	8.8					5,6					
	A4-70										
EA II M8 x 40	5.8	80	40	8	6,1	4,9	150	150	120	200	150
	8.8					5,6					
	A4-70										
EA II M10 x 40	5.8	100	40	15	6,1	6,2	180	180	120	150	180
	8.8					7,1					
	A4-70										
EA II M12	5.8	100	50	35	8,5	11,3	200	200	150	200	200
	8.8					12,9					
	A4-70										
EA II M16	5.8	160	65	60	12,6	18,3	240	240	195	180	240
	8.8					21,1					
	A4-70										
EA II M20	5.8	200	80	120	17,2	29,1	280	285	240	190	280
	8.8					33,7		340			
	A4-70										

For the design the complete assessment ETA-07/0135 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0135 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0135.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0135.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0135.

<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-07/0135, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>8)</sup> Only approved for statically indeterminate systems.



## LOADS

### Hammerset anchor EA II galvanised / corrosion resistant steel A4

Highest permissible loads for a single anchor<sup>1)6)</sup> for multiple use for non-structural applications in cracked and non-cracked concrete C20/25 up to C50/60<sup>5)</sup>.

Type	Effective anchorage depth  $h_{ef}$ [mm]	Min. member thickness  $h_{min}^{4)}$ [mm]	Maximum torque moment  $T_{inst,max}$ [Nm]	Permissible load  $F_{perm}^{3)}$ [kN]	Required spacing for  Max. Load s [mm]	Min. spacing  $s_{min}^{2)}$ [mm]	Min. edge distance  $c_{min}^{2)}$ [mm]
EA II M6 x 25	25	80	4,0	1,0	75	30	60
EA II M6 x 30	30	80	4,0	1,2	90	65	115
EA II M8 x 25	25	80	8,0	1,4	75	50	100
EA II M8 x 30	30	80	8,0	2,0	90	70	115
EA II M8 x 40	40	80	8,0	2,0	120	70	115
EA II M10 x 25	25	80	15,0	1,9	75	60	100
EA II M10 x 30	30	80	15,0	2,0	90	85	140
EA II M10 x 40	40	80	15,0	3,0	200	95	150
EA II M12 x 25	25	80	35,0	1,9	75	100	110
EA II M12 x 50	50	100	35,0	4,3	300	145	200

For the design the complete approval ETA-07/0142 has to be considered.

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum possible axial spacings resp. edge distances while increasing the member thickness. The combination of minimum axial spacing and minimum edge distance with the minimum member thickness is not possible. Exact data see approval.

<sup>3)</sup> Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads as well as bending moments see approval.

<sup>4)</sup> Minimum possible member thickness while increasing the axial spacings and edge distances. The combination of minimum axial spacing and minimum edge distance with the minimum member thickness is not possible. Exact data see approval.

<sup>5)</sup> Further data for concrete C12/15 see approval.

<sup>6)</sup> Screw property class 4.6 and A4-50.

## LOADS

### Hammerset anchor EA II (screw property class 4.6 and A4-50)

Highest permissible loads<sup>1)</sup> for a single anchor for multiple use for non-structural applications in pre-stressed hollow core slabs<sup>4)</sup>

Type	Bottom flange thickness  [mm]	Effective anchorage depth  $h_{ef}$ [mm]	Maximum torque moment  $T_{inst,max}$ [Nm]	Permissible load  $F_{perm}^{3)}$ [kN]	Min. spacing  $s_{min}^{2)}$ [mm]	Min. edge distance  $c_{min}^{2)}$ [mm]
EA II M6 x 25	$\geq 35^{5)}$	25	4,0	1,0	200	150
EA II M8 x 25			8,0	1,4		
EA II M10 x 25			15,0	1,9		
EA II M12 x 25			35,0	1,9		

For the design the complete approval ETA-07/0142 has to be considered.

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum possible axial spacings resp. edge distance. For further measures see approval.

<sup>3)</sup> Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads as well as bending moments see approval.

<sup>4)</sup> Concrete strength class C30/37 up to C50/60.

<sup>5)</sup> The anchor may be used in a flange thickness  $d_f = 30$  mm with the same characteristic resistance, but the drill hole must not cut a cavity.

## The cost-efficient hammerset anchor for an easy installation



Pipelines



Height adjustable pipe installation

### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

- Concrete C12/15 to C50/60, non-cracked

### ADVANTAGES

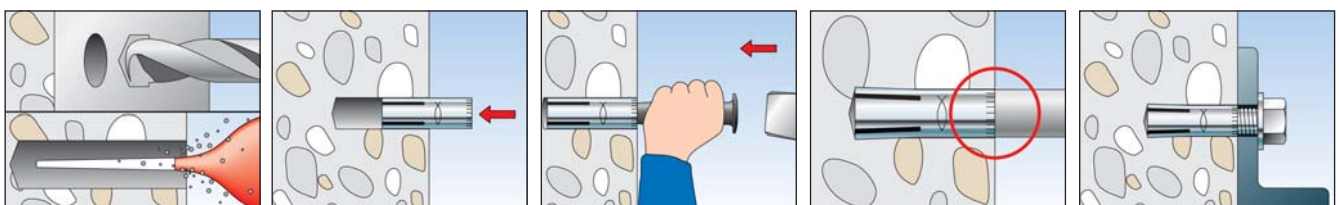
- The hammerset anchor with internal thread is suitable for pre-positioned installation.
- The EA-N fits for all standard screws with metric/inch – thread.
- The available internal thread diameter from 6 mm to 20 mm provides flexibility in the application.

### APPLICATIONS

- Pipeline routes
- Cable trays
- Consoles

### FUNCTIONING

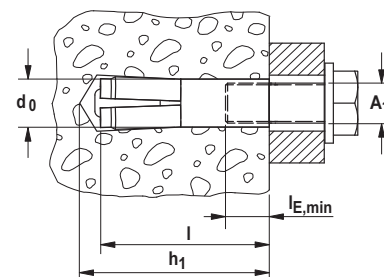
- Put the hammerset anchor in the drill hole and get it flush to the surface by hammering in.
- With the hammerset tool EA-ST the capsule will spread due to hammering in the internal bolt and tensed up against the drill hole wall.
- The hammerset tools must be set up on the edge of the anchor for a correct expansion.



## TECHNICAL DATA



Hammerset anchor **EA-N Metric**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for pre-positioned installation $h_1$ [mm]	Anchor length $l$ [mm]	Internal thread $A_1$	Min. bolt penetration $l_{E,min}$ [mm]	Sales unit [pcs]
EA M 6 x 25 N gvz	090159	8	25	25	M 6	6	100
EA M 8 x 30 N gvz	090160	10	30	30	M 8	8	100
EA M 10x40 N gvz	090161	12	40	40	M 10	10	50
EA M 12 x 50 N gvz	090162	15	50	50	M 12	12	50
EA M 16 x 65 N gvz	090163	20	65	65	M 16	16	25
EA M 20 x 80 N gvz	090164	25	80	80	M 20	20	25
EA M 12 x 50 N D gvz	500872	16	50	50	M 12	12	50



Hammerset anchor **EA-N Inch-metric**

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for pre-positioned installation $h_1$ [mm]	Anchor length $l$ [mm]	Internal thread $A_1$	Min. bolt penetration $l_{E,min}$ [mm]	Sales unit [pcs]
EA IM 1/4 x 25 N gvz	048103	8	25	25	1/4"	6	100
EA IM 5/16 x 30 N gvz	048104	10	30	30	5/16"	8	100
EA IM 3/8 x 40 N gvz	048105	12	40	40	3/8"	10	50
EA IM 1/2 x 50 N gvz	048106	16	50	50	1/2"	12	50
EA IM 5/8 x 65 N gvz	048107	20	65	65	5/8"	16	25
EA IM 3/4 x 80 N gvz	048108	25	80	70	3/4"	20	25



Hammerset anchor **EA-N Inch**

Item	Art.-No.	Drill diameter $d_0$ [Inch]	Min. drill hole depth for pre-positioned installation $h_1$ [Inch]	Total length $l$ [Inch]	Internal thread $A_1$ [Inch]	Min. bolt penetration $l_{E,min}$ [Inch]	Sales unit [pcs]
EA I 1/4 x 1" N gvz	049185	3/8	1	1	1/4	1/4	100
EA I 5/16 x 1 3/16" N gvz	049194	3/8	1 1/4	1 1/4	5/16	5/16	100
EA I 3/8 x 1 9/16" N gvz	049195	1/2	1 9/16	1 5/8	3/8	3/8	50
EA I 1/2 x 2" N gvz	049197	5/8	2	2	1/2	1/2	50
EA I 5/8 x 2 1/2" N gvz	049198	3/4	2 3/8	2 1/2	5/8	5/8	20

## ACCESSORIES



Setting tool **EA-ST**

Item		Match	Sales unit [pcs]
<b>EA-ST 6</b>	<b>504573</b>	EA N M6	1
<b>EA-ST 8</b>	<b>504576</b>	EA N M8	1
<b>EA-ST 10</b>	<b>504584</b>	EA N M10	1
<b>EA-ST 12</b>	<b>504585</b>	EA N M12	1
<b>EA-ST 16</b>	<b>504586</b>	EA N M16	1
<b>EA-ST 20</b>	<b>504587</b>	EA N M20	1

## LOADS

### Hammerset anchor EA-N

zinc plated steel

Recommended loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 <sup>1)</sup>						Minimum spacings while reducing the load	
Type	Screw material	Min. member thickness $h_{min}$ [mm]	Effective anchorage depth $h_{ef}$ [mm]	Maximum torque moment $T_{max}$ [Nm]	Recommended Tensile load $N_{rec}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
<b>EA M6x25 N<sup>3)</sup></b>	≥ 4.6	100	25	4	2,0	65	115
<b>EA M8x30 N<sup>3)</sup></b>	≥ 4.6	100	30	8	2,5	95	140
<b>EA M10x40 N</b>	≥ 4.6	100	40	15	4,5	150	180
<b>EA M12x50 N</b>	≥ 4.6	120	50	35	6,0	145	200
<b>EA M12x50 N D</b>	≥ 4.6	120	50	35	6,0	145	200
<b>EA M16x65 N</b>	≥ 4.6	160	65	60	11,5	180	240
<b>EA M20x80 N</b>	≥ 4.6	200	80	120	16,0	190	280

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the recommended load.

<sup>3)</sup> Only suitable for statically indeterminate systems.

## LOADS

### Hammerset anchor EA-N Inch Metric

zinc plated steel

Recommended loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 <sup>1)</sup>						Minimum spacings while reducing the load	
Type	Screw material	Min. member thickness $h_{min}$ [mm]	Effective anchorage depth $h_{ef}$ [mm]	Maximum torque moment $T_{max}$ [Nm]	Recommended Tensile load $N_{rec}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
<b>EA IM 1/4x25 N<sup>3)</sup></b>	≥ 4.6	100	25	4	3,0	65	115
<b>EA IM 5/16x30 N<sup>3)</sup></b>	≥ 4.6	100	30	8	4,0	95	140
<b>EA IM 3/8x40 N</b>	≥ 4.6	100	40	15	6,0	150	180
<b>EA IM 1/2x50 N</b>	≥ 4.6	120	50	35	7,0	145	200
<b>EA IM 5/8x65 N</b>	≥ 4.6	160	65	60	12,0	180	240
<b>EA IM 3/4x80 N</b>	≥ 4.6	200	80	120	18,0	190	280

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the recommended load.

<sup>3)</sup> Only suitable for statically indeterminate systems.

## LOADS

### Hammerset anchor EA-N Inch

zinc plated steel

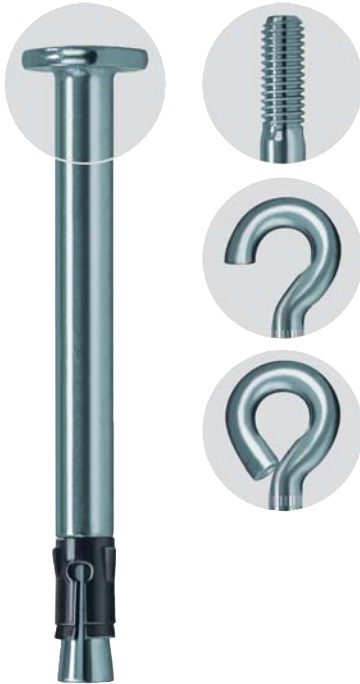
Recommended loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength 3500 psi <sup>1)</sup>						Minimum spacings while reducing the load	
Type	Screw material	Min. member thickness $h_{min}$ [in.]	Effective anchorage depth $h_{ef}$ [in.]	Maximum torque moment $T_{max}$ [ft-lb]	Recommended Tensile load $N_{rec}$ [lb]	Min. spacing $s_{min}^{2)}$ [in.]	Min. edge distance $c_{min}^{2)}$ [in.]
<b>EA I 1/4x1 N<sup>3)</sup></b>	≥ ISO 898-1 Klasse 4.6	4	1	3	560	2 9/16	4 1/2
<b>EA I 5/16x1 3/16 N<sup>3)</sup></b>	≥ ISO 898-1 Klasse 4.6	4	1 3/16	6	900	3 3/4	5 1/2
<b>EA I 3/8x1 9/16 N</b>	≥ ISO 898-1 Klasse 4.6	4	1 9/16	11	1120	5 5/16	7 1/8
<b>EA I 1/2x2 N</b>	≥ ISO 898-1 Klasse 4.6	4 3/4	2	26	1240	5 11/16	7 7/8
<b>EA I 5/8x2 1/2 N</b>	≥ ISO 898-1 Klasse 4.6	6 3/8	2 1/2	44	2020	7 1/8	9 1/2

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the recommended load.

<sup>3)</sup> Only suitable for statically indeterminate systems.

## The installation-friendly hammer-set anchor for multiple fixings



### VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C 12/15 to C 50/60, cracked, for multiple fixings of non-structural applications

#### Also suitable for:

- Solid sand-lime brick
- Natural stone with dense structure
- Prestressed hollow-core concrete slabs

### CERTIFICATES



### ADVANTAGES

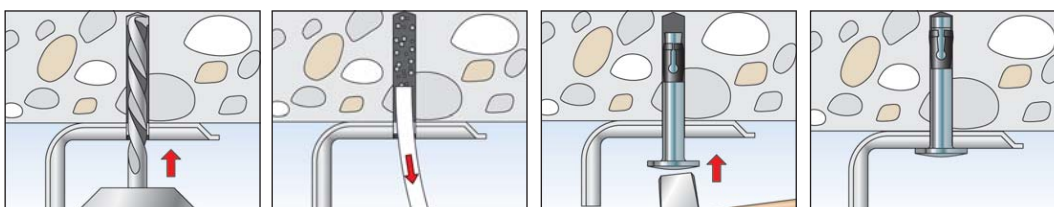
- The special active principle allows for a simple hammer-set installation and, therefore, a short processing time.
- The extremely short anchor depth prevents reinforcement hits, and creates the conditions for a trouble-free installation.
- The optimised expansion clip ensures hold when placing in the drill hole, and prevents it falling out during overhead installations.
- The massive shaft cross-section guarantees a high load-bearing capacity, thus offering an extremely high level of safety.
- A range of head shapes allows for the fixing of wide-ranging fixtures, and for the ideal adaptation to suit the intended use.

### APPLICATIONS

- Fire protection plates
- Fire protection boards
- Ventilation systems
- Wire and nonious hangers
- Mounting rails
- Metal clamps
- Substructures made of wood and metal

### FUNCTIONING

- The FNA II with nail head is suitable for push-through installation. The FNA II M6 is suitable for pre-positioned and push-through installation. The FNA II OE and H are suitable for pre-positioned installation.
- The installed FNA II nail anchor expands automatically under load. The cone is pulled into the expansion clip and expands it against the drill hole wall.
- Available setting tools:  
FNA S-SBO to slip onto the drill,  
FNA S-SDS for series installation with a drilling hammer,  
FNA S-H for the manual installation of mounting rails.

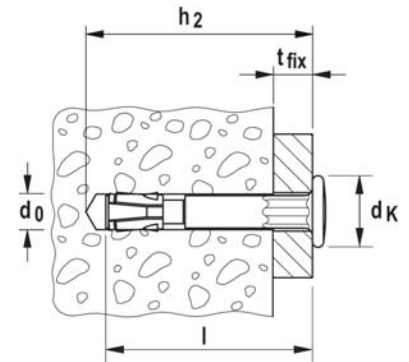




## TECHNICAL DATA



Nail anchor **FNA II** with nail head



	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Head-Ø	Sales unit	
	Art.-No.	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	d <sub>k</sub> [mm]	[pcs]	
Item	gvz	A4	C								
FNA II 6 x 25/5	044121 <sup>1)</sup>	—	—	■	6	40	35	5	13.0	100	
FNA II 6 x 30/5	044115 <sup>1)</sup>	044122	—	■	6	45	40	5	13.0	100	
FNA II 6 x 30/5	—	—	044124	■	6	45	40	5	13.0	25	
FNA II 6 x 30/30	044116	044123	—	■	6	70	65	30	13.0	50	
FNA II 6 x 30/30	—	—	044125	■	6	70	65	30	13.0	25	
FNA II 6 x 30/50	044117	046024	500569	■	6	90	85	50	13.0	50	
FNA II 6 x 30/75	044118	—	500573 <sup>2)</sup>	■	6	115	110	75	13.0	50	
FNA II 6 x 30/100	044119	—	500574 <sup>3)</sup>	■	6	140	135	100	13.0	50	
FNA II 6 x 30/120	044120	—	500575 <sup>3)</sup>	■	6	160	155	120	13.0	50	

<sup>1)</sup> with hexagon below the nail head for anti-rotation lock of hole and wire hangers (for example) and centring for optional setting tool FNA-S

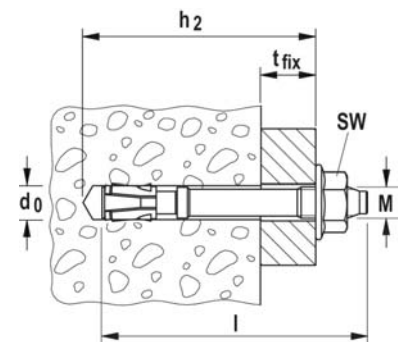
<sup>2)</sup> On request.

<sup>3)</sup> Delivery time on request.

## TECHNICAL DATA



Nail anchor **FNA II M6** with thread and flange nut

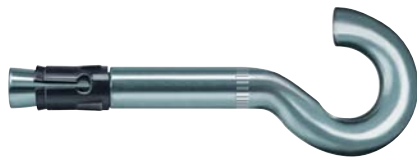


	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	M	○ SW [mm]	[pcs]
Item	gvz	A4	C								
FNA II 6 x 25 M6/5	044111	—	—	■	6	40	45	5	M 6	10	100
FNA II 6 x 30 M6/5	044109	—	—	■	6	45	50	5	M 6	10	100
FNA II 6 x 30 M6/5	—	044112 <sup>2)</sup>	—	■	6	45	50	5	M 6	10	50
FNA II 6 x 30 M6/5	—	—	044113 <sup>2)</sup>	■	6	45	50	5	M 6	10	25
FNA II 6 x 30 M6 x 41	044110 <sup>1)</sup>	—	—	■	6	40	41	—	M 6	10	100
FNA II 6 x 30 M6/10	046022	—	—	■	6	45	55	10	M 6	10	100
FNA II 6 x 30 M8/5	044114	—	—	■	6	45	51	5	M 8	13	50

<sup>1)</sup> without nut; e.g. for fixing of pipe clamps

<sup>2)</sup> with nut and washer (no flange nut)

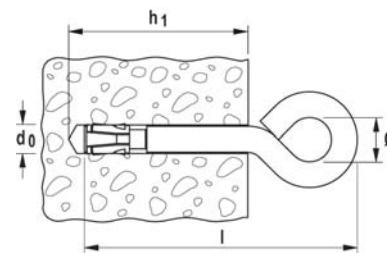
## TECHNICAL DATA



Nail anchor **FNA II-H** with hook



Nail anchor **FNA II-OE** with eye



	Zinc-plated steel	Approval	Drill hole diameter	Anchor length	Min. drill hole depth	Inner diameter of the hook/eye	Sales unit		
	Art.-No.	ETA	d <sub>0</sub> [mm]	l [mm]	h <sub>1</sub> [mm]	[Ø mm]	[pcs]		
Item	gvz								
<b>FNA II 6 x 25 H</b>	<b>044126</b>	—	6	54	35	10	50		
<b>FNA II 6 x 25 OE</b>	<b>044127</b>	■	6	54	35	10	50		

## TECHNICAL DATA



Machine setting tool **FNA S-SDS**



Machine setting tool **FNA S-SBO** for mounting on the drill bit (drill-Ø 6mm)



Hand tool **FNA S-H**

Item	Art.-No.		Sales unit [pcs]
<b>FNA S-SDS</b>	<b>061547</b>	for all FNA II with nail head	The ideal setting tool for the serial installation with SDS-plus adapter for driving in FNA II with nail head using a hammer drill. 1
<b>FNA S-SBO</b>	<b>061548</b>	for all FNA II with nail head	For a power saving and fast installation to be placed on the drill. 1
<b>FNA S-H</b>	<b>095990</b>	for FNA II with metric thread M6	E.g. for the fixing of installation of mounting rails. Chuck with outer diameter of 15mm for the installation of FNA II M6 by hand. 1

## LOADS

### Nail anchor FNA II

zinc plated steel / stainless steel / high corrosion resistant steel

Highest permissible loads <sup>1)</sup> for a single fixing point <sup>6)</sup> as part of a multiple fixing of non-structural systems <sup>4)</sup> in concrete C20/25 up to C50/60 <sup>3)</sup> .								Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth	Minimum member thickness	Maximum torque moment	Permissible load	Required edge distance for	Required spacing for	Min. spacing	Min. edge distance
		$h_{ef}$ [mm]	$h_{min}$ [mm]	$T_{inst}$ [Nm]	$F_{perm}^{2)}$ [kN]	Max. Load c [mm]	Max. Load s [mm]	$s_{min}^{5)}$ [mm]	$c_{min}^{5)}$ [mm]
FNA II 6 x 25	gvz	25	80	-	1,4	100 for s ≥ 200	100 for c ≥ 200	40	40
FNA II 6 x 30	gvz	30		-	2,4				
	A 4								
	C								
FNA II 6 x 25 M6	gvz	25		4	1,4				
FNA II 6 x 30 M6	gvz	30		4	2,4				
	A 4								
	C								
FNA II 6 x 30 M8	gvz	30	4	2,4					
FNA II 6 x 25 OE	qvz	25	-	0,7					

For the design the complete approval ETA - 06/0175 has to be considered.

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.

<sup>3)</sup> For concrete compressive strength C12/15 see approval.

<sup>4)</sup> Multiple use is defined acc ETAG 001 Part 6 with min. 3 fixing points with min. one anchor per fixing point and a permissible load of 1.4 kN or min. 4 fixing points with min. one anchor an a permissible load of 2.1 kN.

<sup>5)</sup> Minimum possible axial spacings resp. edge distances. Smaller permissible loads acc. approval are required.

<sup>6)</sup> A fixing point is defined as a single anchor or a group of 2 or 4 anchor.

## The easy-to-assemble fixing solution for removable fire protection panel



Fire protection boards



Fire protection boards

### VERSIONS

- Stainless steel
- Highly corrosion-resistant steel

### BUILDING MATERIALS

- Concrete C12/15 to C50/60, cracked and non-cracked, for multiple fixings of non-structural applications

### CERTIFICATES



### ADVANTAGES

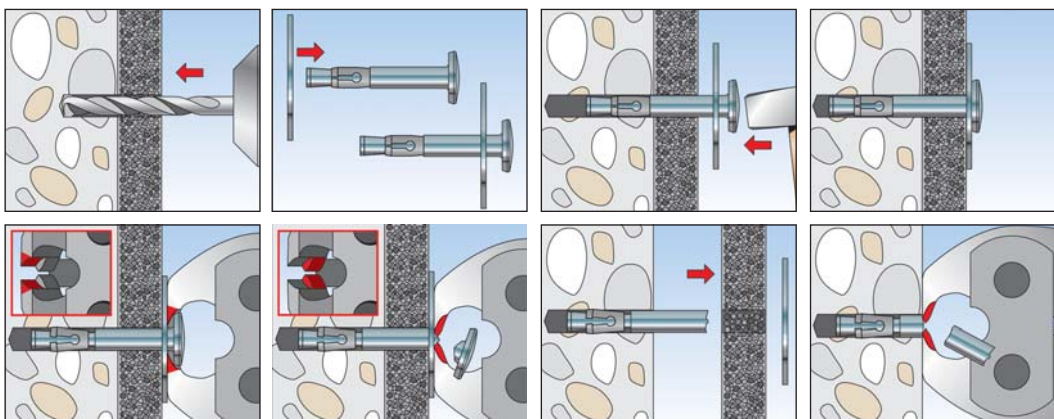
- Easy removal of fire protection panel without damage.
- Reusability of removed fire protection panel.
- Secure fixing, particularly when exposed to vibration, wind and pushing/pulling effects.
- Easy-to-assemble solution.
- Low anchoring depth (30 mm).
- Convenient assembly without torque-controlled setting tool.
- Approved system which has proven itself one million times over.
- Large range of anchor lengths possible.

### APPLICATIONS

- Fixing of fire protection panel in tunnel construction.
- For fixing of one and more layers of fire protection panel of all manufacturers e.g. Aestuver and Promat.

### FUNCTIONING

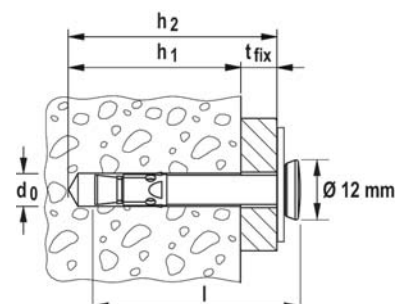
- Nail anchor with low anchoring depth.
- The washer increases the pull through forces significantly and provides the damage of the panel during dismantling.
- Mounting: Drill, hammer in, and you're done!
- Easy pinching off of nail head thanks to special 2-stage pliers.
- For a fast assembly process, we recommend the fischer compressed air setting device (item no. 093731).



## TECHNICAL DATA



Nail anchor **FNA II RB**



	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. drill hole depth for pre-positioned installation	Anchorage depth	Anchor length	Max. usable length	Sales unit
	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	h <sub>1</sub> [mm]	h <sub>ef</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	[pcs]
Item	A4								
<b>FNA II 6 x30/30 RB</b>	<b>530674</b> <sup>1)</sup>	■	6	66	36	30	68	30	50
<b>FNA II 6 x30/30 RB</b>	<b>530798</b> <sup>1)</sup>	■	6	66	36	30	68	30	200

<sup>1)</sup> delivery on request

## TECHNICAL DATA



Washer 30/1,5/7,5

	Stainless steel	Highly corrosion resistant steel	Internal diameter	External-Ø	Thickness	Sales unit
	A4	C	D [mm]	d [mm]	S [mm]	[pcs]
<b>Washer 30/1,5/7,5</b>	<b>531161</b>	<b>531162</b>	7,5	30	1.5	100

## ACCESSORIES



**FNA RB Z** - 2-stage plier

Item	Art.-No.	Adapted for	Sales unit
			[pcs]
<b>FNA RB Z</b>	<b>531142</b>	Plier for removal of FNA II RB	1

## ACCESSORIES



Air compressed setting tool

Item	Art.-No.	Match	Required for	Sales unit [pcs]
<b>Air compressed setting tool</b>	<b>093731</b>	for FNA II + FNA II RB	-	1
<b>Drop in element</b>	<b>093729</b>	-	Air compressed setting tool Art No. 93731	1
<b>Stop ring</b>	<b>093730</b>	-	Air compressed setting tool Art No. 93731	1
<b>Fitting</b>	<b>093732</b>	-	Air compressed setting tool Art No. 93731	1

## LOADS

### Nail anchor FNA II RB

stainless steel / high corrosion resistant steel

Highest permissible loads <sup>1)</sup> for a single fixing point <sup>6)</sup> as part of a multiple fixing of non-structural systems <sup>4)</sup> in concrete C20/25 up to C50/60 <sup>3)</sup> .								Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth  $h_{ef}$ [mm]	Minimum member thickness  $h_{min}$ [mm]	Maximum torque moment  $T_{inst}$ [Nm]	Permissible load  $F_{perm}$ <sup>2)</sup> [kN]	Required edge distance for  Max. Load c [mm]	Required spacing for  Max. Load s [mm]	Min. spacing  $s_{min}$ <sup>5)</sup> [mm]	Min. edge distance  $c_{min}$ <sup>5)</sup> [mm]
<b>FNA II 6 x 30 RB</b>	A4	30	80	-	2,4	100 for $s \geq 200$	100 for $c \geq 200$	40	40
	C								

For the design the complete approval ETA - 06/0175 has to be considered.

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.

<sup>3)</sup> For concrete compressive strength C12/15 see approval.

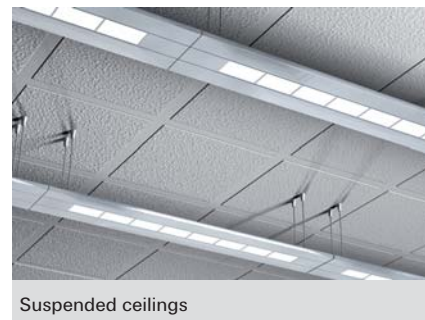
<sup>4)</sup> Multiple use is defined acc ETAG 001 Part 6 with min. 3 fixing points with min. one anchor per fixing point and a permissible load of 1.4 kN or min. 4 fixing points with min. one anchor an a permissible load of 2.1 kN.

<sup>5)</sup> Minimum possible axial spacings resp. edge distances. Smaller permissible loads acc. approval are required.

<sup>6)</sup> A fixing point is defined as a single anchor or a group of 2 or 4 anchor.



## The installation-friendly push-through anchor for multiple fixings



### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked, for the multiple fixings of non-load-bearing systems

#### Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

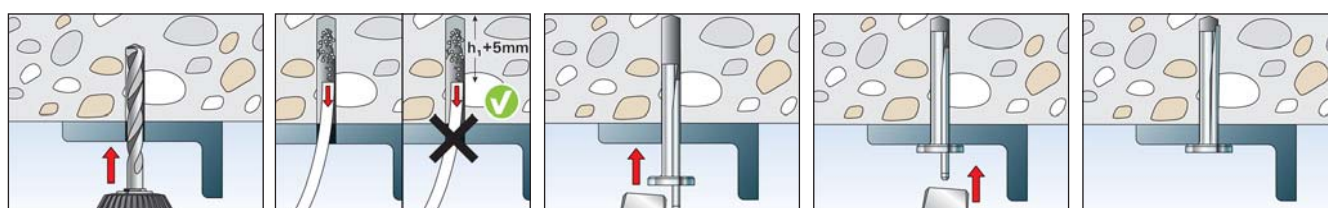
- The simple active principle allows for cost-efficient hammer-set installation.
- The new short version FDN II K with reduced anchorage depth is faster to install and reduces reinforcement hits.
- The flush-sunk expansion nail signifies the complete expansion of the anchor, and thereby ensures minimum movement when under load.
- The fischer FDN II can be installed without cleaning of the drill hole.
- The head embossing offers a simple control of the anchoring, and thus saves time.

### APPLICATIONS

- Wire and Nonius hangers
- Ventilation systems
- Slats
- Metal profiles
- Perforated tapes
- Sub-structures made of metal

### FUNCTIONING

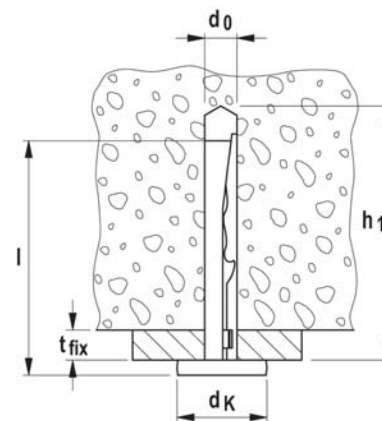
- The FDN II is suitable for push-through installation.
- The FDN II ceiling nail is driven into the drill hole with a hammer until it is firmly in position. Do not hit the expansion wedge at this stage.
- Then, drive the expansion wedge in flush to the nail head. This causes the FDN II to expand against the drill hole wall.



## TECHNICAL DATA



Ceiling nail **FDN II**



		Approval	Drill diameter	Anchor length	Max. usable length	Min. drill hole depth without cleaning	Min. drill hole depth with cleaning	Head-Ø	Sales unit
	Art.-No.	ETA	d <sub>0</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	h <sub>1</sub> [mm]	h <sub>1</sub> [mm]	d <sub>K</sub> [mm]	[pcs]
<b>FDN II 6/5</b>	<b>545636</b>	■	6	40	5	47	42	15	100
<b>FDN II 6/35</b>	<b>545637</b>	■	6	70	35	77	72	15	100
<b>FDN II 6/5 K</b>	<b>545638</b>	■	6	33	5	40	35	15	100
<b>FDN II 6/35 K</b>	<b>545639</b>	■	6	64	35	70	65	15	100

## LOADS

### Ceiling nail FDN II

zinc-plated steel

Permissible loads <sup>1)</sup> for a single fixing point <sup>5)</sup> as part of a multiple fixing <sup>4)</sup> in cracked and non-cracked normal concrete of strength classes C20/25 up to C50/60 <sup>3)</sup>							
Type	Effective anchorage depth	Min. member thickness	Permissible load	Required edge distance for maximum load	Required spacing for maximum load	Min. spacing	Min. edge distance
	h <sub>ef</sub> [mm]	h <sub>min</sub> [mm]	F <sub>perm</sub> <sup>2)</sup> [kN]	c [mm]	s [mm]	s <sub>min</sub> [mm]	c <sub>min</sub> [mm]
<b>FDN II 6/5 K</b>	25	80	1,2	70	60	60	70
<b>FDN II 6/35 K</b>	25	80	1,2	70	60	60	70
<b>FDN II 6/5</b>	32	80	1,7	60	50	50	60
<b>FDN II 6/35</b>	32	80	1,7	60	50	50	60

For the design the complete European Technical Assessment ETA-17/0736 has to be considered.

<sup>1)</sup> The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle. For shear load with lever arm (bending) see assessment.

<sup>3)</sup> For concrete strength class C12/15 see assessment.

<sup>4)</sup> A multiple fixing in accordance with ETAG 001 Part 6 is defined by at least 3 fixing points with at least one anchor each and a permissible load per fixing point of 1,4 kN or by at least 4 fixing points with at least one anchor each and a permissible load per fixing point of 2,1 kN.

<sup>5)</sup> A fixing point is defined as a single anchor or a group of 2 or 4 anchors.

## The cost-efficient push-through anchor for multiple fixings



Drywall profiles



Suspended ceilings with Nonius hangers

### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, cracked, for the multiple fixings of non-load-bearing systems

#### Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

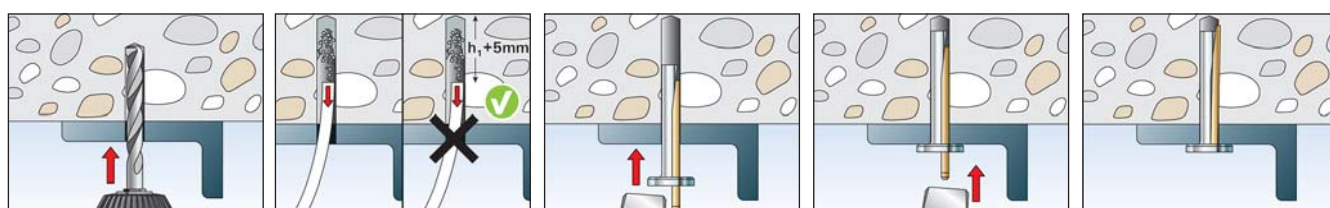
- The simple active principle allows for fast hammer-set installation.
- The efficient anchor offers the perfect price-performance ratio for an economical installation.
- The flush-sunk expansion nail signifies the complete expansion of the anchor, and thereby ensures minimum movement when under load.
- The head embossing offers a simple control of the anchoring, and thus saves time.

### APPLICATIONS

- Drywall profiles
- Wire and Nonius hangers
- Ventilation systems
- Slats
- Metal profiles
- Perforated tapes
- Sub-structures made of metal

### FUNCTIONING

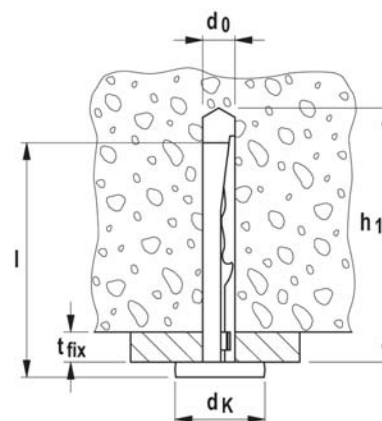
- The FDZ is suitable for push-through installation.
- The FDZ ceiling nail is driven into the drill hole with a hammer until it is firmly in position. Do not hit the expansion wedge at this stage.
- Then, drive the expansion wedge in flush to the nail head. This causes the FDZ to expand against the drill hole wall.



## TECHNICAL DATA



Ceiling nail **FDZ**



		Approval	Drill diameter	Anchor length	Max. usable length	Min. drill hole depth without cleaning	Min. drill hole depth with cleaning	Head-Ø	Sales unit
	Art.-No.	ETA	$d_0$ [mm]	$l$ [mm]	$t_{fix}$ [mm]	$h_1$ [mm]	$h_1$ [mm]	$d_K$ [mm]	[pcs]
<b>FDZ 6/5</b>	<b>544103</b>	■	6	40	5	47	42	15	200
<b>FDZ 6/35</b>	<b>544104</b>	■	6	70	35	77	72	15	200

## LOADS

### Ceiling nail FDZ

zinc-plated steel

Permissible loads <sup>1)</sup> for a single fixing point <sup>5)</sup> as part of a multiple fixing <sup>4)</sup> in cracked and non-cracked normal concrete of strength classes C20/25 up to C50/60 <sup>3)</sup>							
Type	Effective anchorage depth	Min. member thickness	Permissible load	Required edge distance for maximum load	Required spacing for maximum load	Min. spacing	Min. edge distance
	$h_{ef}$ [mm]	$h_{min}$ [mm]	$F_{perm}^{2)}$ [kN]	$c$ [mm]	$s$ [mm]	$s_{min}$ [mm]	$c_{min}$ [mm]
<b>FDZ 6/5</b>	32	80	1,0	60	50	50	60
<b>FDZ 6/35</b>	32	80	1,0	60	50	50	60

For the design the complete European Technical Assessment ETA-17/0737 has to be considered.

<sup>1)</sup> The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle. For shear load with lever arm (bending) see assessment.

<sup>3)</sup> For concrete strength class C12/15 see assessment.

<sup>4)</sup> A multiple fixing in accordance with ETAG 001 Part 6 is defined by at least 3 fixing points with at least one anchor each and a permissible load per fixing point of 1,4 kN or by at least 4 fixing points with at least one anchor each and a permissible load per fixing point of 2,1 kN.

<sup>5)</sup> A fixing point is defined as a single anchor or a group of 2 or 4 anchors.

## The cost-efficient fixing for flexible use in non-cracked concrete



Column bases



Stormwater overflow tank manholes

### VERSIONS

- Zinc-plated steel
- Stainless steel
- Hot-dip galvanised steel (with variable working life for outdoor areas)

### BUILDING MATERIALS

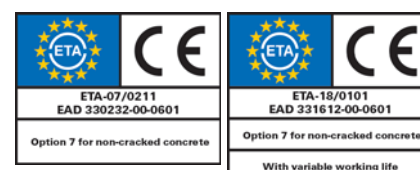
#### Approved for:

- Concrete C20/25 to C50/60, non-cracked

#### Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

- The standard anchorage depth achieves the maximum load-bearing capacities.
- The reduced anchorage depth reduces the drill hole depth. This minimises the amount of time needed for installation whilst increasing flexibility.
- Additional short version „K“ with short anchoring depth.
- The long thread balances component tolerances and allows for stand-off installations, thus increasing flexibility.
- Few hammer blows and the minimal torque slippage allow for a noticeably simpler installation.
- The drive-in pin protects the thread from damage, and thus ensures a faster installation and dismantling of the attachment.
- The larger washer included with the FBN II GS creates a larger supporting surface and, as such, allows for the fixing of wood constructions.
- When using hollow drills with suction is no drill hole cleaning required.
- New ETA assessment for hot-dip galvanised version for variable working life in outdoor areas.

### APPLICATIONS

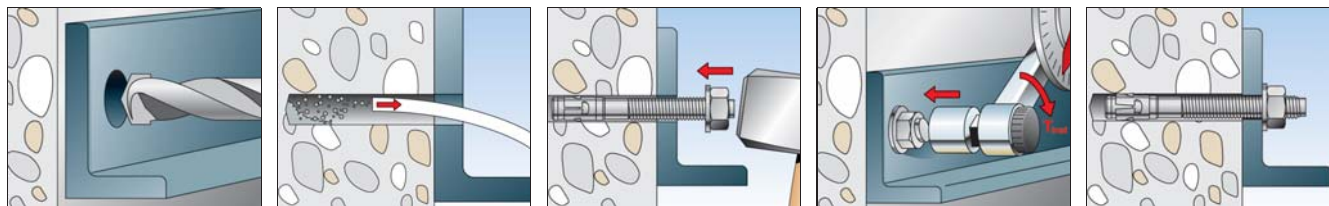
- Steel constructions
- Guard rails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades

### FUNCTIONING

- The FBN II is suitable for pre-positioned and push-through installation; also suitable for stand-off installation under certain conditions.
- Prior to installation, place the hexagon nut in the optimal position (the drive-in pin projects by approx. 3 mm out of the hexagon nut).
- When applying the torque, the cone bolt is pulled into the expansion clip and expands it against the drill hole wall.
- The head embossing offers a simple control of the anchoring.
- In the case of series installation, we recommend using the FABS bolt anchor setting tool.



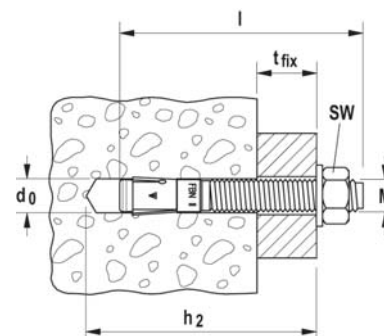
## INSTALLATION



## TECHNICAL DATA



Bolt anchor **FBN II**



	Zinc-plated steel	Stainless steel	Hot-dip galvanized steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	Ø x length [mm]	○ SW [mm]	[pcs]
Item	gvz	A4	hdg								
FBN II 6/5	505526 <sup>1)2)</sup>	—	—	■	6	45	50	5/-	M 6 x 12	10	100
FBN II 6/10	505527 <sup>1)2)</sup>	505532 <sup>1)2)</sup>	—	■	6	50	55	10/-	M 6 x 17	10	100
FBN II 6/30	505528 <sup>1)2)</sup>	505535 <sup>1)2)</sup>	—	■	6	70	75	30/-	M 6 x 35	10	100
FBN II 8/5	040662	—	—	■	8	61	66	5/15	M 8 x 34	13	50
FBN II 8/10	040664	507555	507575	■	8	66	71	10/20	M 8 x 39	13	50
FBN II 8/20	040669	—	—	■	8	76	81	20/30	M 8 x 49	13	50
FBN II 8/30	040700	507556	507576	■	8	86	91	30/40	M 8 x 59	13	50
FBN II 8/50	040771	507557	507577	■	8	106	111	50/60	M 8 x 79	13	50
FBN II 8/70	040777	—	507578	■	8	126	131	70/80	M 8 x 99	13	20
FBN II 8/100	040783	—	—	■	8	156	161	100/110	M 8 x 129	13	20
FBN II 10/10	040827	507558	507579	■	10	78	86	10/20	M 10 x 46	17	50
FBN II 10/20	040851	507559	—	■	10	88	96	20/30	M 10 x 56	17	50
FBN II 10/30	040854	—	—	■	10	98	106	30/40	M 10 x 66	17	—
FBN II 10/30	—	507560	507580	■	10	98	106	30/40	M 10 x 66	17	50
FBN II 10/50	040855	507561	507582	■	10	118	126	50/60	M 10 x 86	17	20
FBN II 10/70	040931	—	—	■	10	138	146	70/80	M 10 x 106	17	20
FBN II 10/100	040943	507562	507583	■	10	168	176	100/110	M 10 x 136	17	20
FBN II 10/140	040944	—	—	■	10	208	216	140/150	M 10 x 176	17	20
FBN II 10/160	040945	—	—	■	10	228	236	160/170	M 10 x 196	17	20
FBN II 12/10	040950	507563	507589	■	12	95	106	10/25	M 12 x 59	19	20
FBN II 12/20	044558	507564	—	■	12	105	116	20/35	M 12 x 69	19	20
FBN II 12/30	045263	507565	507591	■	12	115	126	30/45	M 12 x 79	19	20
FBN II 12/50	045264	507566	507592	■	12	135	146	50/65	M 12 x 99	19	20
FBN II 12/80	045265	—	—	■	12	165	176	80/95	M 12 x 129	19	20
FBN II 12/100	045266	507567	507596	■	12	185	196	100/115	M 12 x 149	19	20
FBN II 12/120	045267	—	—	■	12	205	216	120/135	M 12 x 169	19	20
FBN II 12/140	045268	—	—	■	12	225	236	140/155	M 12 x 189	19	20
FBN II 12/160	045269	—	—	■	12	245	256	160/175	M 12 x 189	19	20
FBN II 16/10	—	507568	—	■	16	114	130	10/25	M 16 x 74	24	10
FBN II 16/25	045564	507569	507598	■	16	129	145	25/40	M 16 x 89	24	10
FBN II 16/50	045565	507570	507553	■	16	154	170	50/65	M 16 x 105	24	10
FBN II 16/80	045566	—	—	■	16	184	200	80/95	M 16 x 144	24	10
FBN II 16/100	045567	—	507554	■	16	204	220	100/115	M 16 x 164	24	10
FBN II 16/140	045568	—	—	■	16	244	260	140/155	M 16 x 184	24	10

1) Use restricted to anchoring of structural components which are statically indeterminate.

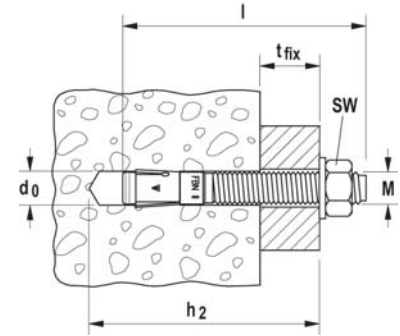
2) Nut and washer not pre-assembled/supplied loose.



## TECHNICAL DATA



Bolt anchor **FBN II**



	Zinc-plated steel	Stainless steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	Ø x length [mm]	○ SW [mm]	[pcs]
Item	gvz	A4	hdg								
<b>FBN II 16/160</b>	<b>045569</b>	—	—	■	16	264	280	160/175	M 16 x 184	24	10
<b>FBN II 16/200</b>	<b>045570</b>	—	—	■	16	304	320	200/215	M 16 x 184	24	10
<b>FBN II 20/30</b>	<b>045573</b>	<b>507571</b>	<b>508015</b>	■	20	165	187	30/55	M 20 x 90	30	10
<b>FBN II 20/60</b>	<b>045574</b>	<b>507572</b>	—	■	20	195	217	60/85	M 20 x 90	30	10
<b>FBN II 20/80</b>	<b>045575</b>	—	—	■	20	215	237	80/105	M 20 x 90	30	10
<b>FBN II 20/120</b>	<b>045576</b>	—	—	■	20	255	277	120/145	M 20 x 90	30	10

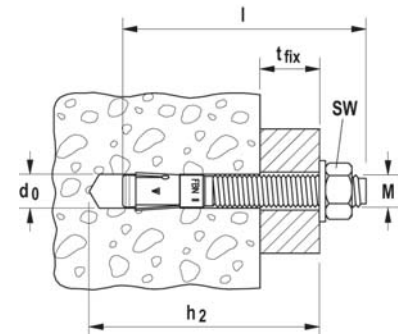
1) Use restricted to anchoring of structural components which are statically indeterminate.

2) Nut and washer not pre-assembled/supplied loose.

## TECHNICAL DATA



Bolt anchor **FBN II K**

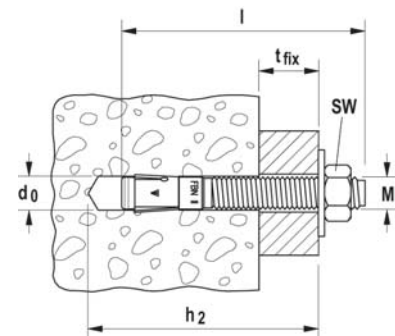


	Zinc-plated steel, short version	Stainless steel, short version	Hot-dip galvanised steel, short version	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	Ø x length [mm]	○ SW [mm]	[pcs]
Item	gvz	A4	hdg								
<b>FBN II 8/5 K</b>	<b>040806</b>	<b>508007</b>	<b>508012</b>	■	8	51	56	-/5	M 8 x 24	13	50
<b>FBN II 8/10 K</b>	<b>040807</b>	—	—	■	8	56	61	-/10	M 8 x 29	13	50
<b>FBN II 10/5 K</b>	<b>040946</b>	<b>508010</b>	<b>508013</b>	■	10	63	71	-/5	M 10 x 31	17	50
<b>FBN II 10/10 K</b>	<b>040947</b>	—	—	■	10	68	76	-/10	M 10 x 36	17	50
<b>FBN II 12/5 K</b>	<b>045272</b>	<b>508011</b>	<b>508014</b>	■	12	75	86	-/5	M 12 x 39	19	20
<b>FBN II 12/10 K</b>	<b>045273</b>	—	—	■	12	80	91	-/10	M 12 x 44	19	20
<b>FBN II 12/30 K</b>	<b>045274</b>	—	—	■	12	100	111	-/30	M 12 x 64	19	20
<b>FBN II 16/15 K</b>	<b>045571</b>	<b>508745</b>	<b>507597</b>	■	16	104	120	-/15	M 16 x 64	24	10
<b>FBN II 16/25 K</b>	<b>045572</b>	—	—	■	16	114	130	-/25	M 16 x 74	24	10
<b>FBN II 20/10 K</b>	<b>045577</b>	—	—	■	20	120	142	-/10	M 20 x 50	30	10

## TECHNICAL DATA



Bolt anchor **FBN II-GS** with large washer



	Steel, zinc-plated, with large washer	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./ hef,min.	Thread	Width across nut	Washer (outer diameter x thickness)	Sales unit
	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	Ø x length [mm]	○ SW [mm]	[mm]	[pcs]
Item	gvz									
<b>FBN II 12/80 GS</b>	<b>045578</b>	■	12	165	176	80/95	M 12 x 129	19	44 x 4	20
<b>FBN II 12/100 GS</b>	<b>045579</b>	■	12	185	196	100/115	M 12 x 149	19	44 x 4	20
<b>FBN II 12/120 GS</b>	<b>045580</b>	■	12	205	216	120/135	M 12 x 169	19	44 x 4	20
<b>FBN II 12/140 GS</b>	<b>045581</b>	■	12	225	236	140/155	M 12 x 189	19	44 x 4	10
<b>FBN II 12/160 GS</b>	<b>045583</b>	■	12	245	256	160/175	M 12 x 189	19	44 x 4	10
<b>FBN II 12/180 GS</b>	<b>045584</b>	■	12	265	276	180/195	M 12 x 189	19	44 x 4	10
<b>FBN II 12/200 GS</b>	<b>045585</b>	■	12	285	296	200/215	M 12 x 189	19	44 x 4	10
<b>FBN II 12/250 GS</b>	<b>045586</b>	■	12	335	346	250/265	M 12 x 100	19	44 x 4	10
<b>FBN II 16/100 GS</b>	<b>045588</b>	■	16	204	220	100/115	M 16 x 164	24	56 x 5	10
<b>FBN II 16/140 GS</b>	<b>045590</b>	■	16	244	260	140/155	M 16 x 184	24	56 x 5	10
<b>FBN II 16/160 GS</b>	<b>045591</b>	■	16	264	280	160/175	M 16 x 184	24	56 x 5	10
<b>FBN II 16/200 GS</b>	<b>045593</b>	■	16	304	320	200/215	M 16 x 100	24	56 x 5	10

## ACCESSORIES



fischer Anchor bolt setting tool **FABS**

Item	Art.-No.	Matching anchor type	Sales unit [pcs]
<b>FABS</b>	<b>077937</b>	FAZ II, FBN II, EXA for diameter from M6 - M12	1

## LOADS

### Bolt anchor FBN II

zinc plated steel / stainless steel / hot dip galvanised steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s [mm]	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]
FBN II 6	gvz	100	30 <sup>8)</sup>	4	2,9	3,4	100	60	90	40	40
	A4			4	2,9	3		55			
FBN II 8	gvz	100	30 <sup>8)</sup>	15	2,9	7,1	65	115	90	40	40
	A4			10	2,9	7,1		115		50	45
	gvz	100	40	15	6,1	7,6	95	120	120	40	40
	A4			10		7,3		115			45
	hdg			15		7,6		120			40
FBN II 10	gvz	100	40	30	6,1	12,0	100	190	120	50	80
	A4			20		11,6		185			
	gvz	100	50	30	8,5	12,0	100	185	150	50	50
	A4			20		11,6		180		70	55
	hdg			30		12,0		185		50	50
	gvz	100	50	50	8,5	17,9	145	280	150	70	100
FBN II 12	A4			35		15,7		245			
	gvz	120	65	50	12,6	17,9	145	245	195	70	70
	A4			35		15,7		215			
	hdg			40		17,9		245			
FBN II 16	gvz	120	65	100	12,6	29,0	175	410	195	90	120
	A4			80							
	gvz	160	80	100	17,2	31,5	175	375	240	90	90
	A4			80		29,1		340		120	80
	hdg			70		31,5		375		90	90
FBN II 20	gvz	160	80	200	17,2	38,3	185	455	240	120	120
	A4			150		39,6		470		140	
	gvz	200	105	200	25,9	38,3	185	385	315	120	120
	A4			150		49,1		510			
	hdg			200		38,3		385			

For the design the complete assessment ETA-07/0211 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0211 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0211.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method Hammer drilling resp. hollow drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0211.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0211.

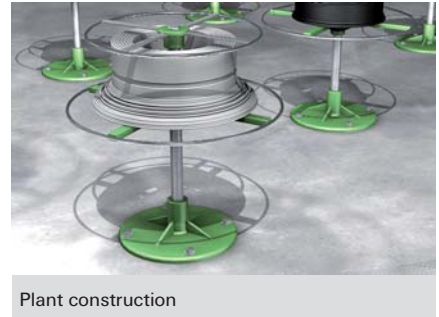
<sup>7)</sup> The given loads refer to the European Technical Assessment ETA-07/0211, issue date 19/05/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>8)</sup> Anchoring depth smaller than 40 mm are only approved for statically indeterminate systems.

## The installation-friendly internally threaded anchor for fixings in non-cracked concrete



Fall protection devices



Plant construction

### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, non-cracked

#### Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

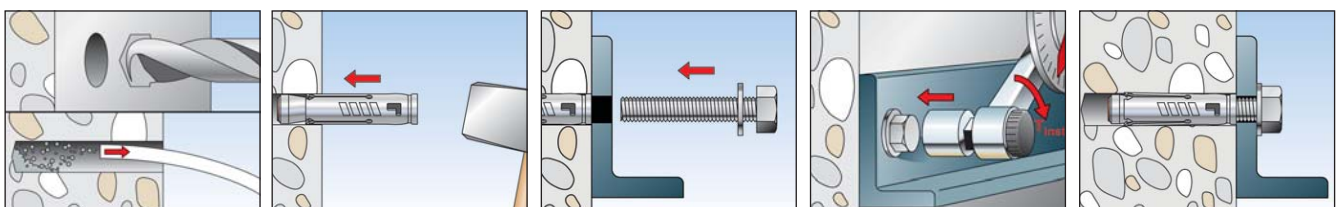
- The optimised geometry minimises setting energy and allows for use in extremely narrow spaces. This allows for user-friendly installation.
- The three-part expansion sleeve creates even load distribution, thus allowing small edge and axial spacing. Thus the TA M is extremely flexible.
- The metric internal thread allows to use standard screws or threaded rods for the ideal adaptation to suit the intended use.
- The red plastic cap protects against soiling and thus ensures free-running of the thread.

### APPLICATIONS

- Steel constructions
- Handrails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades
- Stand-off installations

### FUNCTIONING

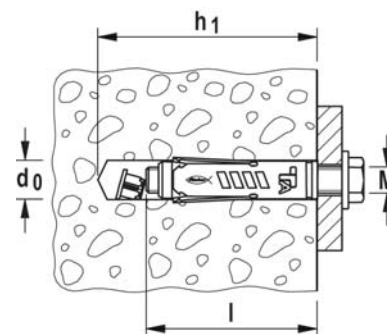
- The TAM is suitable for pre-positioned installation.
- When applying the torque, the cone is pulled into the expansion sleeve and expands it against the drill hole wall.
- For correct installation, it must be ensured that the pre-positioned anchor TA M can be supported on the attachment, or that the threaded rod is countered.
- Determining the screw length  $l_s$ :  
Screw length  $l_s$  =  
Length of fixing  
+ Thickness of fixture  $t_{fix}$   
+ Thickness of washer.



## TECHNICAL DATA



Heavy-duty anchor **TA M**

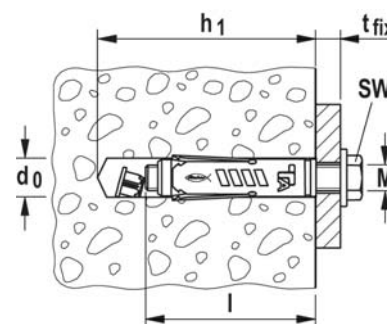


	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth	Anchor length	Thread	Sales unit		
		ETA	$d_0$ [mm]	$h_1$ [mm]	$l$ [mm]	M	[pcs]		
Item	gvz								
<b>TA M6</b>	<b>090245</b>	■	10	65	49	M 6	50		
<b>TA M8</b>	<b>090246</b>	■	12	70	56	M 8	50		
<b>TA M10</b>	<b>090247</b>	■	15	90	69	M 10	25		
<b>TA M12</b>	<b>090248</b>	■	18	105	86	M 12	25		

## TECHNICAL DATA



Heavy-duty anchor **TA M-S** with screw



	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth	Anchor length	Max. fixture thickness	Screw	Width across nut	Sales unit
		ETA	$d_0$ [mm]	$h_1$ [mm]	$l$ [mm]	$t_{fix}$ [mm]	$\emptyset \times \text{length}$	$\bigcirc$ SW [mm]	[pcs]
Item	gvz								
<b>TA M6 S/10</b>	<b>090249</b>	■	10	65	49	10	M 6 x 60	10	50
<b>TA M8 S/10</b>	<b>090250</b>	■	12	70	56	10	M 8 x 65	13	50
<b>TA M10 S/20</b>	<b>090251</b>	■	15	90	69	20	M 10 x 90	17	25
<b>TA M12 S/25</b>	<b>090252</b>	■	18	105	86	25	M 12 x 110	19	20

## LOADS

### Heavy-duty anchor TA M

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load c	Max. shear load c			
		$h_{min}$ [mm]	$h_{ef}$ [mm]	$T_{inst}$ [Nm]	$N_{perm}^{4)}$ [kN]	$V_{perm}^{4)}$ [kN]			Max. Load s	$s_{min}^{5) 6)}$ [mm]	$c_{min}^{5) 6)}$ [mm]
TA M6	8.8	100	40	10	3,6	3,3	50	55	120	80	50
TA M8	8.8	100	45	20	5,7	6,7	65	95	135	90	60
TA M10	8.8	110	55	40	9,5	11,0	160	150	165	110	70
TA M12	8.8	140	70	75	11,9	17,0	170	200	210	160	120

For the design the complete assessment ETA-04/0003 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-04/0003 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-04/0003.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-04/0003.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

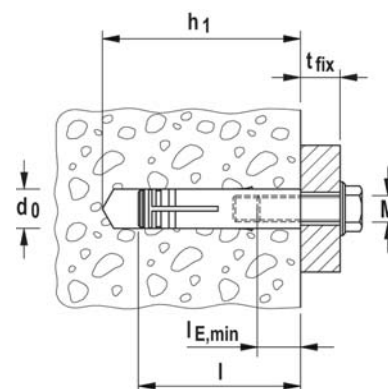
<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-04/0003.

<sup>7)</sup> The given loads refer to the European Technical Approval ETA-04/0003, issue date 11/06/2013. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## TECHNICAL DATA



Heavy-duty anchor **SL M**



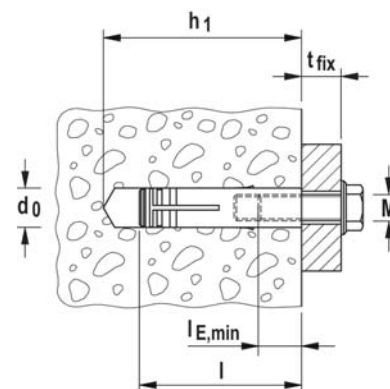
	Zinc-plated steel	Drill hole diameter	Min. drill hole depth	Anchor length	Internal thread	Min. bolt penetration	Sales unit	
	Art.-No.	$d_0$ [mm]	$h_1$ [mm]	$l$ [mm]	A1	$l_{E,min}$ [mm]	[pcs]	
Item	gvz							
SL M 16	050556	24	110	90	M 16	90	10	
SL M 20	050557	30	130	110	M 20	110	5	
SL M 24	050558	35	150	125	M 24	125	5	



## TECHNICAL DATA



Heavy-duty anchor **SLM-N A4**



	Stainless steel	Drill hole diameter	Min. drill hole depth	Anchor length	Internal thread	Min. bolt penetration	Sales unit	
	Art.-No.	$d_0$ [mm]	$h_1$ [mm]	$l$ [mm]	A1	$l_{E,min}$ [mm]	[pcs]	
Item	A4							
<b>SL M 8 N A4</b>	<b>050526</b>	12	60	54	M 8	52	25	
<b>SL M 10 N A4</b>	<b>050527</b>	16	70	62	M 10	62	20	

## LOADS

### Heavy-duty anchor SL M

zinc plated steel / stainless steel

Recommended loads<sup>1) 3)</sup> of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25.

Type	Effective anchorage depth	Min. member thickness	Torque-moment	Recommended load	Char. spacing	Char. edge distance	Min. spacing	Min. edge distance
	$h_{ef}$ [mm]	$h_{min}$ [mm]	$T_{inst}$ [Nm]	$F_{rec}^{2)}$ [kN]	$s_{cr,N}$ [mm]	$c_{cr,N}$ [mm]	$s_{min}^{4)}$ [mm]	$c_{min}^{4)}$ [mm]
<b>SL M 8 N A4</b>	45	100	25	3,5	135	68	50	90
<b>SL M 10 N A4</b>	50	100	50	5,0	150	75	50	100
<b>SL M 16 gvz</b>	62	130	100	8,0	186	93	60	120
<b>SL M 20 gvz</b>	77	150	150	11,0	231	116	80	160
<b>SL M 24 gvz</b>	90	200	200	13,9	270	135	90	180

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>3)</sup> Valid for screws with grade 8.8 and A4-70

<sup>4)</sup> Minimum possible axial spacings resp. edge distance while reducing the recommended load.

## The installation-friendly push-through anchor for fixings in non-cracked concrete



Collision protection



Benches

### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

#### Approved for:

- Concrete C20/25 to C50/60, non-cracked

#### Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

### CERTIFICATES



### ADVANTAGES

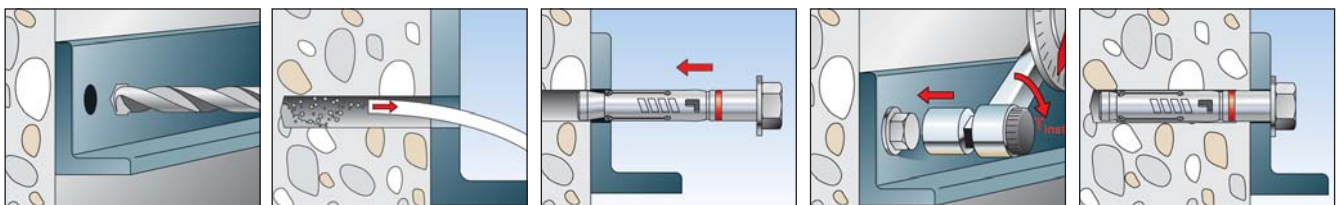
- The optimised geometry minimises setting energy and allows for use in extremely narrow spaces. This allows for user-friendly installation.
- The three-part expansion sleeve creates even load distribution, thus allowing small edge and axial spacing. Thus the TA M-T is extremely flexible.
- The TA M-BP version with twist-off head hinders the dismantling of the fixture for use as a theft-deterrent and break-in protection.
- The detachable screw connection allows for surface flush removal.

### APPLICATIONS

- Steel constructions
- Handrails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades

### FUNCTIONING

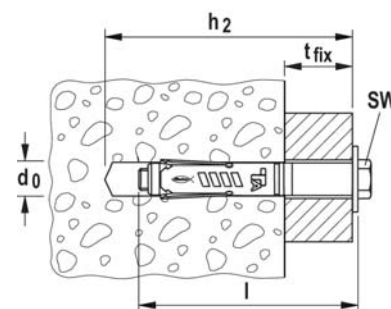
- The TA M-T is suitable for push-through installation.
- When applying the torque, the cone is pulled into the expansion sleeve and expands it against the drill hole wall.
- The hexagonal head of the TA M-BP is tightened until it breaks off.



## TECHNICAL DATA



Heavy-duty anchor **TA M-T**,  
for push-through installation

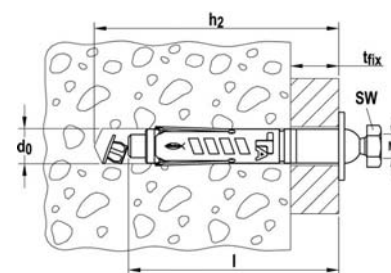


	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	M	○ SW [mm]	[pcs]
Item	gvz								
<b>TA M8 T/25 S</b>	<b>090268</b>	■	12	95	84	25	M 8	13	50
<b>TA M10 T/25 S</b>	<b>090269</b>	■	15	110	100	25	M 10	17	25
<b>TA M12 T/25 S</b>	<b>090270</b>	■	18	120	114	25	M 12	19	20

## TECHNICAL DATA



Heavy-duty anchor **TA M-T BP**,  
with twist-off head



	Zinc-plated steel	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	M	○ SW [mm]	[pcs]
Item	gvz							
<b>TA M8 BP</b>	<b>090265</b>	12	95	84	25	M 8	13	50

## LOADS

### Heavy-duty anchor TA M-T

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
		h <sub>min</sub> [mm]	h <sub>ef</sub> [mm]	T <sub>inst</sub> [Nm]	N <sub>perm</sub> <sup>4)</sup> [kN]	V <sub>perm</sub> <sup>4)</sup> [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Max. Load s [mm]	s <sub>min</sub> <sup>5) 6)</sup> [mm]	c <sub>min</sub> <sup>5) 6)</sup> [mm]
<b>TA M8 T</b>	gvz	100	45	20	5,7	6,7	65	95	135	90	60
<b>TA M10 T</b>	gvz	110	55	40	9,5	11,0	160	150	165	110	70
<b>TA M12 T</b>	gvz	140	70	75	11,9	17,0	170	200	210	160	120

For the design the complete assessment ETA-04/0003 has to be considered. <sup>7)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-04/0003 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-04/0003.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method hammer drilling.

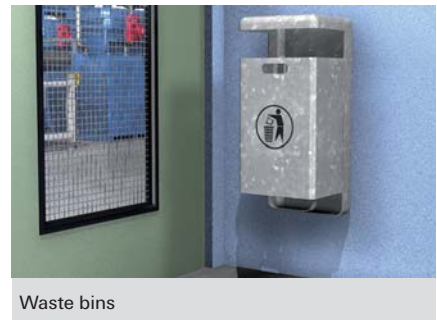
<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-04/0003.

<sup>5)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

<sup>6)</sup> Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-04/0003.

<sup>7)</sup> The given loads refer to the European Technical Approval ETA-04/0003, issue date 11/06/2013. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## The push-through anchor for structural fixings in non-cracked concrete



### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

#### Suitable for:

- Concrete C12/15 to C20/25, non-cracked
- Natural stone with dense structure

### ADVANTAGES

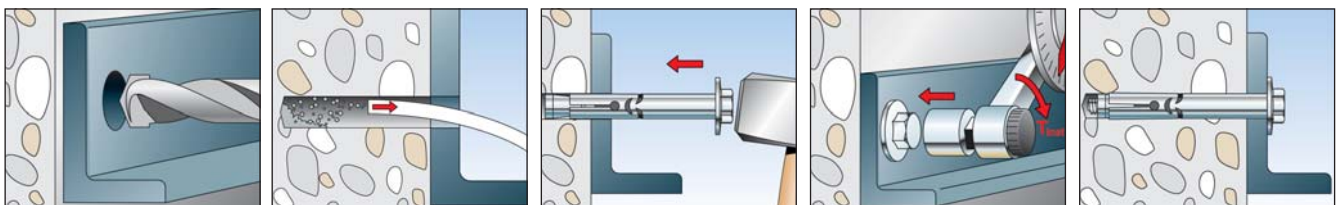
- The optimised geometry minimises setting energy and enables the use in extremely narrow spaces. This allows for user-friendly installation.
- The anchor design makes it possible to use different head shapes for flexible design solutions: Hexagon head (type S), bolt version with nut and washer (type B).
- The detachable screw connection allows for surface flush removal.

### APPLICATIONS

- Handrails
- Consoles
- Ladders
- Cable trays
- Gates
- Façades
- Temporary or structural fixings

### FUNCTIONING

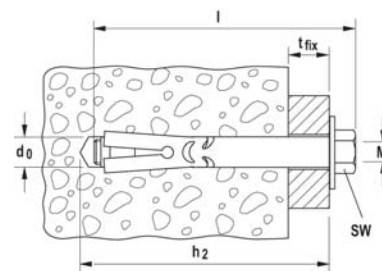
- The FSA is suitable for push-through installation.
- When applying the torque, the cone is pulled into the expansion sleeve and expands it against the drill hole wall.
- The half-moon shaped recesses act as a crumple zone to take the torque slippage, so that the attachment is pulled onto the anchor base.



## TECHNICAL DATA



Sleeve anchor **FSA-S**



	Zinc-plated steel	Drill hole diameter	Min. drill hole depth for through fixings	Max. fixture thickness	Anchor length	Thread	Width across nut	Sales unit
	Art.-No.	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	t <sub>fix</sub> [mm]	l [mm]	M	○ SW [mm]	[pcs]
Item	gvz							
<b>FSA 8/15 S</b>	<b>068520</b>	8	65	15	64	M 6	10	50
<b>FSA 8/40 S</b>	<b>068521</b>	8	90	40	89	M 6	10	50
<b>FSA 8/65 S</b>	<b>068522</b>	8	115	65	114	M 6	10	50
<b>FSA 10/10 S</b>	<b>068523</b>	10	65	10	65	M 8	13	20
<b>FSA 10/35 S</b>	<b>068524</b>	10	90	35	90	M 8	13	20
<b>FSA 10/60 S</b>	<b>068525</b>	10	115	60	115	M 8	13	20
<b>FSA 12/10 S</b>	<b>068526</b>	12	75	10	76	M 10	17	20
<b>FSA 12/25 S</b>	<b>068527</b>	12	90	25	91	M 10	17	20
<b>FSA 12/50 S</b>	<b>068528</b>	12	115	50	116	M 10	17	20

## TECHNICAL DATA



Sleeve anchor **FSA-B**

	Zinc-plated steel	Drill hole diameter	Min. drill hole depth for through fixings	Max. fixture thickness	Anchor length	Thread	Width across nut	Sales unit
	Art.-No.	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	t <sub>fix</sub> [mm]	l [mm]	M	○ SW [mm]	[pcs]
Item	gvz							
<b>FSA 8/15 B</b>	<b>068500</b>	8	65	15	65	M 6	10	50
<b>FSA 8/40 B</b>	<b>068501</b>	8	90	40	90	M 6	10	50
<b>FSA 8/65 B</b>	<b>068502</b>	8	115	65	115	M 6	10	50
<b>FSA 10/10 B</b>	<b>068503</b>	10	65	10	69	M 8	13	20
<b>FSA 10/35 B</b>	<b>068504</b>	10	90	35	94	M 8	13	20
<b>FSA 10/60 B</b>	<b>068505</b>	10	115	60	119	M 8	13	20
<b>FSA 12/10 B</b>	<b>068506</b>	12	75	10	81	M 10	17	20
<b>FSA 12/25 B</b>	<b>068507</b>	12	90	25	96	M 10	17	20
<b>FSA 12/50 B</b>	<b>068508</b>	12	115	50	121	M 10	17	20
<b>FSA 12/75 B</b>	<b>068509</b>	12	140	75	146	M 10	17	20

## LOADS

### Sleeve anchor FSA zinc plated steel

Recommended loads<sup>1)</sup> of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25.

Type	Effective anchorage-depth	Minimum member thickness	Torque-moment	Recommended Tensile load	Recommended shear load	Char. spacing	Char. edge distance	Min. spacing	Min. edge distance
	$h_{ef}$ [mm]	$h_{min}$ [mm]	$T_{inst}$ [Nm]	$N_{rec}^{2)}$ [kN]	$V_{rec}^{2)}$ [kN]	$s_{cr,N}$ [mm]	$c_{cr,N}$ [mm]	$s_{min}^{3)}$ [mm]	$c_{min}^{3)}$ [mm]
<b>FSA 8</b>	35	70	8	2,0	3,4	105	53	70	50
<b>FSA 10</b>	40	80	25	3,5	6,3	120	60	80	60 <sup>4)</sup>
<b>FSA 12</b>	50	100	40	5,0	9,9	150	75	100	75 <sup>4)</sup>

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> For combination of tensile and shear loads a detailed anchor design is necessary.

<sup>3)</sup> Minimum possible axial spacings resp. edge distance while reducing the recommended load.

<sup>4)</sup> No reduction of the recommended tensile load.



## The reusable fixing system for diamond drills and saws



Diamond drills



Detail: Diamond drills

### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

#### Suitable for:

- Concrete C12/15 to C50/60, non-cracked
- Natural stone with dense structure

### ADVANTAGES

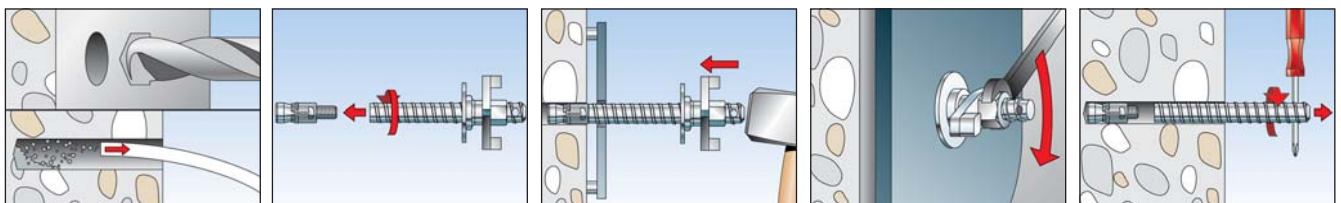
- The detachable screw connection between the expansion element and spindle enables simple dismantling and ensures that the spindle bolt can be reused.
- The robust, reusable spindle bolt guarantees a long life span.
- The active principle of the anchor enables an active controlled expansion, thus offering a high level of safety.
- The large steel cross-section provides high shear load-bearing capability and, as such, high security for the jerky stoppage of the drill bit.

### APPLICATIONS

- Diamond and core drilling devices
- Diamond saws

### FUNCTIONING

- The FDBB is suitable for pre-positioned and push-through installation.
- An expansion element must be added to the spindle bolt before installation.
- Use a hammer to drive the FDBB through the base plate of the drilling device into the drill hole.
- When the nut is tightened, the cone bolt is pulled into the expansion clip and expands it against the drill hole wall.
- The expansion element remains in the drill hole when dismantling the spindle bolt. The spindle bolt is once again completed with an expansion element and can be reused.



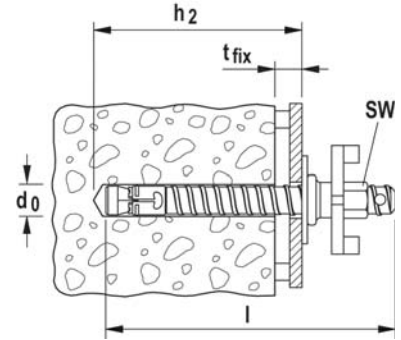
## TECHNICAL DATA



Fixing set for diamond drills **FDBB**



Expansion element **FDBB SE**



		Drill hole diameter $d_0$ [mm]	Usable length $t_{fix}$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Width across nut $\varnothing SW$ [mm]	Length $l$ [mm]	Contents	Sales unit [pcs]
Item	Art.-No. gvz							
<b>FDBB 16/50 Set</b>	<b>090680</b>	16	50	135	27	200	1 expansion element 16 SE, 1 spindle bolt 16/50/160, 1 washer, 1 nut	1
<b>FDBB 16 SE</b>	<b>090681</b>	16	—	—	—	—	Expansion element	25

## LOADS

### Fixing set for Diamond Drills FDBB

Highest recommended loads<sup>1)</sup> for a single anchor in non-cracked concrete.

Type	Recommended bending moment $M_{rec}$ [Nm]	C20/25		C12/15	
		Recommended Tensile load $N_{rec}$ [kN]	Recommended shear load $V_{rec}^{2)}$ [kN]	Recommended Tensile load $N_{rec}$ [kN]	Recommended shear load $V_{rec}^{2)}$ [kN]
<b>FDBB</b>	98	12,0	13,3	9,0	13,3

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Steel failure value.

## The fixing with simple hammer-set installation in non-cracked concrete



### VERSIONS

- Zinc-plated steel

### BUILDING MATERIALS

#### Suitable for:

- Concrete C12/15 to C50/60, non-cracked
- Natural stone with dense structure

### ADVANTAGES

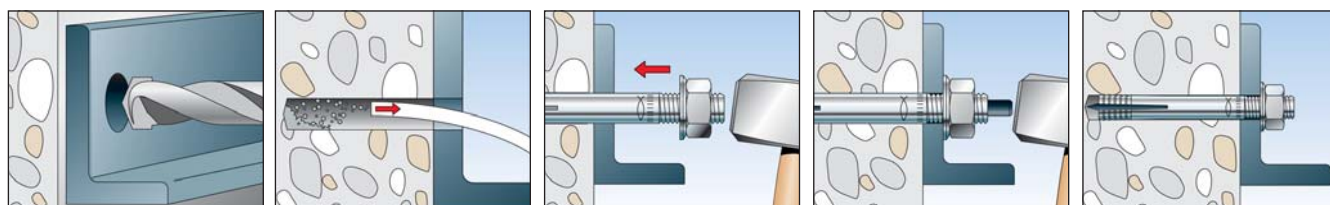
- The special construction of the anchor sleeve enables it to be set into the drill hole with a low number of hammer blows. This enables easy installation.
- The flush-sunk expansion pin signifies the complete expansion of the anchor, and thereby ensures minimum movement when under load.
- The special geometry of the expansion pin reduces the setting energy, thereby enabling a fast and energy-saving installation.

### APPLICATIONS

- Non-approval-relevant fixings only
- Handrails
- Gratings
- Garden gates

### FUNCTIONING

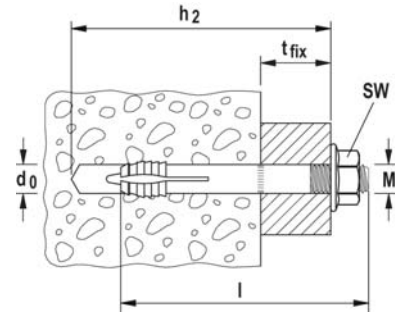
- The MR is suitable for pre-positioned and push-through installation.
- The anchor sleeve is driven into the drill hole with a hammer, without the need for an expansion pin.
- Then the expansion pin is driven in with a hammer, and the wall screw expands against the drill hole wall.



## TECHNICAL DATA



Wall screw **MR**



	Zinc-plated steel	Drill hole diameter	Anchor length	Min. drill hole depth for through fixings	Thread	Width across nut	Max. fixture thickness	Sales unit
	Art.-No.	$d_0$ [mm]	$l$ [mm]	$h_2$ [mm]	M	$\varnothing$ SW [mm]	$t_{fix}$ [mm]	[pcs]
Item	gvz							
<b>MR 8</b>	<b>050583</b>	8	70	70	M 8	13	22	25
<b>MR 10</b>	<b>050584</b>	10	85	85	M 10	15	24	20
<b>MR 12</b>	<b>050585</b>	12	100	100	M 12	18	27	10

## The installation-friendly internally threaded anchor for fixings in pre-stressed hollow-core concrete slabs



Air conditioning units in pre-stressed hollow-core concrete slabs



Cable trays in pre-stressed hollow-core concrete

### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

#### Approved for:

- Pre-stressed hollow-core concrete slabs  $\geq$  C45/55

### CERTIFICATES



### ADVANTAGES

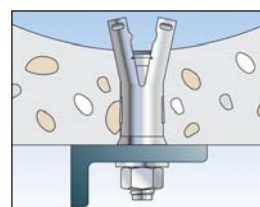
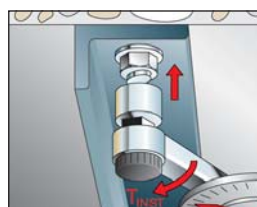
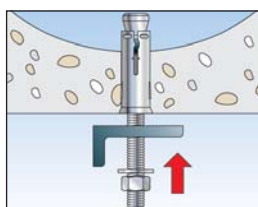
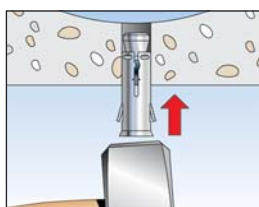
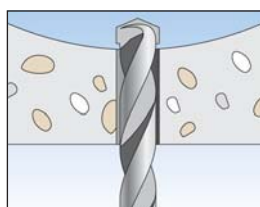
- The active principle of the anchor means that the FHY can be used in cavities or in solid materials up to 5 cm from the tensioning wire. This ensures the highest flexibility and user-friendly installation.
- The embossed edge prevents the anchor sleeve from slipping in the cavity, thus allowing for trouble-free installation.
- The optimised geometry minimises setting energy and allows for use in extremely narrow spaces. This allows for user-friendly installation.
- The metric internal thread means that it is possible to use standard screws or threaded rods for the ideal adaptation to suit the intended use.

### APPLICATIONS

- Pipelines
- Cable trays
- Ventilation systems
- Sprinkler systems
- Suspended ceilings
- Consoles
- Steel constructions
- Timber constructions

### FUNCTIONING

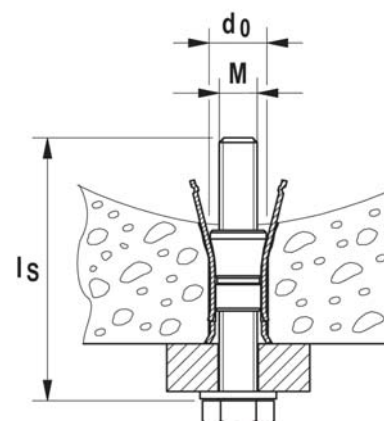
- The FHY is suitable for pre-positioned installation.
- Position the FHY hollow-ceiling anchor in the drill hole and drive in flush to the surface of the anchor base using the hammer.
- The FHY pre-positioned anchor must be able to be supported on the attachment for expansion.
- When applying the torque, the cone is pulled into the expansion sleeve and expands it into the cavity or expands it in the solid material against the drill hole wall.
- Screw length  $l_s =$   
Minimum screw-in depth  $e_2$   
+ Thickness of fixture  $t_{fix}$   
+ Thickness of washer  
(with threaded rod: + height of nut)



## TECHNICAL DATA



Hollow-ceiling anchor **FHY**



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Anchor length	Thread	Min. drill hole depth	Min. bolt penetration	Sales unit
	Art.-No.	Art.-No.	DIBt	d <sub>0</sub> [mm]	l [mm]	M	h <sub>1</sub> [mm]	l <sub>E,min</sub> [mm]	[pcs]
Item	gvz	A4							
<b>FHY M 6</b>	<b>030138</b>	—	●	10	37	M 6	50	37	50
<b>FHY M 6</b>	—	<b>030139</b>	—	10	37	M 6	50	37	50
<b>FHY M 8</b>	<b>030146</b>	—	●	12	43	M 8	60	43	25
<b>FHY M 8</b>	—	<b>030147</b>	—	12	43	M 8	60	43	25
<b>FHY M10</b>	<b>030148</b>	—	●	16	52	M 10	65	52	20
<b>FHY M10</b>	—	<b>030151</b>	—	16	52	M 10	65	52	20
<b>FHY M12</b>	<b>545512</b>	—	—	18	52	M 12	65	52	25

## LOADS

### Hollow-ceiling anchor FHY zinc plated steel

Highest permissible loads<sup>1)3)</sup> for a single anchor in pre-stressed hollow-core concrete slabs of strength class  $\geq$  C45/55.

Type	Bottom flange thickness	Installation torque	Permissible load	Required edge distance (with one edge) for max. load	Min. spacing	Min. edge distance
	d <sub>u</sub> [mm]	T <sub>inst</sub> [Nm]	F <sub>perm</sub> <sup>2)</sup> [kN]	[mm]	s <sub>min</sub> <sup>4)</sup> [mm]	c <sub>min</sub> <sup>4)</sup> [mm]
<b>FHY M6</b>	25 - 29	10	0,7	150	70	100
	30 - 39		0,9		80	
	$\geq 40$		2,0		100	
<b>FHY M8</b>	25 - 29	10	0,7		70	
	30 - 39		0,9		80	
	$\geq 40$		2,0		100	
<b>FHY M10</b>	30 - 39	20	1,2		80	
	$\geq 40$		3,0		100	

For the design the complete approval Z-21.1-1711 has to be considered.

<sup>1)</sup> The required safety factors as regulated in the approval are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.

<sup>3)</sup> For screw strength class 4.6.

<sup>4)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.



LOADS

Hollow-ceiling anchor FHY stainless steel A4

Highest recommended loads <sup>1) 3)</sup> for a single anchor in pre-stressed hollow-core concrete slabs of strength class ≥ C45/55

Type	Bottom flange thickness  d <sub>u</sub> [mm]	Installation torque  T <sub>inst</sub> [Nm]	Recommended load  F <sub>rec</sub> <sup>2)</sup> [kN]	Required edge distance (with one edge) for Max. load  [mm]	Min. spacing  s <sub>min</sub> <sup>4)</sup> [mm]	Min. edge distance  c <sub>min</sub> <sup>4)</sup> [mm]
FHY M6 A4	25 - 29	10	0,7	150	70	100
	30 - 39		0,9		80	
	≥40		2,0		100	
FHY M8 A4	25 - 29	10	0,7		70	
	30 - 39		0,9		80	
	≥40		2,0		100	
FHY M10 A4	30 - 39	20	1,2		80	
	≥40		3,0		100	

<sup>1)</sup> Required safety factors are considered.  
<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.  
<sup>3)</sup> For screw strength class A4-70.  
<sup>4)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

## The strong internally threaded anchor with unique 4-way expansion for fixings in aerated concrete



Rail fixing



Air conditioning units

### VERSIONS

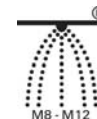
- Zinc-plated steel

### BUILDING MATERIALS

#### Approved for:

- Aerated concrete with compressive strength 2 to 7 N/mm<sup>2</sup>
- Aerated concrete wall or ceiling boards with compressive strength 3.3 to 4.4 N/mm<sup>2</sup>
- Planked aerated concrete masonry, e.g. plastered, tiled, papered etc.

### CERTIFICATES



MB - M12

### ADVANTAGES

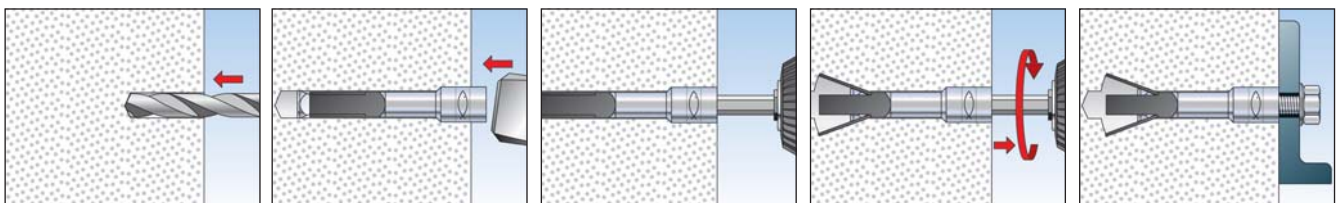
- The FPX-I enables easy tightening via the hexagon wrench using a cordless screwdriver or ratchet and therefore offers top installation comfort.
- The deformation-controlled expansion of the anchor with the hexagon wrench ensures safe, even and gentle installation.
- The unique 4-way expansion of the FPX-I with a square expansion sleeve prevents the rotation of the anchor in the drill hole and ensures high tension and shear loads, which means fewer fixing points.
- The releasing of the hexagonal wrench guarantees an automatic setting control for each installation process.
- The first steel anchor with an ETA-Approval and fire protection certificate for fixings in aerated concrete enables use for safety-relevant fixings, too.

### APPLICATIONS

- Suspended ceilings
- Cable trays
- Pipelines
- Ventilation ducts
- Guard rails/hand rails
- TV consoles
- Kitchen cupboards
- Stand-off installations

### FUNCTIONING

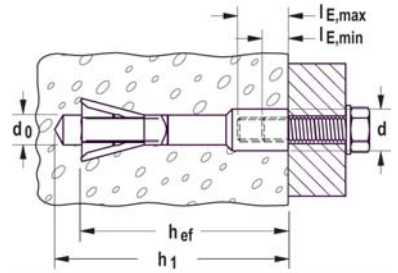
- The FPX-I with internal thread is suitable for pre-positioned installation.
- Pre-drilling enables easy hammering in, even in high-strength aerated concrete. There is no need to clean the drill hole.
- When the anchor is tightened with the hexagon wrench, the internal thread sleeve starts to rotate and the cone is pulled into the square expansion sleeve. The aerated concrete is compressed on the four sides and generates an undercut in the drill hole.
- When reached the optimum expansion, the hexagon wrench is released automatically from the anchor.



## TECHNICAL DATA



Aircrete anchor **FPX-I**



	Art.-No.	Approval ETA	Drill diameter $d_0$ [mm]	Min. drill hole depth for pre-positioned installation $h_1$ [mm]	Anchor length $l$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Min. bolt pene- tration $l_{E,min}$ [mm]	Max. bolt pene- tration $l_{E,max}$ [mm]	Sales unit [pcs]
Item	gvz								
<b>FPX M6-I</b>	<b>519021</b>	■	10	95	75	70	10	15	25
<b>FPX M8-I</b>	<b>519022</b>	■	10	95	75	70	8	15	25
<b>FPX M10-I</b>	<b>519023</b>	■	10	95	75	70	10	15	25
<b>FPX M12-I</b>	<b>519024</b>	■	10	95	75	70	12	15	25

## ACCESSORIES



Setting tool **FPX M6 I**



Setting tool **FPX M8-M12 I**

Item	Art.-No.	Matching anchor type	Sales unit [pcs]
<b>Setting tool FPX M6 I</b>	<b>522517</b>	FPX M6-I	10
<b>Setting tool FPX M8-M12 I</b>	<b>522518</b>	FPX M8-I - FPX M12-I	10

## LOADS

### AAC anchor FPX-I

Highest permissible loads<sup>1)5)</sup> and required component dimensions in aerated concrete masonry.

Type			FPX-I M6 , M8 , M10 , M12	
Permissible load <sup>1)5)</sup> per anchor $F_{perm}$				
Effective anchoring depth	hef	[mm]	70	
$f_{ck} \geq 1,6 \text{ N/mm}^2 / \rho_m \geq 0,25 \text{ kg/dm}^3$		[kN]	0,32	
$f_{ck} \geq 2,0 \text{ N/mm}^2 / \rho_m \geq 0,35 \text{ kg/dm}^3$		[kN]	0,43	
$f_{ck} \geq 4,0 \text{ N/mm}^2 / \rho_m \geq 0,50 \text{ kg/dm}^3$		[kN]	0,89	
$f_{ck} \geq 6,0 \text{ N/mm}^2 / \rho_m \geq 0,65 \text{ kg/dm}^3$		[kN]	1,43	
Component dimensions				
Minimum member thickness with drill hole cleaning	hmin	[mm]	100	
Minimum member thickness without drill hole cleaning	hmin	[mm]	120	
Single anchor				
Min. spacing between single anchors	a	[mm]	375	
Min. edge distance	c1	[mm]	125	
Min. distance to joints	cF <sup>4)</sup>	[mm]	75 <sup>2)</sup> / 125	
Min. edge distance orthogonal to c <sub>1</sub>	c2	[mm]	190	
Anchor groups <sup>3)</sup> with 2 or 4 Ancors				
Actions			shear + oblique tension	only axial tension
Min. spacing	smin	[mm]	100	100
Min. edge distance	c1	[mm]	250	125
Min. spacing between single anchors	a	[mm]	750	375
Min. edge distance orthogonal to c <sub>1</sub>	c2	[mm]	375	190

For the design the complete approval ETA - 12/0456 has to be considered.

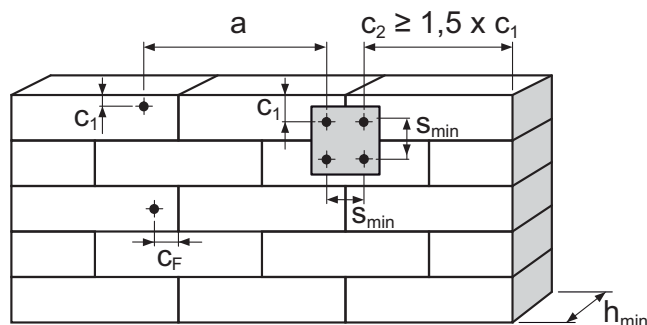
<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup>  $c_F$  for tensile load and/or shear load parallel to the joint which is not filled with mortar with width  $\leq 2 \text{ mm}$ .

<sup>3)</sup>  $F_{perm, Group} = 2 \times F_{perm, single}$  anchor valid in case of anchor groups with 2 or 4 anchors.

<sup>4)</sup> In case of non visible joints  $F_{perm}$  has to be divided in half.

<sup>5)</sup> Grade of the screw, resp. threaded rod  $\geq 4,8$ .



## LOADS

### AAC anchor FPX-I

Highest permissible loads<sup>1)4)</sup> and required component dimensions in cracked and non-cracked aerated concrete wall and slab plates.

Type			FPX-I M6 , M8 , M10 , M12	
Permissible load <sup>1)4)</sup> per anchor $F_{perm}$				
Effective anchoring depth	hef	[mm]	70	
Tensile area of the AAC plate				
$f_{ck} \geq 3,3 \text{ N/mm}^2 / \rho_m \geq 0,50 \text{ kg/dm}^3$		[kN]	0,62	
$f_{ck} \geq 4,4 \text{ N/mm}^2 / \rho_m \geq 0,55 \text{ kg/dm}^3$		[kN]	0,83	
Compression area of the AAC plate				
$f_{ck} \geq 3,3 \text{ N/mm}^2 / \rho_m \geq 0,50 \text{ kg/dm}^3$		[kN]	0,83	
$f_{ck} \geq 4,4 \text{ N/mm}^2 / \rho_m \geq 0,55 \text{ kg/dm}^3$		[kN]	1,24	
Component dimensions				
Minimum member thickness with drill hole cleaning	hmin	[mm]	100	
Minimum member thickness without drill hole cleaning	hmin	[mm]	120	
Single anchor				
Min. spacing between single anchors	a	[mm]	600	
Min. edge distance	c1	[mm]	125 / 300 <sup>3)</sup>	
Min. edge distance orthogonal to c1	c2	[mm]	190	
Anchor groups <sup>2)</sup> with 2 or 4 anchors				
Actions			shear + oblique tension	only axial tension
Min. spacing	smin	[mm]	100	100
Min. edge distance	c1	[mm]	250	125 / 150 <sup>3)</sup>
Min. spacing between single anchors	a	[mm]	750	600
Min. edge distance orthogonal to c1	c2	[mm]	375	190

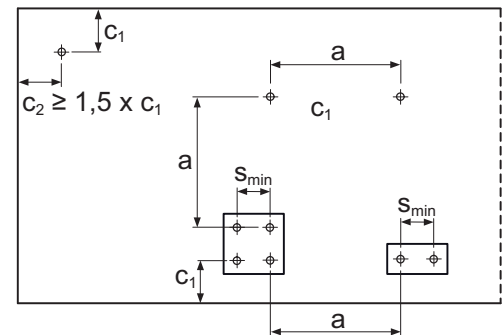
For the design the complete approval ETA - 12/0456 has to be considered.

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup>  $F_{perm, Group} = 2 \times F_{perm, single \text{ anchor}}$  valid in case of anchor groups with 2 or 4 anchors.

<sup>3)</sup> In case of reinforced plates with a width  $\leq 700 \text{ mm}$ .

<sup>4)</sup> Grade of the screw, resp. threaded rod  $\geq 4.8$ .


























# 5

## Frame fixings / Stand-off installation

Page

Frame fixing SXRL		294
Frame fixing SXR		300
Frame fixing FUR		306
Anti-corrosion spray FTC-CP		310
Hammerfix N		311
Hammerfix N GREEN		315
Nail sleeve FNH		317
Window frame fixing F-S		319
Metal frame fixing F-M		321
Window frame screws FFSZ and FFS		324
Wall tie VB		328
Adjustable fixing S10J		329
Adjustable screw JUSS		331
Spacing screw ASL		332
Stand-off installation Thermax 8 / 10		334
Stand-off installation Thermax 12 / 16		337
Remedial wall tie mechanical VBS-M		343

## The versatile with multiple anchorage depth



Timber substructures



Wall consoles

### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

#### Approved for:

- Vertically perforated brick
- Aerated concrete
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Thermal insulation blocks
- Solid block made from lightweight and normal weight concrete
- Solid brick
- Solid sand-lime brick
- Concrete  $\geq$  C12/15

#### Also suitable for:

- Natural stone with dense structure
- Solid panel made from gypsum

### CERTIFICATES



### ADVANTAGES

- The long expansion element with multiple anchorage depths of 50, 70 or 90 mm for SXRL 8 and SXRL 10 and 70 or 90 mm for SXRL 14 makes the SXRL a versatile applicable product.
- Through the special geometry of the plug, the loads are evenly distributed in the drill hole.
- When the plug is to be set below the plaster, the longer ribs prevent plug rotation during installation.
- The approval for single-point fixing in cracked concrete makes the SXRL the designated specialist in concrete particularly for tasks such as the installation of awning roofs and outdoor railings compared to steel anchors.
- SXRL 14 is approved for the application under compression load and is thus for example useable for facade substructures that are mounted at a distance without wall brackets.
- Complete range available with diameters of 8, 10 and 14 mm and usable lengths up to 290 mm.

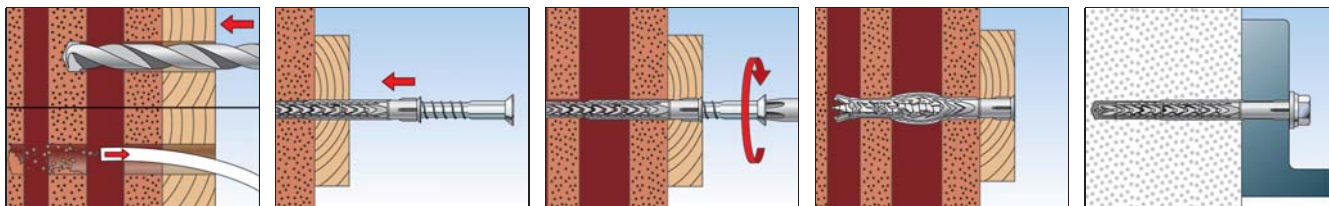
### APPLICATIONS

- Façade, ceiling and roof substructures made of wood and metal
- Facade substructures under compression load (e.g. distance installation without a wall bracket)
- Windows
- Gates and doors
- Wardrobes
- Kitchen hanging cabinets
- Squared timbers
- Beams
- TV consoles
- Wall covering
- Metal brackets
- Metal supports
- Cable ducts
- Cable trays

### FUNCTIONING

- In hollow building materials, the two expansion zones ensure that the introduction of force is gentle on the substrate. The porous block fillets are not crushed by the second expansion zone and therefore serve to transmit the force
- In aircrete and solid building material, the two expansion zones combine to form one long expansion element, thus providing for a uniform and flat distribution of the load into substrate.
- SXRL-T with countersunk head screw is recommended for the installation of timber constructions; in the case of metal constructions, use SXRL-FUS with a wide sleeve rim and a moulded washer on the screw, which also features an integrated hexagon socket.

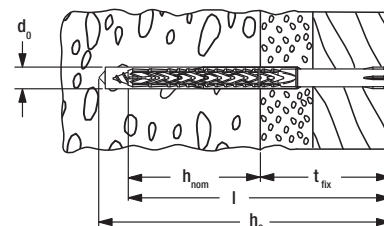
## INSTALLATION



## TECHNICAL DATA



**SXRL-T** - with fischer countersunk head safety screw



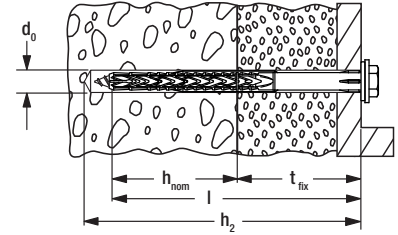
	Zinc-plated steel	Stainless steel	Approval		Drill diameter	Min. drill hole depth for through fixings	Usable length at anchorage depth 50mm	Usable length at anchorage depth 70mm	Usable length at anchorage depth 90mm	Anchor length	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	DIBt	$d_0$ [mm]	$h_2$ [mm]	$t_{fix}$ [mm]	$t_{fix}$ [mm]	$t_{fix}$ [mm]	$l$ [mm]		[pcs]
Item	gvz	A4										
<b>SXRL 8 x 60 T</b>	<b>540113</b>	<b>540119</b>	■	—	8	70	10	—	—	60	T30	50
<b>SXRL 8 x 80 T</b>	<b>540114</b>	<b>540121</b>	■	—	8	90	30	10	—	80	T30	50
<b>SXRL 8 x 100 T</b>	<b>540115</b>	<b>540123</b>	■	—	8	110	50	30	10	100	T30	50
<b>SXRL 8 x 120 T</b>	<b>540116</b>	<b>540124</b>	■	—	8	130	70	50	30	120	T30	50
<b>SXRL 8 x 140 T</b>	<b>540117</b>	<b>540125</b>	■	—	8	150	90	70	50	140	T30	50
<b>SXRL 8 x 160 T</b>	<b>540118</b>	<b>540126</b>	■	—	8	170	110	90	70	160	T30	50
<b>SXRL 10 x 60 T</b>	<b>546477</b>	<b>546505</b>	■	●	10	70	10	—	—	60	T40	50
<b>SXRL 10 x 80 T</b>	<b>522698</b>	<b>522709</b>	■	●	10	90	30	10	—	80	T40	50
<b>SXRL 10 x 100 T</b>	<b>522699</b>	<b>522710</b>	■	●	10	110	50	30	10	100	T40	50
<b>SXRL 10 x 120 T</b>	<b>522700</b>	<b>522711</b>	■	●	10	130	70	50	30	120	T40	50
<b>SXRL 10 x 140 T</b>	<b>522701</b>	<b>522712</b>	■	●	10	150	90	70	50	140	T40	50
<b>SXRL 10 x 160 T</b>	<b>522703</b>	<b>522713</b>	■	●	10	170	110	90	70	160	T40	50
<b>SXRL 10 x 180 T</b>	<b>522704</b>	<b>522714</b>	■	●	10	190	130	110	90	180	T40	50
<b>SXRL 10 x 200 T</b>	<b>522705</b>	<b>522715</b>	■	●	10	210	150	130	110	200	T40	50
<b>SXRL 10 x 230 T</b>	<b>522706</b>	<b>522716</b>	■	●	10	240	180	160	140	230	T40	50
<b>SXRL 10 x 260 T</b>	<b>522707</b> <sup>1)</sup>	<b>522717</b> <sup>1)</sup>	■	●	10	270	210	190	170	260	T40	50
<b>SXRL 10 x 290 T</b>	<b>522708</b> <sup>1)</sup>	<b>522718</b> <sup>1)</sup>	■	●	10	300	240	220	200	290	T40	50
<b>SXRL 14 x 80 T</b>	<b>530920</b>	<b>530932</b>	■	●	14	95	—	10	—	80	T50	50
<b>SXRL 14 x 100 T</b>	<b>530921</b>	<b>530933</b>	■	●	14	115	—	30	10	100	T50	50
<b>SXRL 14 x 120 T</b>	<b>530922</b>	<b>530934</b>	■	●	14	135	—	50	30	120	T50	50
<b>SXRL 14 x 140 T</b>	<b>530923</b>	<b>530935</b>	■	●	14	155	—	70	50	140	T50	50
<b>SXRL 14 x 160 T</b>	<b>530924</b>	<b>530936</b>	■	●	14	175	—	90	70	160	T50	50
<b>SXRL 14 x 180 T</b>	<b>530925</b>	<b>530937</b>	■	●	14	195	—	110	90	180	T50	50
<b>SXRL 14 x 200 T</b>	<b>530926</b>	<b>530938</b>	■	●	14	215	—	130	110	200	T50	50
<b>SXRL 14 x 230 T</b>	<b>530927</b>	<b>530939</b>	■	●	14	245	—	160	140	230	T50	50
<b>SXRL 14 x 260 T</b>	<b>530928</b>	<b>530940</b>	■	●	14	275	—	190	170	260	T50	50
<b>SXRL 14 x 300 T</b>	<b>530929</b> <sup>1)</sup>	<b>530941</b> <sup>1)</sup>	■	●	14	315	—	230	210	300	T50	20
<b>SXRL 14 x 330 T</b>	<b>530930</b> <sup>1)</sup>	<b>530942</b> <sup>1)</sup>	■	●	14	345	—	260	240	330	T50	20
<b>SXRL 14 x 360 T</b>	<b>530931</b> <sup>1)</sup>	<b>530943</b> <sup>1)</sup>	■	●	14	375	—	290	270	360	T50	20

1) not pre-assembled

## TECHNICAL DATA



**SXRL-FUS** - with fischer hexagon head safety screw, moulded washer and integrated bit recess



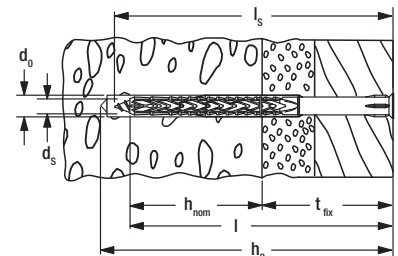
Item	Zinc-plated steel	Stainless steel	Approval		Drill diameter	Min. drill hole depth for through fixings	Usable length at anchorage depth 50mm	Usable length at anchorage depth 70mm	Usable length at anchorage depth 90mm	Anchor length	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	DIBt	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	t <sub>fix</sub> [mm]	t <sub>fix</sub> [mm]	t <sub>fix</sub> [mm]	l [mm]		[pcs]
	gvz	A4										
<b>SXRL 8 x 60 FUS</b>	<b>540127</b>	<b>540135</b>	■	—	8	70	10	—	—	60	T30/SW10	50
<b>SXRL 8 x 80 FUS</b>	<b>540129</b>	<b>540136</b>	■	—	8	90	30	10	—	80	T30/SW10	50
<b>SXRL 8 x 100 FUS</b>	<b>540130</b>	<b>540137</b>	■	—	8	110	50	30	10	100	T30/SW10	50
<b>SXRL 8 x 120 FUS</b>	<b>540131</b>	—	■	—	8	130	70	50	30	120	T30/SW10	50
<b>SXRL 8 x 140 FUS</b>	<b>540133</b>	—	■	—	8	150	90	70	50	140	T30/SW10	50
<b>SXRL 8 x 160 FUS</b>	<b>540134</b>	—	■	—	8	170	110	90	70	160	T30/SW10	50
<b>SXRL 10 x 60 FUS</b>	<b>546506</b>	<b>546507</b>	■	●	10	70	10	—	—	60	T40/SW13	50
<b>SXRL 10 x 80 FUS</b>	<b>522719</b>	<b>522730</b>	■	●	10	90	30	10	—	80	T40/SW13	50
<b>SXRL 10 x 100 FUS</b>	<b>522720</b>	<b>522731</b>	■	●	10	110	50	30	10	100	T40/SW13	50
<b>SXRL 10 x 120 FUS</b>	<b>522721</b>	<b>522732</b>	■	●	10	130	70	50	30	120	T40/SW13	50
<b>SXRL 10 x 140 FUS</b>	<b>522723</b>	<b>522733</b>	■	●	10	150	90	70	50	140	T40/SW13	50
<b>SXRL 10 x 160 FUS</b>	<b>522724</b>	<b>522734</b>	■	●	10	170	110	90	70	160	T40/SW13	50
<b>SXRL 10 x 180 FUS</b>	<b>522725</b>	<b>522735</b>	■	●	10	190	130	110	90	180	T40/SW13	50
<b>SXRL 10 x 200 FUS</b>	<b>522726</b>	<b>522736</b>	■	●	10	210	150	130	110	200	T40/SW13	50
<b>SXRL 10 x 230 FUS</b>	<b>522727</b>	<b>522737</b>	■	●	10	240	180	160	140	230	T40/SW13	50
<b>SXRL 10 x 260 FUS</b>	<b>522728</b> <sup>1)</sup>	<b>522738</b> <sup>1)</sup>	■	●	10	270	210	190	170	260	T40/SW13	50
<b>SXRL 10 x 290 FUS</b>	<b>522729</b> <sup>1)</sup>	<b>522739</b> <sup>1)</sup>	■	●	10	300	240	220	200	290	T40/SW13	50
<b>SXRL 14 x 80 FUS</b>	<b>530946</b>	<b>530955</b>	■	●	14	95	—	10	—	80	T50/SW17	50
<b>SXRL 14 x 100 FUS</b>	<b>530947</b>	<b>530956</b>	■	●	14	115	—	30	10	100	T50/SW17	50
<b>SXRL 14 x 120 FUS</b>	<b>530948</b>	<b>530957</b>	■	●	14	135	—	50	30	120	T50/SW17	50
<b>SXRL 14 x 140 FUS</b>	<b>530949</b>	<b>530958</b>	■	●	14	155	—	70	50	140	T50/SW17	50
<b>SXRL 14 x 160 FUS</b>	<b>530950</b>	<b>530959</b>	■	●	14	175	—	90	70	160	T50/SW17	50
<b>SXRL 14 x 180 FUS</b>	<b>530951</b>	<b>530960</b>	■	●	14	195	—	110	90	180	T50/SW17	50
<b>SXRL 14 x 200 FUS</b>	<b>530952</b>	<b>530961</b>	■	●	14	215	—	130	110	200	T50/SW17	50
<b>SXRL 14 x 230 FUS</b>	<b>530953</b>	<b>530962</b>	■	●	14	245	—	160	140	230	T50/SW17	50
<b>SXRL 14 x 260 FUS</b>	<b>530954</b>	<b>530963</b>	■	●	14	275	—	190	170	260	T50/SW17	50

1) not pre-assembled

## ACCESSORIES



**SXRL** - without screw



Item	Art.-No.	Drill diameter	Min. drill hole depth for through fixings	Usable length at anchorage depth 50mm	Usable length at anchorage depth 70mm	Usable length at anchorage depth 90mm	Anchor length	Screw diameter	Min. screw length	Sales unit
		d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	t <sub>fix</sub> [mm]	t <sub>fix</sub> [mm]	t <sub>fix</sub> [mm]	l [mm]	d <sub>s</sub> [mm]	l <sub>s</sub> [mm]	[pcs]
<b>SXRL 8 x 60</b>	<b>540879</b>	8	70	10	—	—	60	5,5 - 6,0	65	100
<b>SXRL 8 x 80</b>	<b>540880</b>	8	90	30	10	—	80	5,5 - 6,0	85	100
<b>SXRL 8 x 100</b>	<b>540881</b>	8	110	50	30	10	100	5,5 - 6,0	105	100
<b>SXRL 8 x 120</b>	<b>540882</b>	8	130	70	50	30	120	5,5 - 6,0	125	100

## ACCESSORIES



Cover cap **ADT**

Item	Art.-No.	Colour	Cap [Ø mm]	Match	Sales unit [pcs]
<b>ADT 15 W</b>	<b>060326</b>	white	15	Safety screw with integrated bit recess T40	100
<b>ADT 15 DB</b>	<b>060329</b>	dark brown	15	Safety screw with integrated bit recess T40	100
<b>ADT 18 W</b>	<b>060334</b>	white	18	Safety screw with integrated bit recess T40	100
<b>ADT 18 DB</b>	<b>060337</b>	dark brown	18	Safety screw with integrated bit recess T40	100

## ACCESSORIES



Washer **U**

Item	Art.-No.	External-Ø d [mm]	Hole-Ø D [mm]	Thickness S [mm]	Matching anchor type	Sales unit [pcs]
<b>U 11,5 x 21 x 1,5 DIN 522 A2</b>	<b>010026</b>	21	11.5	1.5	SXR 10, SXRL 10, FUR 10	500

## LOADS

### Frame fixing SXRL<sup>3)</sup>

Highest recommended loads<sup>1)</sup> for a single anchor as part of a multiple fixing of non-structural systems.

The given loads are valid for wood screws with the specified diameter.

Type			SXRL 8		
Anchorage depth	$h_{nom}$	[mm]	50	70	90
Screw diameter	Ø	[mm]	6,0	6,0	6,0
Min. edge distance concrete	$a_r$	[mm]	60	80	100
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>					
Concrete	$\geq C20/25$	[kN]	0,60	1,00	1,00
Solid brick	$\geq Mz 12$	[kN]	0,45	0,60	0,60
Solid sand-lime brick	$\geq KS 12$	[kN]	0,40	0,50	0,50
Vertically perforated brick	$\geq Hlz 12$ ( $\rho \geq 1,0 \text{ kg/dm}^3$ )	[kN]	0,15	0,15	0,15
Perforated sand-lime brick	$\geq KSL 12$	[kN]	0,10	0,40	0,40
Aerated concrete	AAC 2	[kN]	-	0,10	0,10
Aerated concrete	AAC 4	[kN]	-	0,15	0,20

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>3)</sup> Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity have to be taken.



## LOADS

### Frame fixing SXRL<sup>4)</sup>

Highest permissible loads<sup>1)2)</sup> of a single anchor as part of a multiple fixing of non-structural systems.  
For the design the complete assessment ETA-07/0121 has to be considered.

Product			SXRL								
Anchor diameter		[mm]	Ø 8			Ø 10			Ø 14		
Anchorage depth		$h_{nom}$	[mm]	50	70	90	50	70	90	70	90
Anchorage in concrete $\geq$ C12/15											
Permissible tensile load			[kN]	1,59	1,98		1,98	2,58		3,37	
Permissible shear load	Zinc-plated steel		[kN]	4,23			5,98			12,40	
	Stainless steel A4		[kN]	3,93			5,98			11,63	
Minimum member thickness		$h_{min}$	[mm]	80	100	120	100		120	110	130
Characteristic edge distance		$c_{cr,N}$	[mm]	85			140			140	
Characteristic spacing		$a$ resp. $s_{cr,N}$	[mm]	90	105		120			135	
Minimum spacing with an edge distance	$s_{min}$	[mm]	85			70			85		
	$c \geq$	[mm]	85			140			140		
Minimum edge distance with a spacing	$c_{min}$	[mm]	85			70			85		
	$s \geq$	[mm]	85			175			175		
Anchorage in narrow concrete members ( $h \geq 40$ mm) made of concrete $\geq$ C12/15, e.g. weather shells of triple-skin outer wall panels											
Permissible tensile load			[kN]	-			0,99	-		-	
Permissible shear load			[kN]	-			5,98	-		-	
Anchorage in pre-stressed hollow-core concrete slabs (mirror thickness $d_b \geq 30$ mm) made of concrete $\geq$ C45/55											
Permissible tensile load			[kN]	-			1,39	-		-	
Permissible shear load			[kN]	-			5,98	-		-	
Anchorage in masonry											
Permissible load <sup>3)</sup> in solid brick	$\geq Mz 12$ a. $\geq NF$		[kN]	0,57	0,71		0,57	1,14	-	0,86	
	$\geq Mz 20$ a. $\geq NF$		[kN]	0,86	1,14		1,00	1,14	-	1,14	
Permissible load <sup>3)</sup> in solid sand-lime brick	$\geq KS 10$ a. $\geq NF$		[kN]	0,57			0,57	0,71	-	0,86	
	$\geq KS 20$ a. $\geq NF$		[kN]	0,71	0,86		1,00		-	1,29	
Permissible load <sup>3)</sup> in lightweight concrete block	$\geq V 2$ ; $\rho \geq 1,2$ kg/dm <sup>3</sup>		[kN]	0,11	0,26		0,11		-	0,26	
	$\geq V 6$ ; $\rho \geq 1,6$ kg/dm <sup>3</sup>		[kN]	0,34	0,57		0,57	1,29	-	0,57	
Permissible load <sup>3)5)</sup> in vertically perforated brick (e.g. Poroton)	$\geq HLz 10$ ; $\rho \geq 1,0$ kg/dm <sup>3</sup>		[kN]	0,17			-	0,21	-	0,57	0,71
	$\geq KSL 6$		[kN]	-			-	0,21	-	0,26	0,34
Permissible load <sup>3)</sup> in perforated sand-lime brick	$\geq KSL 12$		[kN]	0,34	0,43		-	0,71	-	0,43	0,71
	$\geq HBL 2$		[kN]	0,43	0,57	0,43	0,57	0,71	-	0,34	0,21
Permissible load in <sup>3)5)</sup> hollow lightweight concrete blocks	$\geq HBL 6$		[kN]	0,43	0,71	0,43	0,71	0,43	-	0,57	-
	$f_b \geq 10$ N/mm <sup>2</sup> ; $\rho \geq 0,7$ kg/dm <sup>3</sup>		[kN]	-			-	0,57	-	-	
Minimum member thickness		$h_{min}$	[mm]	115			110			115	
Minimum spacing (single anchor)		$a_{min}$	[mm]	250			250			250	
Minimum spacing (anchor group)		$s_{min}$	[mm]	100			100			100	
Minimum edge distance (anchor group)		$c_{min}$	[mm]	100			100			100	
Anchorage in aerated concrete											
Permissible load <sup>3)</sup> in aerated concrete	2 N/mm <sup>2</sup>		[kN]	-	0,14	0,21	-	0,18	0,21	0,32	0,43
	4 N/mm <sup>2</sup>		[kN]	-	0,32	0,43	-	0,43	0,54	0,89	1,07
	6 N/mm <sup>2</sup>		[kN]	-	0,54	0,71	-	0,71	0,89	1,43	1,79
Minimum member thickness		$h_{min}$	[mm]	-	175		-	100	120	175 <sup>6)</sup> /300 <sup>7)</sup>	
Minimum spacing (single anchor)		$a_{min}$	[mm]	-	250		-	250		250	
Minimum spacing (anchor group)		$s_{min}$	[mm]	-	80 <sup>6)</sup> / 110 <sup>8)</sup>		-	100 <sup>6)</sup> / 120 <sup>8)</sup>		80	100 <sup>6)</sup> /125 <sup>7)</sup>
Minimum edge distance (anchor group)		$c_{min}$	[mm]	-	90 <sup>6)</sup> /110 <sup>8)</sup>		-	120		120	120 <sup>6)</sup> /150 <sup>7)</sup>

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions  $\gamma_L = 1,4$  are considered.

As a single anchor counts e.g. an anchor with a minimum spacing  $a$  according to table B4.1 resp. table B4.2 of the assessment.

<sup>2)</sup> Valid for temperatures in the substrate up to +50 °C (resp. short term up to +80 °C). For long term temperatures up to +30 °C higher permissible loads may be possible.

<sup>3)</sup> Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see assessment.

<sup>4)</sup> Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity according to assessment have to be taken.

<sup>5)</sup> Rotary drilling.

<sup>6)</sup> Only valid for AAC with compression strength  $\geq 2$  to  $< 4$  N/mm<sup>2</sup>.

<sup>7)</sup> Only valid for AAC with compression strength  $\geq 4$  N/mm<sup>2</sup>.

<sup>8)</sup> Only valid for AAC with compression strength  $\geq 6$  N/mm<sup>2</sup>.



## LOADS

### Frame fixing SXRL<sup>3)</sup>

Highest permissible compression loads<sup>1)2)</sup> of a single anchor as part of a multiple fixing of non-structural systems.

For the design the complete approval Z-2.1.2-2037 has to be considered.

Product			SXRL	
Anchor diameter		[mm]	Ø 14	
Anchorage depth	h <sub>nom</sub>	[mm]	70	90
Anchorage in concrete ≥ C12/15				
Permissible compression load		[kN]	3,37	
Minimum member thickness	h <sub>min</sub>	[mm]	110	130
Characteristic edge distance	c <sub>cr,N</sub>	[mm]	140	
Characteristic spacing	a resp. s <sub>cr,N</sub>	[mm]	135	
Minimum spacing	s <sub>min</sub>	[mm]	85	
with an edge distance	c ≥	[mm]	140	
Minimum edge distance	c <sub>min</sub>	[mm]	85	
with a spacing	s ≥	[mm]	175	
Anchorage in masonry				
Permissible compression load in solid brick	≥ Mz 12 a. ≥ NF	[kN]	0,86	
	≥ Mz 20 a. ≥ NF	[kN]	1,14	
Permissible compression load in solid sand-lime brick	≥ KS 10 a. ≥ NF	[kN]	0,86	
	≥ KS 20 a. ≥ NF	[kN]	1,29	
Permissible compression load in lightweight concrete block	≥ V 2; ρ ≥ 1,2 kg/dm³	[kN]	0,26	0,34
	≥ V 6; ρ ≥ 1,6 kg/dm³	[kN]	0,57	
Permissible compression load <sup>4)</sup> in vertically perforated brick (e.g. Poroton)	≥ HLz 10; ρ ≥ 1,0 kg/dm³	[kN]	0,34	0,57
Permissible compression load in perforated sand-lime brick	≥ KSL 6	[kN]	0,21	0,34
	≥ KSL 12	[kN]	0,43	0,71
Permissible compression load <sup>4)</sup> in hollow lightweight concrete blocks	≥ HBL 2	[kN]	0,26	-
Minimum member thickness	h <sub>min</sub>	[mm]	115	
Minimum spacing (single anchor)	a <sub>min</sub>	[mm]	250	
Minimum spacing (anchor group)	s <sub>min</sub>	[mm]	100	
Minimum edge distance (anchor group)	c <sub>min</sub>	[mm]	100	
Anchorage in aerated concrete				
Permissible compression load in aerated concrete	2 N/mm²	[kN]	0,32	
	4 N/mm²	[kN]	0,89	1,07
	6 N/mm²	[kN]	1,43	1,79
Minimum member thickness	h <sub>min</sub>	[mm]	175 <sup>5)</sup> /300 <sup>6)</sup>	
Minimum spacing (single anchor)	a <sub>min</sub>	[mm]	250	
Minimum spacing (anchor group)	s <sub>min</sub>	[mm]	80	100 <sup>5)</sup> /125 <sup>6)</sup>
Minimum edge distance (anchor group)	c <sub>min</sub>	[mm]	120	120 <sup>5)</sup> /150 <sup>6)</sup>

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions  $\gamma_L = 1,4$  are considered.

As a single anchor counts e.g. an anchor with a minimum spacing  $a$  according to tables B3.1, B4.1 resp. B4.2 of the ETA-07/0121.

<sup>2)</sup> Valid for temperatures in the substrate up to +50 °C (resp. short term up to +80 °C). For long term temperatures up to +30 °C higher permissible loads may be possible.

<sup>3)</sup> Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity according to assessment have to be taken.

<sup>4)</sup> Rotary drilling.

<sup>5)</sup> Only valid for AAC with compression strength  $\geq 2$  to  $< 4 \text{ N/mm}^2$ .

<sup>6)</sup> Only valid for AAC with compression strength  $\geq 4 \text{ N/mm}^2$ .

## The efficient with short expansion element



### VERSIONS

- Zinc-plated steel
- Stainless steel
- Hot-dip galvanised steel

### BUILDING MATERIALS

#### Approved for:

- Concrete  $\geq$  C 12/15
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid block made from lightweight and normal weight concrete
- Solid brick
- Thermal insulation blocks

#### Also suitable for:

- Natural stone with dense structure
- Solid panel made from gypsum

### CERTIFICATES



### ADVANTAGES

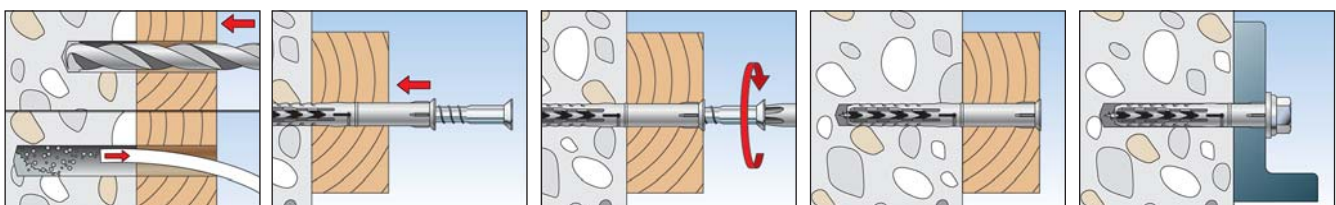
- The special functioning allows for use in solid and hollow building materials with an anchorage depth of just 50 mm, ensuring an economical fixing.
- The ETA assessment covers use in a range of solid and hollow building materials, and guarantees a secure fixing.
- The specially developed combination of plugs and screws ensures the very best handling. The plug has a noticeable hold, making installation more convenient.
- The extensive range with diameters of 6, 8 and 10 mm, usable lengths up to 210 mm.

### APPLICATIONS

- Façade, ceiling and roof substructures made of wood and metal
- Windows
- Gates and doors
- Wardrobes
- Kitchen hanging cabinets
- Squared timbers
- Beams
- TV consoles
- Wall covering
- Metal brackets
- Metal supports
- Cable ducts
- Cable trays

### FUNCTIONING

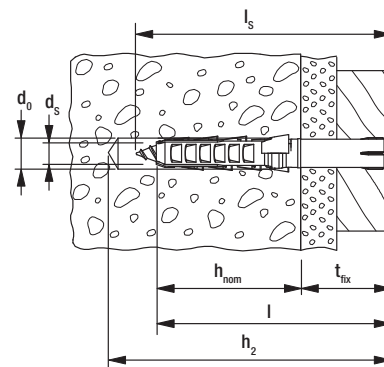
- The SXR is suitable for push-through installation.
- The SXR expands in solid building materials. In hollow building materials the loads are transmitted to the substrate webs.
- With vertically perforated bricks, only use rotary drilling (no impact drilling).
- SXR-T with countersunk head screw is recommended for the installation of timber constructions; in the case of metal constructions, use SXR-FUS with a wide sleeve rim and a moulded washer on the screw, which also features an integrated hexagon socket.



## TECHNICAL DATA



**SXR** - without screw

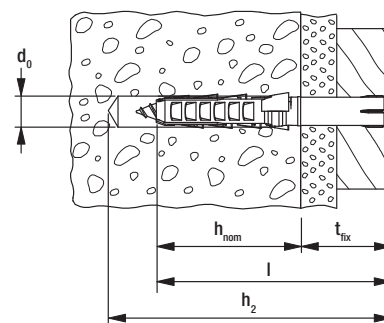


Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Min. anchorage depth $h_{nom}$ [mm]	Anchor length $l$ [mm]	Screw diameter $d_s$ [mm]	Min. screw length $l_s$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Sales unit [pcs]
<b>SXR 6 x 35</b>	<b>503228</b>	6	45	30	35	4,5	40	5	100
<b>SXR 6 x 50</b>	<b>503229</b>	6	60	30	50	4,5	55	20	100
<b>SXR 6 x 60</b>	<b>503230</b>	6	70	30	60	4,5	65	30	100
<b>SXR 8 x 60</b>	<b>506194</b>	8	70	50	60	5,5 - 6,0	65	10	100
<b>SXR 8 x 80</b>	<b>506196</b>	8	90	50	80	5,5 - 6,0	85	30	100
<b>SXR 8 x 100</b>	<b>506198</b>	8	110	50	100	5,5 - 6,0	125	50	100
<b>SXR 8 x 120</b>	<b>506199</b>	8	130	50	120	5,5 - 6,0	105	70	100

## TECHNICAL DATA



**SXR-Z** - with zinc-plated countersunk head screw with cross drive PZ



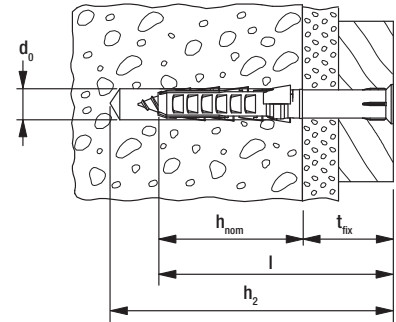
Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Min. anchorage depth $h_{nom}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Drive	Sales unit [pcs]
<b>SXR 6 x 60 Z</b>	<b>503233</b> <sup>1)</sup>	6	70	30	60	30	PZ2	50

<sup>1)</sup> not pre-assembled

## TECHNICAL DATA



**SXR-T** - with fischer countersunk head safety screw

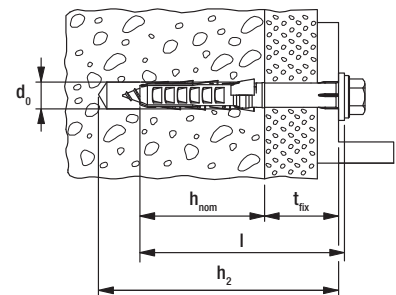


	Zinc-plated steel	Stainless steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	$d_0$ [mm]	$h_2$ [mm]	$h_{nom}$ [mm]	$l$ [mm]	$t_{fix}$ [mm]		[pcs]
Item	gvz	A4	hdg								
SXR 8 x 60 T	502999	—	—	■	8	70	50	60	10	T30	50
SXR 8 x 80 T	503000	—	—	■	8	90	50	80	30	T30	50
SXR 8 x 100 T	503001	—	—	■	8	110	50	100	50	T30	50
SXR 8 x 120 T	503002	—	—	■	8	130	50	120	70	T30	50
SXR 10 x 80 T	046263	046272	—	■	10	90	50	80	30	T40	50
SXR 10 x 100 T	046264	046274	—	■	10	110	50	100	50	T40	50
SXR 10 x 100 T	—	—	509534	—	10	110	50	100	50	T40	50
SXR 10 x 120 T	046265	046278	—	■	10	130	50	120	70	T40	50
SXR 10 x 120 T	—	—	509535	—	10	130	50	120	70	T40	50
SXR 10 x 140 T	046266	046279	—	■	10	150	50	140	90	T40	50
SXR 10 x 140 T	—	—	509536	—	10	150	50	140	90	T40	50
SXR 10 x 160 T	046267	046283	—	■	10	170	50	160	110	T40	50
SXR 10 x 180 T	046268	046285	—	■	10	190	50	180	130	T40	50
SXR 10 x 200 T	046269	046286	—	■	10	210	50	200	150	T40	50
SXR 10 x 230 T	046270	046287	—	■	10	240	50	230	180	T40	50
SXR 10 x 260 T	046271	046288	—	■	10	270	50	260	210	T40	50

## TECHNICAL DATA



**SXR-FUS** - with fischer hexagon head safety screw, moulded washer and integrated T40 bit recess



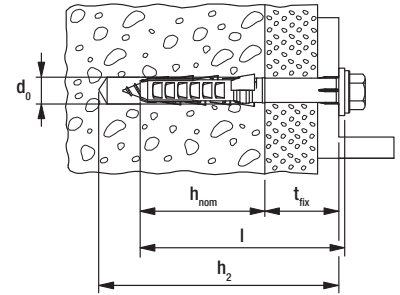
	Zinc-plated steel	Stainless steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	$d_0$ [mm]	$h_2$ [mm]	$h_{nom}$ [mm]	$l$ [mm]	$t_{fix}$ [mm]		[pcs]
Item	gvz	A4	hdg								
SXR 10 x 52 FUS	502456 <sup>1)</sup>	—	—	■	10	62	50	52	2	T40/SW13	50
SXR 10 x 60 FUS	046329	046339	—	■	10	70	50	60	10	T40/SW13	50
SXR 10 x 60 FUS	—	—	509537	—	10	70	50	60	10	T40/SW13	50
SXR 10 x 80 FUS	046330	046340	—	■	10	90	50	80	30	T40/SW13	50
SXR 10 x 80 FUS	—	—	509538	—	10	90	50	80	30	T40/SW13	50
SXR 10 x 100 FUS	046331	046342	—	■	10	110	50	100	50	T40/SW13	50
SXR 10 x 100 FUS	—	—	509539	—	10	110	50	100	50	T40/SW13	50
SXR 10 x 120 FUS	046332	046343	—	■	10	130	50	120	70	T40/SW13	50
SXR 10 x 140 FUS	046333	046344	—	■	10	150	50	140	90	T40/SW13	50
SXR 10 x 140 FUS	—	—	509540	—	10	150	50	140	90	T40/SW13	50

1) not pre-assembled

## TECHNICAL DATA



**SXR-FUS** - with fischer hexagon head safety screw, moulded washer and integrated T40 bit recess



	Zinc-plated steel	Stainless steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	h <sub>nom</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]		[pcs]
Item	gvz	A4	hdg								
<b>SXR 10 x 160 FUS</b>	<b>046334</b>	<b>046345</b>	—	■	10	170	50	160	110	T40/SW13	50
<b>SXR 10 x 180 FUS</b>	<b>046335</b>	<b>046361</b>	—	■	10	190	50	180	130	T40/SW13	50
<b>SXR 10 x 200 FUS</b>	<b>046336</b>	<b>046362</b>	—	■	10	210	50	200	150	T40/SW13	50
<b>SXR 10 x 230 FUS</b>	<b>046337</b>	<b>046363</b>	—	■	10	240	50	230	180	T40/SW13	50
<b>SXR 10 x 260 FUS</b>	<b>046338</b>	<b>046364</b>	—	■	10	270	50	260	210	T40/SW13	50

1) not pre-assembled

## ACCESSORIES



Cover cap **ADT**

Item	Art.-No.	Colour	Cap	Match	Sales unit
			[Ø mm]		[pcs]
<b>ADT 15 W</b>	<b>060326</b>	white	15	Safety screw with integrated bit recess T40	100
<b>ADT 15 DB</b>	<b>060329</b>	dark brown	15	Safety screw with integrated bit recess T40	100
<b>ADT 18 W</b>	<b>060334</b>	white	18	Safety screw with integrated bit recess T40	100
<b>ADT 18 DB</b>	<b>060337</b>	dark brown	18	Safety screw with integrated bit recess T40	100

## ACCESSORIES



Washer **U**

Item	Art.-No.	External-Ø	Hole-Ø	Thickness	Matching anchor type	Sales unit
		d [mm]	D [mm]	S [mm]		[pcs]
<b>U 11,5 x 21 x 1,5 DIN 522 A2</b>	<b>010026</b>	21	11.5	1.5	SXR 10, SXRL 10, FUR 10	500

## ACCESSORIES



Aircrete hole punch **GBS**

Item	Art.-No.	Drill hole	Min. drill hole depth for through fixings	Match	Sales unit
		d <sub>0</sub> [Ø mm]	h <sub>2</sub> [mm]		[pcs]
<b>GBS 10 x 80</b>	<b>050590</b> 1)	9	85	SXR 10 x 52, SXR 10 x 60, SXR 10 x 80	1
<b>GBS 10 x 100</b>	<b>050591</b> 1)	9	105	SXR 10 x 100	1
<b>GBS 10 x 135</b>	<b>050593</b> 1)	9	140	SXR 10 x 120	1
<b>GBS 10 x 160</b>	<b>050594</b> 1)	9	165	SXR 10 x 140, SXR 10 x 160	1
<b>GBS 10 x 185</b>	<b>050595</b> 1)	9	190	SXR 10 x 180	1
<b>GBS 10 x 230</b>	<b>050596</b> 1)	9	235	SXR 10 x 200, SXR 10 x 230	1

1) According to the ETA, the aircrete hole punch GBS must be used for drill-hole production in aerated concrete PB < 4N/mm<sup>2</sup>.

## LOADS

### Frame fixing SXR<sup>4)</sup>

Highest permissible loads<sup>1)2)</sup> of a single anchor as part of a multiple fixing of non-structural systems.  
For the design the complete assessment ETA-07/0121 has to be considered.

Product			SXR	
Anchor diameter		[mm]	Ø 8	Ø 10
Anchorage depth	$h_{nom}$	[mm]	50	50
<b>Anchorage in concrete <math>\geq</math> C12/15</b>				
Permissible tensile load		[kN]	0,99	1,79
Permissible shear load	Zinc-plated steel	[kN]	4,23	5,98
	Stainless steel A4	[kN]	3,93	5,98
Minimum member thickness	$h_{min}$	[mm]	100	100
Characteristic edge distance	$c_{cr,N}$	[mm]	70	140
Characteristic spacing	$a$ resp. $s_{cr,N}$	[mm]	70	100
Minimum spacing	$s_{min}$	[mm]	70	70
with an edge distance	$c \geq$	[mm]	70	210
Minimum edge distance	$c_{min}$	[mm]	70	85
with a spacing	$s \geq$	[mm]	70	100
<b>Anchorage in narrow concrete members (<math>h \geq 40</math> mm) made of concrete <math>\geq</math> C12/15, e.g. weather shells of triple-skin outer wall panels</b>				
Permissible tensile load		[kN]	-	1,19
Permissible shear load		[kN]	-	5,98
<b>Anchorage in masonry</b>				
Permissible load <sup>3)</sup> in solid brick	$\geq Mz 12$ a. $\geq NF$	[kN]	0,57	0,57
	$\geq Mz 20$ a. $\geq NF$	[kN]	0,71	0,86
Permissible load <sup>3)</sup> in solid sand-lime brick	$\geq KS 10$ a. $\geq NF$	[kN]	0,57	0,57
	$\geq KS 20$ a. $\geq NF$	[kN]	0,71	0,71
Permissible load <sup>3)</sup> in lightweight concrete block	$\geq V 2; \rho \geq 1,2 \text{ kg/dm}^3$	[kN]	0,26	0,21
	$\geq V 6; \rho \geq 1,6 \text{ kg/dm}^3$	[kN]	0,26	0,71
Permissible load <sup>3)5)</sup> in vertically perforated brick (e.g. Poroton)	$\geq HLz 10; \rho \geq 1,0 \text{ kg/dm}^3$	[kN]	0,17	0,26
Permissible load <sup>3)</sup> in perforated sand-lime brick	$\geq KSL 6$	[kN]	0,26	0,43
	$\geq KSL 12$	[kN]	0,57	0,57
Permissible load <sup>3)5)</sup> in hollow lightweight concrete blocks	$\geq HBL 2$	[kN]	-	0,43
	$\geq HBL 6$	[kN]	0,43	0,57
Minimum member thickness	$h_{min}$	[mm]	100	100
Minimum spacing (single anchor)	$a_{min}$	[mm]	250	250
Minimum spacing (anchor group)	$s_{min}$	[mm]	100	100
Minimum edge distance (anchor group)	$c_{min}$	[mm]	100	100
<b>Anchorage in aerated concrete</b>				
Permissible load <sup>3)</sup> in aerated concrete	$2 \text{ N/mm}^2$	[kN]	-	0,14 <sup>6)</sup>
	$4 \text{ N/mm}^2$	[kN]	-	0,27
	$6 \text{ N/mm}^2$	[kN]	-	0,27
Minimum member thickness	$h_{min}$	[mm]	-	100
Minimum spacing (single anchor)	$a_{min}$	[mm]	-	250
Minimum spacing (anchor group)	$s_{min}$	[mm]	-	400
Minimum edge distance (anchor group)	$c_{min}$	[mm]	-	100

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions  $\gamma_L = 1,4$  are considered.  
As a single anchor counts e.g. an anchor with a minimum spacing  $a$  according to table B4.1 resp. table B4.2 of the assessment.

<sup>2)</sup> Valid for temperatures in the substrate up to +50 °C (resp. short term up to +80 °C). For long term temperatures up to +30 °C higher permissible loads may be possible.

<sup>3)</sup> Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see assessment.

<sup>4)</sup> Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity according to assessment have to be taken.

<sup>5)</sup> Rotary drilling.

<sup>6)</sup> Drill holes to be made with aerated concrete hole punch.



## LOADS

### Frame fixing SXR<sup>3)</sup>

Highest recommended loads<sup>1)</sup> for a single anchor as part of a multiple fixing of non-structural systems.

The given loads are valid for wood screws with the specified diameter.

Type			SXR 6	SXR 8
Anchorage depth	$h_{nom}$	[mm]	30	50
Screw diameter	$\emptyset$	[mm]	4,5	6,0
Min. edge distance concrete	$a_r$	[mm]	50	60
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>				
Concrete	$\geq C20/25$	[kN]	0,25	0,40
Solid brick	$\geq Mz 12$	[kN]	0,20	0,30
Solid sand-lime brick	$\geq KS 12$	[kN]	0,20	0,30
Vertically perforated brick	$\geq Hlz 12$ ( $\rho \geq 1,0 \text{ kg/dm}^3$ )	[kN]	0,10	0,10
Perforated sand-lime brick	$\geq KSL 12$	[kN]	0,20	0,30

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>3)</sup> Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity have to be taken.

## The lamella plug with gentle power transfer



### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

#### Approved for:

- Concrete  $\geq$  C12/15
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick made from lightweight concrete
- Solid brick

#### Also suitable for:

- Natural stone with dense structure
- Solid panel made from gypsum
- Hollow blocks made from lightweight concrete
- Three-layer composite exterior wall panels
- Lightweight aggregate concrete

### CERTIFICATES



### ADVANTAGES

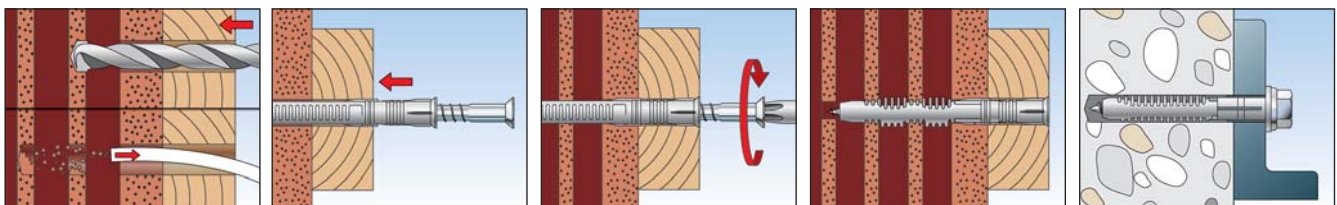
- The operating principle with an anchorage depth of 70 mm and proven asymmetrical teeth, makes it an assembly-friendly anchor even in an unknown base material.
- The slim geometry guarantees a simple installation, even in cases involving thick wooden fixtures and narrow drill holes.
- Range available with diameters of 8 and 10 mm and usable lengths up to 160 mm.

### APPLICATIONS

- Façade, ceiling and roof substructures made of wood and metal
- Windows
- Gates and doors
- Squared timbers
- Beams
- Wall covering

### FUNCTIONING

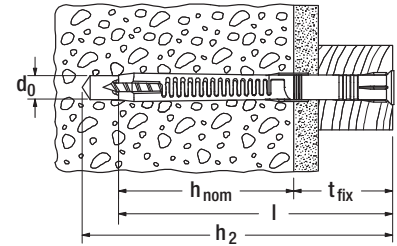
- The FUR is suitable for push-through installation.
- Screwing in the screw causes the individual teeth to expand. In solid materials, the teeth create even expansion forces. In hollow materials, the teeth expand through the solid part of the block and form an undercut in the cavity.
- With vertically perforated bricks, only use rotary drilling (no impact drilling).
- FUR-T with countersunk head screw is recommended for the installation of timber constructions; in the case of metal constructions, use FUR-FUS with a wide sleeve rim and a moulded washer on the screw.



## TECHNICAL DATA



**FUR-T** - with fischer countersunk head safety screw

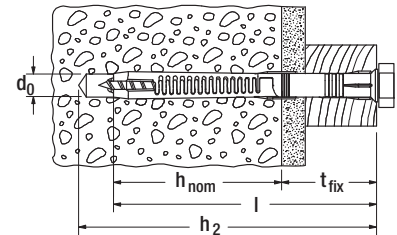


	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	h <sub>nom</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]		[pcs]
Item	gvz	A4								
<b>FUR 8 x 80 T</b>	<b>070110</b>	<b>070120</b>	—	8	90	70	80	10	T30	50
<b>FUR 8 x 100 T</b>	<b>070111</b>	<b>070121</b>	—	8	110	70	100	30	T30	50
<b>FUR 8 x 120 T</b>	<b>070112</b>	<b>070122</b>	—	8	130	70	120	50	T30	50
<b>FUR 10 x 80 T</b>	<b>088756</b>	<b>088784</b>	■	10	90	70	80	10	T40	50
<b>FUR 10 x 100 T</b>	<b>088757</b>	<b>088785</b>	■	10	110	70	100	30	T40	50
<b>FUR 10 x 115 T</b>	<b>088760</b>	<b>088791</b>	■	10	125	70	115	45	T40	50
<b>FUR 10 x 135 T</b>	<b>088758</b>	<b>088786</b>	■	10	145	70	135	65	T40	50
<b>FUR 10 x 160 T</b>	<b>088759</b>	<b>088787</b>	■	10	170	70	160	90	T40	50
<b>FUR 10 x 185 T</b>	<b>088761</b>	<b>088788</b>	■	10	195	70	185	115	T40	50
<b>FUR 10 x 200 T</b>	<b>088764</b>	<b>088789</b>	■	10	210	70	200	130	T40	50
<b>FUR 10 x 230 T</b>	<b>088762</b>	<b>088790</b>	■	10	240	70	230	160	T40	50

## TECHNICAL DATA



**FUR-SS** - with fischer hexagon head safety screw

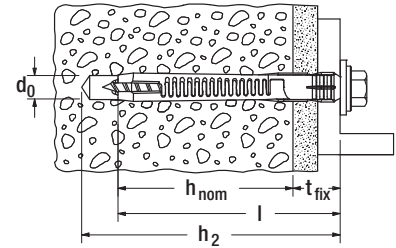


	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	h <sub>nom</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]		[pcs]
Item	gvz	A4								
<b>FUR 8 x 80 SS</b>	<b>070130</b>	<b>070140</b>	—	8	90	70	80	10	SW 10	50
<b>FUR 8 x 100 SS</b>	<b>070131</b>	<b>070141</b>	—	8	110	70	100	30	SW 10	50
<b>FUR 8 x 120 SS</b>	<b>070132</b>	—	—	8	130	70	120	50	SW 10	50
<b>FUR 10 x 80 SS</b>	<b>088776</b>	<b>088792</b>	■	10	90	70	80	10	SW 13	50
<b>FUR 10 x 100 SS</b>	<b>088777</b>	<b>088793</b>	■	10	110	70	100	30	SW 13	50
<b>FUR 10 x 115 SS</b>	<b>088783</b>	<b>088799</b>	■	10	125	70	115	45	SW 13	50
<b>FUR 10 x 135 SS</b>	<b>088778</b>	<b>088794</b>	■	10	145	70	135	65	SW 13	50
<b>FUR 10 x 160 SS</b>	<b>088779</b>	<b>088795</b>	■	10	170	70	160	90	SW 13	50
<b>FUR 10 x 185 SS</b>	<b>088780</b>	<b>088796</b>	■	10	195	70	185	115	SW 13	50
<b>FUR 10 x 200 SS</b>	<b>088781</b>	<b>088797</b>	■	10	210	70	200	130	SW 13	50
<b>FUR 10 x 230 SS</b>	<b>088782</b>	<b>088798</b>	■	10	240	70	230	160	SW 13	50

## TECHNICAL DATA



**FUR-FUS** - with fischer hexagon head safety screw, moulded washer and integrated bit recess



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	d <sub>0</sub> [mm]	h <sub>2</sub> [mm]	h <sub>nom</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]		[pcs]
Item	gvz	A4								
<b>FUR 10 x 80 FUS</b>	<b>093527</b> <sup>1)</sup>	<b>093528</b> <sup>1)</sup>	■	10	90	70	80	10	T40/SW13	50
<b>FUR 10 x 100 FUS</b>	<b>097797</b> <sup>1)</sup>	—	■	10	110	70	100	30	T40/SW13	50

<sup>1)</sup> Collar: Ø 18 x 2 mm.

## ACCESSORIES



Cover cap **ADT**

		Colour	Cap	Match	Sales unit
Item	Art.-No.		[Ø mm]		[pcs]
<b>ADT 15 W</b>	<b>060326</b>	white	15	Safety screw with integrated bit recess T40	100
<b>ADT 15 DB</b>	<b>060329</b>	dark brown	15	Safety screw with integrated bit recess T40	100
<b>ADT 18 W</b>	<b>060334</b>	white	18	Safety screw with integrated bit recess T40	100
<b>ADT 18 DB</b>	<b>060337</b>	dark brown	18	Safety screw with integrated bit recess T40	100

## ACCESSORIES



Washer **U**

		External-Ø	Hole-Ø	Thickness	Matching anchor type	Sales unit
Item	Art.-No.	d [mm]	D [mm]	S [mm]		[pcs]
<b>U 11,5 x 21 x 1,5 DIN 522 A2</b>	<b>010026</b>	21	11.5	1.5	SXR 10, SXRL 10, FUR 10	500

## LOADS

### Frame fixing FUR 10<sup>4)</sup>

Highest permissible loads<sup>1)2)</sup> of a single anchor as part of a multiple fixing of non-structural systems.

For the design the complete approval ETA-13/0235 has to be considered.

Product			FUR 10
Anchorage depth	$h_{nom}$	[mm]	70
<b>Anchorage in concrete <math>\geq</math> C12/15</b>			
Permissible tensile load		[kN]	1,79
Permissible shear load	Zinc-plated steel	[kN]	5,37
	Stainless steel A4	[kN]	4,98
Minimum member thickness	$h_{min}$	[mm]	110
Characteristic edge distance	$c_{cr,N}$	[mm]	140
Characteristic spacing	$a$ resp. $s_{cr,N}$	[mm]	90
Minimum spacing	$s_{min}$	[mm]	70
with an edge distance	$c \geq$	[mm]	140
Minimum edge distance	$c_{min}$	[mm]	70
with a spacing	$s \geq$	[mm]	210
<b>Anchorage in masonry</b>			
Permissible load <sup>3)</sup> in solid brick	$\geq Mz 12$ a. $\geq NF$	[kN]	0,86
	$\geq Mz 20$ a. $\geq NF$	[kN]	0,86
Permissible load <sup>3)</sup> in solid sand-lime brick	$\geq KS 10$ a. $\geq NF$	[kN]	0,57
	$\geq KS 20$ a. $\geq NF$	[kN]	0,71
Permissible load <sup>3)</sup> in lightweight concrete block	$\geq V 6$ ; $\rho \geq 1,6 \text{ kg/dm}^3$	[kN]	0,57
Permissible load <sup>3)5)</sup> in vertically perforated brick (e.g. Poroton)	$\geq HLz 10$ ; $\rho \geq 1,0 \text{ kg/dm}^3$	[kN]	0,37
Permissible load <sup>3)</sup> in perforated sand-lime brick	$\geq KSL 12$	[kN]	0,57
Minimum member thickness	$h_{min}$	[mm]	110
Minimum spacing (single anchor)	$a_{min}$	[mm]	250
Minimum spacing (anchor group)	$s_{min}$	[mm]	100
Minimum edge distance (anchor group)	$c_{min}$	[mm]	100

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions  $\gamma_F = 1,4$  are considered.

As a single anchor counts e.g. an anchor with a minimum spacing a according to table 8 resp. table 10 of the approval.

<sup>2)</sup> Valid for temperatures in the substrate up to +50 °C (resp. short term up to +80 °C).

<sup>3)</sup> Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see approval.

<sup>4)</sup> Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity according to approval have to be taken.

<sup>5)</sup> Rotary drilling.

## LOADS

### Frame fixing FUR 8<sup>3)</sup>

Highest recommended loads<sup>1)</sup> for a single anchor for multiple fixings of non-structural systems.

The given loads are valid for fischer safety screws included in delivery.

Type			FUR 8
Anchorage depth	$h_{nom}$	[mm]	70
Diameter of the safety screw	$\emptyset$	[mm]	6,0
Min. edge distance concrete	$a_r$	[mm]	50
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>			
Concrete	$\geq C12/15$	[kN]	1,0
Solid brick	$\geq Mz 12$	[kN]	0,60
Solid sand-lime brick	$\geq KS 12$	[kN]	0,60

<sup>1)</sup> Required safety factors are considered.

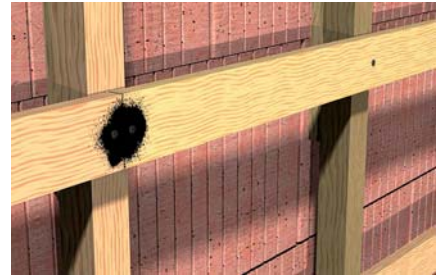
<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>3)</sup> Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity have to be taken.

## The elastic protective coating for use with frame fixings



Sealing of the screw heads



Sealing of the screw heads

### BUILDING MATERIALS

- Zinc-plated frame fixings
- Corrosive metals

### ADVANTAGES

- FTC-CP professionally prevents the penetration of moisture into the anchor shaft and securely protects the connection from corrosion - as required in the ETA assessments.
- Once dry, the optimised formulation provides a long-lasting, elastic protective coating with a secure hold and a high abrasion resistance.
- The thixotropic anti-corrosion agent is also ideally suited to other corrosion protection applications and thus offers a wide range of uses.

### APPLICATIONS

- Façade anchorings in line with the assessments for frame fixings, e.g. SXR, SXRL and FUR
- For all substructures, e.g. made from wood, aluminium, metal.

### FUNCTIONING

- Thixotropic, bitumen-based anti-corrosion agent.
- Good stability under load; non-drip, no spray mist.
- Shake canister for at least 2 minutes from the time the mixing balls can be heard.
- Spray as evenly as possible from a distance of 15 to 20 cm.
- Ideal processing temperature +16 °C to +25 °C.
- Quick-drying (dried through after 3-4 hours at 600 m<sub>μ</sub> and 20 °C).
- Temperature-resistant from -25 °C to 80 °C.
- Salt and water-resistant, and resistant to abrasion.
- With one can about 300 screw heads can be coated.

### TECHNICAL DATA



Anti-corrosion spray **FTC-CP**

Item	Art.-No.	Colour	Content per can [ml]	Sales unit [pcs]
<b>FTC-CP</b>	<b>511440</b>	black	500	12



## The hammer-in plug for a simple, fast and economical installation



Timber substructures



Cable ducts

### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Building brick
- Natural stone
- Solid brick made from lightweight concrete
- Aerated concrete
- Solid panel made from gypsum
- Vertically perforated brick
- Perforated sand-lime brick
- Hollow blocks made from lightweight concrete

### CHARACTERISTICS



### ADVANTAGES

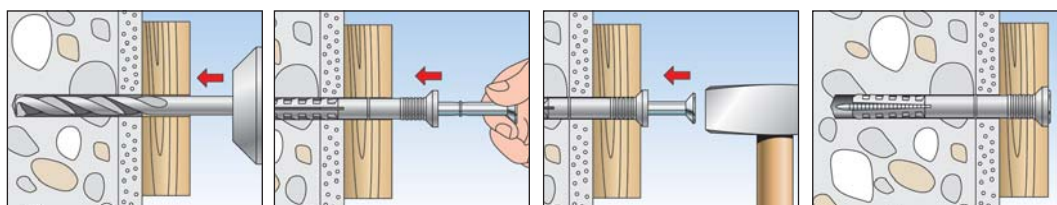
- The rapidammerset installation reduces the amount of time required and allows for an economic series installation.
- The integrated hammer-in stop prevents the plug from expanding prematurely (jamming), thus enabling a problem-free installation.
- Together with the cross-slot recess, the thread of the nail screw allows the screw to be removed, thus allowing for subsequent dismantling.
- The wide range of diameters, usage lengths and head shapes provides the correct plug for every fixing.

### APPLICATIONS

- Substructures made of wood and metal
- Wall connection or plaster profiles
- Slides
- Sheets
- Cable and pipe clips
- Perforated tapes

### FUNCTIONING

- The Hammerfix N is suitable for push-through installation.
- When hammered in, the nail screw causes the plug to expand in two directions, thus providing a secure anchoring in the building material.
- Countersunk head plugs are recommended for the installation of timber constructions; in the case of metal constructions, use flat-head plugs, and use pan-head plugs for long holes.



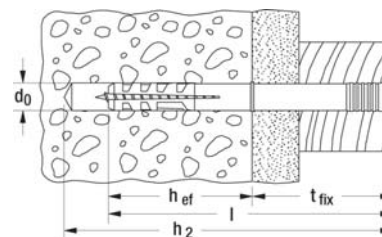
## TECHNICAL DATA



Hammerfix **N-S** with nail



Hammerfix **N-S A2** with stainless steel A2 nail



	Zinc-plated steel	Stainless steel A2	Drill hole diameter	Effect. anchorage depth	Anchor length	Min. drill hole depth for through fixings	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	d <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	l [mm]	h <sub>2</sub> [mm]	t <sub>fix</sub> [mm]		[pcs]
Item	gvz	A2							
<b>N 5 x 30/5 S (100)</b>	<b>050395</b> <sup>2)</sup>	<b>050370</b>	5	25	30	45	5	PZ2	100
<b>N 5 x 40/15 S (100)</b>	<b>050351</b>	—	5	25	40	55	15	PZ2	100
<b>N 5 x 50/25 S (100)</b>	<b>050352</b>	—	5	25	50	65	25	PZ2	100
<b>N 6 x 40/10 S (50)</b>	<b>050354</b>	<b>050372</b>	6	30	40	55	10	PZ2	50
<b>N 6 x 40/10 S (100)</b>	<b>048788</b>	—	6	30	40	55	10	PZ2	100
<b>N 6 x 40/10 S (200)</b>	<b>513834</b> <sup>2)</sup>	—	6	30	40	55	10	PZ2	200
<b>N 6 x 60/30 S (50)</b>	<b>050355</b>	<b>050373</b>	6	30	60	75	30	PZ2	50
<b>N 6 x 60/30 S (100)</b>	<b>048789</b>	—	6	30	60	75	30	PZ2	100
<b>N 6 x 60/30 S (200)</b>	<b>513835</b> <sup>2)</sup>	—	6	30	60	75	30	PZ2	200
<b>N 6 x 80/50 S (50)</b>	<b>050353</b>	—	6	30	80	95	50	PZ2	50
<b>N 6 x 80/50 S (100)</b>	<b>048790</b>	—	6	30	80	95	50	PZ2	100
<b>N 6 x 80/50 S (200)</b>	<b>513836</b> <sup>2)</sup>	—	6	30	80	95	50	PZ2	200
<b>N 8 x 60/20 S (50)</b>	<b>050356</b>	<b>050374</b>	8	40	60	75	20	PZ3	50
<b>N 8 x 60/20 S (100)</b>	<b>048791</b>	—	8	40	60	75	20	PZ3	100
<b>N 8 x 80/40 S (50)</b>	<b>050358</b>	<b>050375</b>	8	40	80	95	40	PZ3	50
<b>N 8 x 80/40 S (100)</b>	<b>048792</b>	—	8	40	80	95	40	PZ3	100
<b>N 8 x 100/60 S (50)</b>	<b>050357</b>	<b>050376</b>	8	40	100	115	60	PZ3	50
<b>N 8 x 100/60 S (100)</b>	<b>048793</b>	—	8	40	100	115	60	PZ3	100
<b>N 8 x 120/80 S (50)</b>	<b>050359</b>	—	8	40	120	135	80	PZ3	50
<b>N 8 x 120/80 S (100)</b>	<b>048794</b>	—	8	40	120	135	80	PZ3	100
<b>N 10 x 100/50 S (50)</b>	<b>050346</b> <sup>1)</sup>	—	10	50	100	115	50	PZ3	50
<b>N 10 x 135/85 S (50)</b>	<b>050347</b> <sup>1)</sup>	—	10	50	135	150	85	PZ3	50
<b>N 10 x 160/110 S (50)</b>	<b>050348</b> <sup>1)</sup>	—	10	50	160	175	110	PZ3	50
<b>N 10 x 230/180 S (50)</b>	<b>050335</b> <sup>1)</sup>	—	10	50	230	245	180	PZ3	50

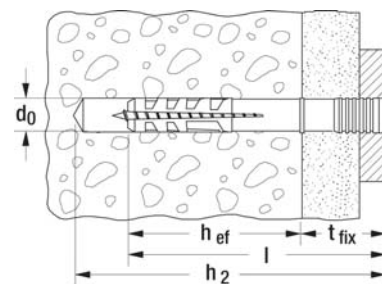
1) not pre-assembled

2) also specially suitable for fischer pipe clips FC, see chapter electrical fixings.

## TECHNICAL DATA



Hammerfix **N-F** with cylindrical head and nail



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Drive	Sales unit [pcs]
<b>N 5 x 25/1 F (100)</b>	<b>514872</b>	5	25	25	40	1	PZ2	100
<b>N 5 x 25/1 F (200)</b>	<b>514873</b>	5	25	25	40	1	PZ2	200
<b>N 5 x 30/5 F (100)</b>	<b>513736</b>	5	25	30	45	5	PZ2	100
<b>N 5 x 30/5 F (200)</b>	<b>513739</b>	5	25	30	45	5	PZ2	200
<b>N 5 x 40/15 F (100)</b>	<b>513737</b>	5	25	40	55	15	PZ2	100
<b>N 5 x 40/15 F (200)</b>	<b>513740</b>	5	25	40	55	15	PZ2	200
<b>N 5 x 50/25 F (100)</b>	<b>513738</b>	5	25	50	65	25	PZ2	100
<b>N 5 x 50/25 F (200)</b>	<b>513741</b>	5	25	50	65	25	PZ2	200
<b>N 6 x 35/5 F (100)</b>	<b>522948</b>	6	30	35	40	5	PZ2	100
<b>N 6 x 40/10 F (50)</b>	<b>513837</b>	6	30	40	55	10	PZ2	50
<b>N 6 x 40/10 F (100)</b>	<b>513840</b>	6	30	40	55	10	PZ2	100
<b>N 6 x 40/10 F (200)</b>	<b>513843</b>	6	30	40	55	10	PZ2	200
<b>N 6 x 60/30 F (50)</b>	<b>513838</b>	6	30	60	75	30	PZ3	50
<b>N 6 x 60/30 F (100)</b>	<b>513841</b>	6	30	60	75	30	PZ2	100
<b>N 6 x 60/30 F (200)</b>	<b>513844</b>	6	30	60	75	30	PZ2	200
<b>N 6 x 80/50 F (50)</b>	<b>513839</b>	6	30	80	95	50	PZ3	50
<b>N 6 x 80/50 F (100)</b>	<b>513842</b>	6	30	80	95	50	PZ2	100
<b>N 6 x 80/50 F (200)</b>	<b>513845</b>	6	30	80	95	50	PZ2	200
<b>N 8 x 60/20 F (50)</b>	<b>513697</b>	8	40	60	75	20	PZ3	50
<b>N 8 x 60/20 F (100)</b>	<b>513701</b>	8	40	60	75	20	PZ3	100
<b>N 8 x 80/40 F (50)</b>	<b>513698</b>	8	40	80	95	40	PZ3	50
<b>N 8 x 80/40 F (100)</b>	<b>513702</b>	8	40	80	95	40	PZ3	100
<b>N 8 x 100/60 F (50)</b>	<b>513699</b>	8	40	100	115	60	PZ3	50
<b>N 8 x 100/60 F (100)</b>	<b>513703</b>	8	40	100	115	60	PZ3	100
<b>N 8 x 120/80 F (50)</b>	<b>513700</b>	8	40	120	135	80	PZ3	50
<b>N 8 x 120/80 F (100)</b>	<b>513704</b>	8	40	120	135	80	PZ3	100

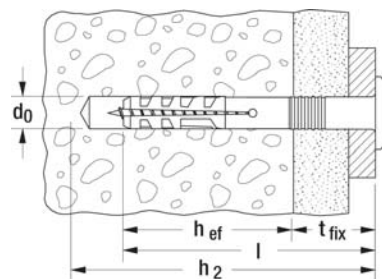
## TECHNICAL DATA



Hammerfix **N-P** with flat edge and nail



Hammerfix **N-P A2** with flat edge and stainless steel A2 nail



	Zinc-plated steel	Stainless steel A2	Drill hole diameter	Effect. anchor depth	Anchor length	Min. drill hole depth for through fixings	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	d <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	l [mm]	h <sub>2</sub> [mm]	t <sub>fix</sub> [mm]		[pcs]
Item	gvz	A2							
N 5 x 30/5 P (100)	050338	—	5	25	30	45	5	PZ2	100
N 6 x 30/1 P (100)	514869	—	6	30	30	45	1	PZ2	100
N 6 x 40/7 P (50)	050339	050369	6	30	40	55	7	PZ2	50
N 6 x 40/7 P (100)	048795	092520	6	30	40	55	7	PZ2	100
N 6 x 40/7 P (200)	514871	—	6	30	40	55	7	PZ2	200
N 8 x 40/1 P (50)	015903	—	8	40	40	55	1	PZ3	50
N 8 x 40/1 P (100)	514870	—	8	40	40	55	1	PZ3	100

## TECHNICAL DATA



Hammerfix **N-P K** with flat edge and plastic nail



**N-S M** with nail and connection thread M 6



Hammerfix **N-S D A2** with isolating washer and nail

		Drill hole diameter	Effect. anchor depth	Anchor length	Max. fixture thickness	Min. drill hole depth for through fixings	Washer	Drive	Sales unit
	Art.-No.	d <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	h <sub>2</sub> [mm]	[Ø mm]		[pcs]
N 6 x 40/7 P K (50)	050342	6	30	40	7	55	—	—	50
N 6 x 40/10 S M6 (50)	050398	6	30	40	10	55	—	—	50
N 6 x 40/10 S D A2 (50)	050367	6	30	40	10	55	19	PZ2	50
N 6 x 60/30 S D A2 (50)	050368	6	30	60	30	75	19	PZ2	50

## LOADS

### Hammerfix N

Highest recommended loads<sup>1)</sup> for a single anchor

The given loads are valid for screw nails with the specified diameter.

Type		N5	N6 <sup>3)</sup>	N8	N10
Screw nail diameter	Ø [mm]	3,5	4	5	7
<b>Recommended loads in the respective base material F<sub>rec</sub><sup>2)</sup></b>					
Concrete	≥ C20/25 [kN]	0,20	0,25	0,27	0,33
Solid brick	≥ Mz 12 [kN]	0,14	0,18	0,24	0,30
Solid sand-lime brick	≥ KS 12 [kN]	0,18	0,22	0,24	0,33
Solid brick of lightweight aggregate concrete	≥ V 4 [kN]	0,05	0,12	0,15	0,16
Aerated concrete	≥ PB 2 [kN]	0,03	0,04	0,05	0,10
Aerated concrete	≥ PB 4 [kN]	0,07	0,10	0,13	0,16

<sup>1)</sup> Required safety factors are considered.

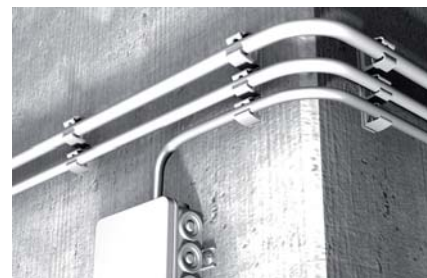
<sup>3)</sup> The values have to be reduced by 50% for N 6 x 40/7 P K.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The hammer-in plug for simple, fast and economic installation



Timber substructures



Cable fixing

### BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Building brick
- Natural stone
- Solid brick made from lightweight concrete
- Aerated concrete
- Solid panel made from gypsum
- Vertically perforated brick
- Perforated sand-lime brick
- Hollow blocks made from lightweight concrete

### CHARACTERISTICS



### ADVANTAGES

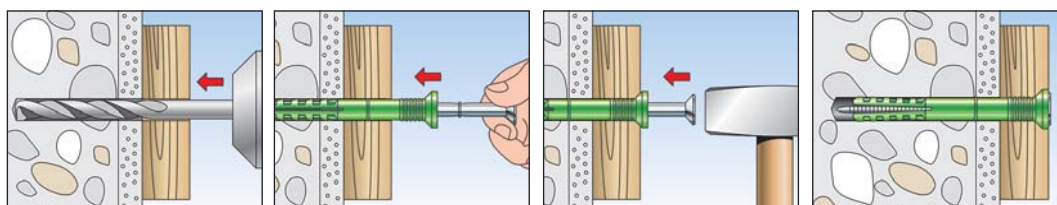
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular hammerfix N plugs.
- The rapid push-through and hammer-set installation reduces the amount of work required and allows for economic series installation.
- The integrated hammer-in stop prevents the plug from expanding prematurely, thus enabling problem-free installation.
- Together with the cross-slot recess, the thread of the nail screw allows the screw to be removed, thus allowing for subsequent dismantling.

### APPLICATIONS

- Substructures made of wood and metal
- Wall connection or plaster profiles
- Slides
- Sheets
- Cable and pipe clips
- Perforated tapes

### FUNCTIONING

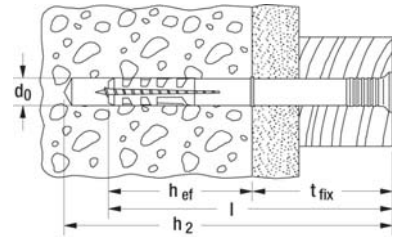
- The hammerfix N GREEN is suitable for push-through installation.
- The easiest installation: drill, knock in and you're done.
- When being hammered in, the nail screw causes the plug to expand in two directions, thus providing a secure anchoring in the building material.



## TECHNICAL DATA



Hammerfix **N GREEN S** with countersunk head and zinc-plated nail



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Drive	Sales unit [pcs]
<b>N GREEN 6 x 40/10 S</b>	<b>524845</b>	6	30	40	55	10	PZ2	45
<b>N GREEN 6 x 60/30 S</b>	<b>524847</b>	6	30	60	75	30	PZ2	45
<b>N GREEN 6 x 80/50 S</b>	<b>524848</b>	6	30	80	95	50	PZ2	45
<b>N GREEN 8 x 80/40 S</b>	<b>524849</b>	8	40	80	95	40	PZ3	45
<b>N GREEN 8 x 100/60 S</b>	<b>524850</b>	8	40	100	115	60	PZ3	45

## LOADS

### Hammerfix N GREEN S

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for screw nails with the specified diameter.

Type			N GREEN 6	N GREEN 8
Screw nail diameter	Ø	[mm]	4	5
Recommended loads in the respective base material F <sub>rec</sub> <sup>2)</sup>				
Concrete	≥ C20/25	[kN]	0,25	0,27
Solid brick	≥ Mz 12	[kN]	0,18	0,24
Solid sand-lime brick	≥ KS 12	[kN]	0,22	0,24
Solid brick of lightweight aggregate concrete	≥ V 4	[kN]	0,12	0,15
Aerated concrete	≥ AAC 2	[kN]	0,04	0,05
Aerated concrete	≥ AAC 4	[kN]	0,10	0,13

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.



## The user-friendly spring sleeve for light fixings in solid building materials



Timber substructures

### BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

### ADVANTAGES

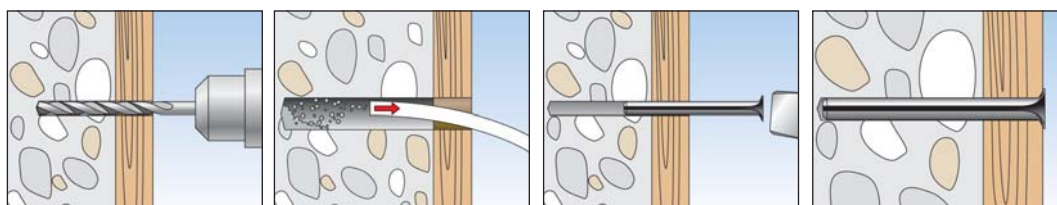
- No plugs or screws are required for the one-piece nail sleeve. This guarantees a simple and easy installation.
- The geometry of the nail sleeve makes it easy to push it into the drill hole. This saves time and money.

### APPLICATIONS

- Squared timbers
- Substructures made of wood and metal
- Metal profiles

### FUNCTIONING

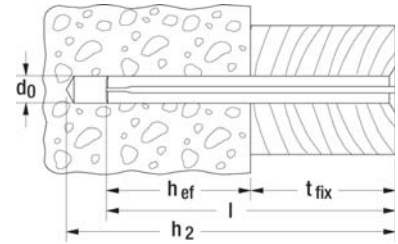
- The FNH nail sleeve is suitable for push-through installation.
- The nail sleeve is hammered in and expands its entire length in the hole.
- FNH is suitable for interior applications and for temporary external fixings.



## TECHNICAL DATA



Nail sleeve **FNH**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Max. fixture thick- ness $t_{fix}$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Sales unit [pcs]
<b>FNH 5/50</b>	<b>541893</b>	5	20	50	30	60	100
<b>FNH 6/30</b>	<b>541894</b>	6	30	30	—	40	100
<b>FNH 6/40</b>	<b>541895</b>	6	30	40	10	50	100
<b>FNH 6/50</b>	<b>541896</b>	6	30	50	20	60	100
<b>FNH 6/60</b>	<b>541897</b>	6	30	60	30	70	100
<b>FNH 6/80</b>	<b>541898</b>	6	30	80	50	90	100
<b>FNH 8/70</b>	<b>541899</b>	8	40	70	30	80	100
<b>FNH 8/90</b>	<b>541905</b>	8	40	90	50	100	50
<b>FNH 8/110</b>	<b>541906</b>	8	40	110	70	120	50
<b>FNH 8/130</b>	<b>541907</b>	8	40	130	90	140	50
<b>FNH 8/150</b>	<b>541908</b>	8	40	150	110	160	50
<b>FNH 8/180</b>	<b>541909</b>	8	40	180	140	190	50

## LOADS

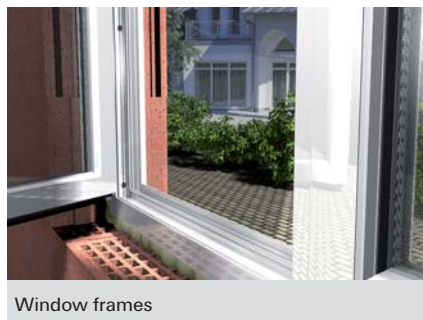
### Nail sleeve FNH

Highest recommended loads<sup>1)</sup> of a single anchor as part of a multiple fixing of non-structural systems.

Type		<b>FNH 5</b>	<b>FNH 6</b>	<b>FNH 8</b>
Minimum member thickness	[mm]	50	60	70
<b>Anchorage in concrete ≥ C20/25</b>				
Recommended tensile load	[kN]	0,10	0,50	0,70
Recommended shear load	[kN]	0,40	1,40	2,00

<sup>1)</sup> Required safety factors are considered.

## The nylon fixing for stress-free stand-off installation of window and door frames



### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

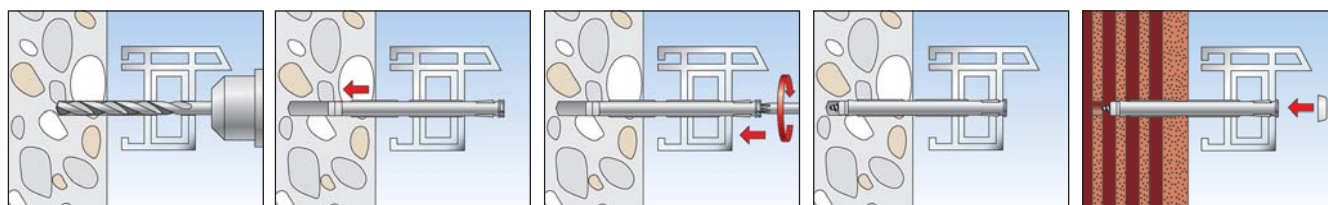
- The operating principle of the plug prevents the frame from being pulled against the substrate, and ensures a stress-free and long-lasting fixing of the frame.
- The special plug geometry anchors the metal and plastic profiles against compressive and tensile loads, and allows for a secure hold of the window frame.
- The cover cap (available separately) can be used to discreetly cover the screw head.

### APPLICATIONS

- Window frames
- Door frames

### FUNCTIONING

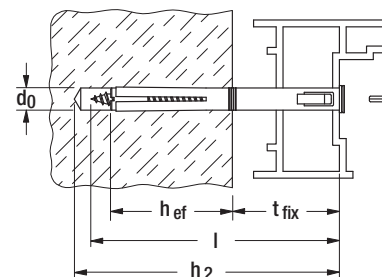
- The F-S is suitable for push-through installation.
- By tightening the screw, the glass-fibre-reinforced plastic cone is drawn into the sleeve, whereby it is expanded and wedged inside the drill hole. The window frames are thus fixed in a stress-free manner.
- The maximum installation torque is 3 Nm for F8S and 6 Nm for F10S.



## TECHNICAL DATA



**F-S** - with zinc-plated countersunk screw and cross drive Z3



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Max. installation torque $T_{inst}$ [Nm]	Sales unit [pcs]
<b>F 8 S 100</b>	<b>088635</b>	8	40	100	50	115	3	50
<b>F 8 S 120</b>	<b>088636</b>	8	40	120	70	135	3	50
<b>F 8 S 140</b>	<b>088637</b>	8	40	140	90	155	3	50
<b>F 10 S 75</b>	<b>088625</b>	10	50	75	15	90	6	50
<b>F 10 S 100</b>	<b>088626</b>	10	50	100	40	115	6	50
<b>F 10 S 120</b>	<b>088627</b>	10	50	120	60	135	6	50
<b>F 10 S 140</b>	<b>088628</b>	10	50	140	80	155	6	50
<b>F 10 S 165</b>	<b>088629</b>	10	50	165	105	180	6	50

## ACCESSORIES



Cover cap for **F-S** - with counter-sunk screw and cross drive Z3

Item	Art.-No.	Diameter [mm]	Colour	Sales unit [pcs]
<b>ADF 12W</b>	<b>060275</b>	12	white	100

## LOADS

### Window frame fixing F-S

Highest recommended loads<sup>1)</sup> for a single anchor as part of a multiple fixing of non-structural systems.

Type		<b>F 8 S</b>	<b>F 10 S</b>
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>			
Concrete	$\geq C20/25$ [kN]	0,78	1,48
Solid brick	$\geq Mz 12$ [kN]	0,90	1,25
Solid sand-lime brick	$\geq KS 12$ [kN]	0,90	1,25
Solid brick of lightweight aggregate concrete	$\geq V 2$ [kN]	0,25	-
Perforated sand-lime brick	$\geq KSL 6$ [kN]	0,25	-

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The fixing for stress-free installation of window and door frames with fire classification



Fire protection doors

### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

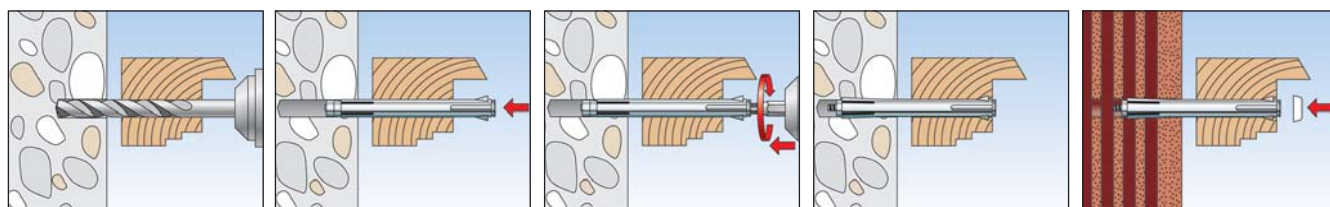
- The F-M metal frame plug achieves fire resistance F 120. This allows for use in areas where fire resistance is relevant.
- The operating principle prevents the window frame from being pulled against the substrate, and ensures a stress-free and long-lasting fixing of the frame.
- The special plug geometry anchors the metal and plastic profiles against compressive and tensile loads, and allows for a secure hold of the window frame.
- The cover caps (available separately) can be used to discreetly cover the screw heads.

### APPLICATIONS

- Window frames
- Door frames
- Squared timbers

### FUNCTIONING

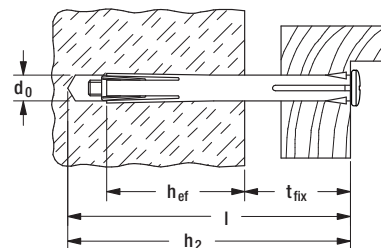
- The F-M is suitable for push-through installation.
- By tightening the screw, the cone is drawn into the sleeve and the fixing is expanded which wedges it inside the drill hole. The window frames are thus fixed in a stress-free manner.
- The maximum installation torque is 5 Nm.



## TECHNICAL DATA



**F 8 M** - with zinc-plated raised countersunk screw and cross drive PZ2

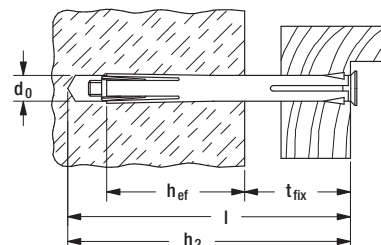


Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Drive	Sales unit [pcs]
<b>F 8 M 72</b>	<b>088660</b>	8	90	30	72	42	PZ2	100
<b>F 8 M 92</b>	<b>088662</b>	8	110	30	92	62	PZ2	100
<b>F 8 M 112</b>	<b>088664</b>	8	130	30	112	82	PZ2	100
<b>F 8 M 132</b>	<b>088666</b>	8	150	30	132	102	PZ2	100

## TECHNICAL DATA



**F 10 M** - with zinc-plated countersunk head screw and cross drive PZ3



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Drive	Sales unit [pcs]
<b>F 10 M 72</b>	<b>088670</b>	10	90	30	72	42	PZ3	100
<b>F 10 M 92</b>	<b>088672</b>	10	110	30	92	62	PZ3	100
<b>F 10 M 112</b>	<b>088674</b>	10	130	30	112	82	PZ3	100
<b>F 10 M 132</b>	<b>088676</b>	10	150	30	132	102	PZ3	100
<b>F 10 M 152</b>	<b>088678</b>	10	170	30	152	122	PZ3	100
<b>F 10 M 182</b>	<b>088680</b>	10	200	30	182	152	PZ3	50
<b>F 10 M 202</b>	<b>061064</b>	10	220	30	202	172	PZ3	50

## ACCESSORIES



Cover cap **ADM 10 W**

Item	Art.-No.	Colour	Cap height [mm]	Cap [Ø mm]	Match	Sales unit [pcs]
<b>ADM 10 W</b>	<b>088688</b>	white	4	16,5	F 10 M	100
<b>ASM 10 W</b>	<b>060320</b>	white	3	15	F 10 M	100



## LOADS

### Metal frame fixing F-M

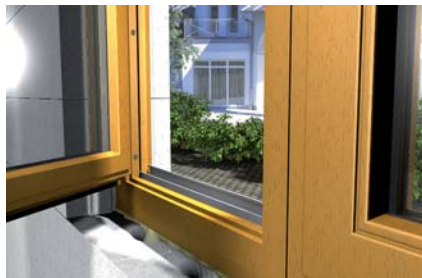
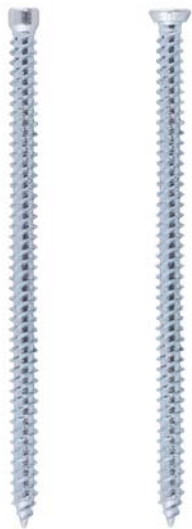
Highest recommended loads<sup>1)</sup> for a single anchor as part of a multiple fixing of non-structural systems.

Type			F 8 M	F 10 M
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>				
Concrete	≥ C20/25	[kN]	1,00	1,40
Solid brick	≥ Mz 12	[kN]	0,30	1,30
Solid sand-lime brick	≥ KS 12	[kN]	0,70	1,30
Solid brick of lightweight aggregate concrete	≥ V 2	[kN]	-	0,50
Perforated sand-lime brick	≥ KSL 12	[kN]	0,25	0,60

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The economical special screw for window installation



Window frames

### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick made from lightweight concrete
- Solid brick
- Aerated concrete

### CERTIFICATES



Test Report No.:  
14-000559-PR02

### ADVANTAGES

- Screw installation without plug for economical processing.
- The small drill bit diameter of 6 mm allows for efficient series installation.
- The continuous thread ensures a stress-free fixing of the frame in the substrate.
- The high-low-thread at the screw tip as well as several cutting notches reduce the amount of force required for screwing in the screws. The installation process can be completed without excessive effort.
- With two head types applicable for all common frame materials.
- According to the ift Rosenheim suitable for the fixation of a plastic window in brick masonry.

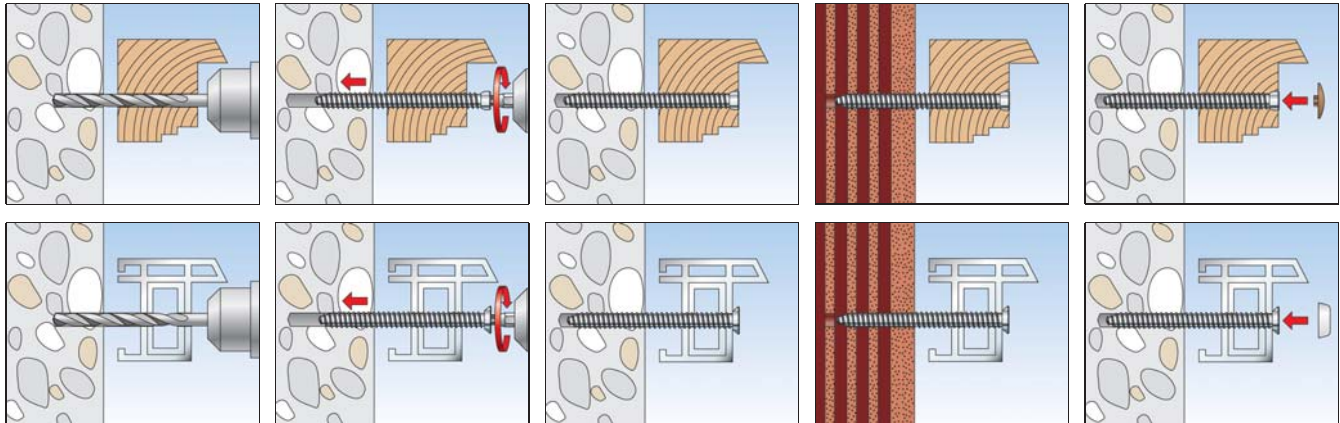
### APPLICATIONS

- Window frames made of wood, plastic and aluminium
- Door frames
- Squared timbers

### FUNCTIONING

- Note the drill hole and screw-in depths for the different building materials listed in the table.
- Cylinder head screws are recommended for recessed installation in wooden profiles.
- Flat head screws are recommended for installation in plastic and aluminium profiles.

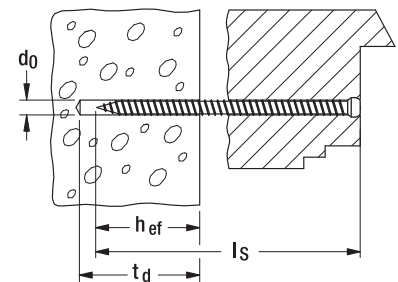
## INSTALLATION



## TECHNICAL DATA



Window frame screw with cylinder head  
**FFSZ**



Anchorage depth  $h_{ef}$   
 $h_{ef} \geq 30$  mm in concrete  
 $h_{ef} \geq 40$  mm in solid brick  
 $h_{ef} \geq 60$  mm in perforated brick /  
aerated concrete

$t_d$  : drill hole depth  $\geq h_{ef} + 10$  mm

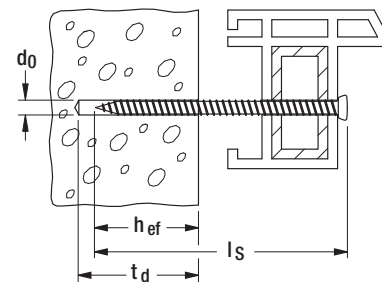
Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Screw length $l_s$ [mm]	Drive	Head [Ø mm]	Sales unit [pcs]
<b>FFSZ 7,5 x 52 T30</b>	<b>532906</b>	6	52	T30	8	100
<b>FFSZ 7,5 x 62 T30</b>	<b>532907</b>	6	62	T30	8	100
<b>FFSZ 7,5 x 72 T30</b>	<b>532908</b>	6	72	T30	8	100
<b>FFSZ 7,5 x 82 T30</b>	<b>532909</b>	6	82	T30	8	100
<b>FFSZ 7,5 x 92 T30</b>	<b>532910</b>	6	92	T30	8	100
<b>FFSZ 7,5 x 102 T30</b>	<b>532911</b>	6	102	T30	8	100
<b>FFSZ 7,5 x 112 T30</b>	<b>532912</b>	6	112	T30	8	100
<b>FFSZ 7,5 x 122 T30</b>	<b>532913</b>	6	122	T30	8	100
<b>FFSZ 7,5 x 132 T30</b>	<b>532914</b>	6	132	T30	8	100
<b>FFSZ 7,5 x 152 T30</b>	<b>532915</b>	6	152	T30	8	100
<b>FFSZ 7,5 x 182 T30</b>	<b>532916</b>	6	182	T30	8	100
<b>FFSZ 7,5 x 202 T30</b>	<b>532917</b>	6	202	T30	8	100
<b>FFSZ 7,5 x 212 T30</b>	<b>532919</b>	6	212	T30	8	100
<b>FFSZ 7,5 x 252 T30</b>	<b>532920</b>	6	252	T30	8	100
<b>FFSZ 7,5 x 302 T30</b>	<b>532921</b>	6	302	T30	8	100

No pre-drilling in aerated concrete.

## TECHNICAL DATA



Window frame screw with flat head **FFS**



Anchorage depth  $h_{ef}$   
 $h_{ef} \geq 30$  mm in concrete  
 $h_{ef} \geq 40$  mm in solid brick  
 $h_{ef} \geq 60$  mm in perforated brick / aerated concrete

$t_d$  : drill hole depth  $\geq h_{ef} + 10$  mm

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Screw length $l_s$ [mm]	Drive	Head [Ø mm]	Sales unit [pcs]
<b>FFS 7,5 x 42 T30</b>	<b>532922</b>	6	42	T30	11,5	100
<b>FFS 7,5 x 52 T30</b>	<b>532923</b>	6	52	T30	11,5	100
<b>FFS 7,5 x 62 T30</b>	<b>532925</b>	6	62	T30	11,5	100
<b>FFS 7,5 x 72 T30</b>	<b>532927</b>	6	72	T30	11,5	100
<b>FFS 7,5 x 82 T30</b>	<b>532928</b>	6	82	T30	11,5	100
<b>FFS 7,5 x 92 T30</b>	<b>532930</b>	6	92	T30	11,5	100
<b>FFS 7,5 x 102 T30</b>	<b>532931</b>	6	102	T30	11,5	100
<b>FFS 7,5 x 112 T30</b>	<b>532932</b>	6	112	T30	11,5	100
<b>FFS 7,5 x 122 T30</b>	<b>532934</b>	6	122	T30	11,5	100
<b>FFS 7,5 x 132 T30</b>	<b>532935</b>	6	132	T30	11,5	100
<b>FFS 7,5 x 152 T30</b>	<b>532941</b>	6	152	T30	11,5	100
<b>FFS 7,5 x 182 T30</b>	<b>532942</b>	6	182	T30	11,5	100
<b>FFS 7,5 x 202 T30</b>	<b>532943</b>	6	202	T30	11,5	100
<b>FFS 7,5 x 212 T30</b>	<b>532944</b>	6	212	T30	11,5	100
<b>FFS 7,5 x 252 T30</b>	<b>532945</b>	6	252	T30	11,5	100
<b>FFS 7,5 x 302 T30</b>	<b>532946</b>	6	302	T30	11,5	100

No pre-drilling in aerated concrete.

## ACCESSORIES



Cover cap **FFSZ-A**

Item	Art.-No.	Colour	Cap [Ø mm]	Cap height [mm]	Match	Sales unit [pcs]
<b>FFSZ-A W</b>	<b>538708</b>	white	14	2,2	FFSZ - cylinder head	100
<b>FFSZ-A BR</b>	<b>538709</b>	brown	14	2,2	FFSZ - cylinder head	100

## ACCESSORIES



Cover cap **FFS-A**

Item	Art.-No.	Colour	Cap [Ø mm]	Cap height [mm]	Match	Sales unit [pcs]
<b>FFS-A W</b>	<b>061560</b>	white	15	4,8	FFS - flat head	100
<b>FFS-A BR</b>	<b>061561</b>	brown	15	4,8	FFS - flat head	100

## LOADS

### Window frame screws FFSZ and FFS

Highest recommended loads<sup>1)</sup> of a single screw.

Type			FFSZ			FFS		
Screw diameter	Ø	[mm]	7,5			7,5		
Anchorage depth	$h_{ef} \geq$	[mm]	30	40	60	30	40	60
<b>Anchorage in concrete <math>\geq</math> C20/25</b>								
Recommended tensile load		[kN]	1,00	-		1,00	-	
Recommended shear load		[kN]	0,70	-		0,70	-	
Min. edge distance <sup>5)</sup>	$c_{min}$	[mm]	30	-		30	-	
<b>Anchorage in masonry</b>								
Recommended tensile load in solid brick	$\geq Mz 12$	[kN]	-	0,40 <sup>3)</sup>	0,80	-	0,40 <sup>3)</sup>	0,80
Recommended shear load in solid brick	$\geq Mz 12$	[kN]	-	0,30 <sup>3)</sup>	0,70	-	0,30 <sup>3)</sup>	0,70
Recommended tensile load in solid sand-lime brick	$\geq KS 12$	[kN]	-	1,00	-	-	1,00	-
Recommended shear load in solid sand-lime brick	$\geq KS 12$	[kN]	-	0,60	-	-	0,60	-
Recommended tensile load in vertically perforated brick	$\geq HLz 12$	[kN]	-	-	0,25 <sup>3)</sup>	-	-	0,25 <sup>3)</sup>
Recommended shear load in vertically perforated brick	$\geq HLz 12$	[kN]	-	-	0,40 <sup>3)</sup>	-	-	0,40 <sup>3)</sup>
Min. edge distance <sup>5)</sup>	$c_{min}$	[mm]	-	40		-	40	
<b>Anchorage in aerated concrete</b>								
Recommended load <sup>2)</sup> in aerated concrete	$\geq AAC 2$	[kN]	-	0,10 <sup>4)</sup>		-	0,10 <sup>4)</sup>	
	$\geq AAC 4$	[kN]	-	0,25 <sup>4)</sup>		-	0,25 <sup>4)</sup>	
Min. edge distance <sup>5)</sup>	$c_{min}$	[mm]	-	40		-	40	

<sup>1)</sup> Required safety factors are considered. As a single screw counts e.g. a screw with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1,5 \times h_{ef}$ .

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>3)</sup> Rotary drilling.

<sup>4)</sup> Without pre-drilling.

<sup>5)</sup> Minimal possible edge distance while reducing the recommended loads.

## The stainless steel A4 joint for two-shell masonry



Facing masonry

### BUILDING MATERIALS

- All concrete and masonry materials in conjunction with the appropriate frame fixing

### ADVANTAGES

- The VB securely connects the facing masonry with the load-bearing layer.
- The high quality A4 stainless steel connecting wire guarantees a long-lasting fixing.
- The VB is flexible and can be mounted on any point of the external wall.

### APPLICATIONS

- Two-shell external walls (facings)
- Closers and economy facings

### FUNCTIONING

- The frame fixings SXR 10, SXRL 10 and FUR 10 are suitable for the anchoring of wall ties in concrete and masonry.

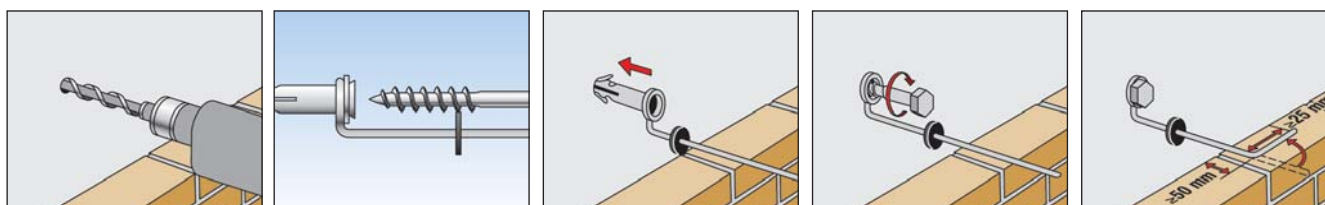
### TECHNICAL DATA



Cladding tie VB

Item	Art.-No.	Contents	Sales unit [pcs]
<b>VB</b>	<b>050495</b> <sup>1)</sup>	1 wire anchor stainless steel A4, 1 washer stainless steel A4, 1 drip ring	50

<sup>1)</sup> Wire: angled 265 mm.





## The fixing for infinite adjustment of timber constructions in all standard solid building materials



Stand-off installations

### BUILDING MATERIALS

- Concrete
- Wood
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

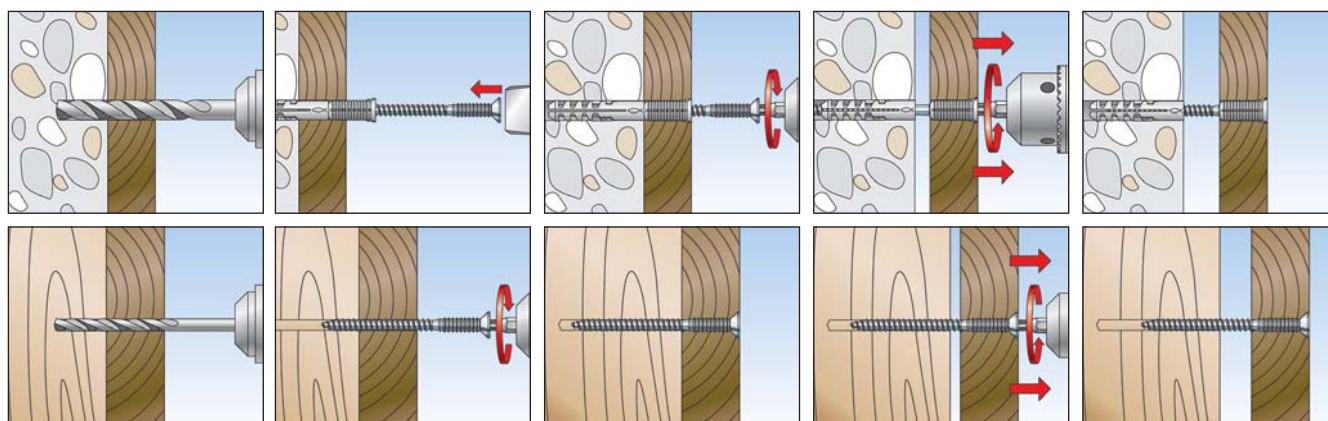
- The combination of adjustment plug and spacing screw allows for universal usage in wooden and solid building materials.
- The special operating principle of the adjustable fixing S10J and the spacing screw allows for infinite adjustment. This saves on the use of wedges and blocks when fixing the fixture.

### APPLICATIONS

- Substructures made of wooden battens of 20-25 mm thickness.

### FUNCTIONING

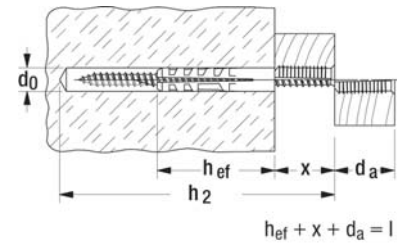
- The S10J is suitable for push-through installation.
- Once the screw has been screwed in, the fixture distance can be infinitely adjusted by modifying the rotation direction.
- For the fixing of wood on wood, e.g. in the roof truss, only use adjustment screw JS.



## TECHNICAL DATA



Adjustable fixing **S 10 J 75 S**

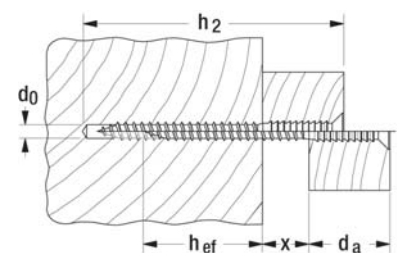


Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Max. timber thickness $d_a$ [mm]	Max. adjustment travel $x$ [mm]	Sales unit [pcs]
<b>S 10 J 75 S</b>	<b>080710</b>	10	115	50	75	25	30	50

## TECHNICAL DATA

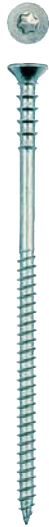


Adjustable screw **JS**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Max. timber thickness $d_a$ [mm]	Max. adjustment travel $x$ [mm]	Sales unit [pcs]
<b>JS 6 x 110</b>	<b>080700</b>	5	50 - 110	30	25	55	50

## The adjustable screw for fast and infinitely adjustable installation of timber constructions



Stand-off installations



Stand-off installations

### BUILDING MATERIALS

- Wood and wooden materials or wooden panels

### ADVANTAGES

- The special operating principle of the adjustable screw JUSS allows for infinite adjustment. This saves on the use of wedges and blocks when fixing the fixture.
- The self-drilling thread cuts directly into the wood. Therefore pre-drilling is not required. For the installation in hardwood pre-drilling is recommended.

### APPLICATIONS

- Substructures made of wooden battens of 20-25 mm thickness.

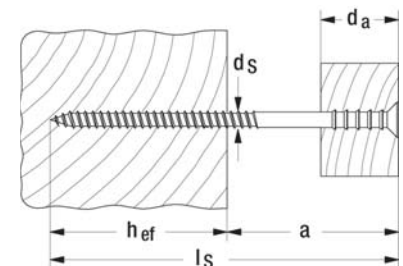
### FUNCTIONING

- The JUSS is suitable for push-through installation.
- Once the screw has been screwed in, the parallel thread below the screw head causes the fixture to initially pull against the substrate. The fixture distance can then be infinitely adjusted by modifying the rotation direction.

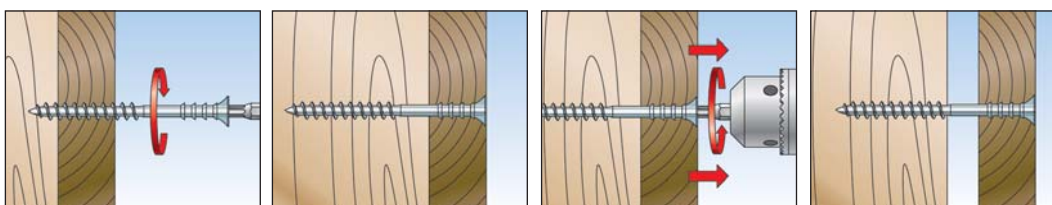
### TECHNICAL DATA



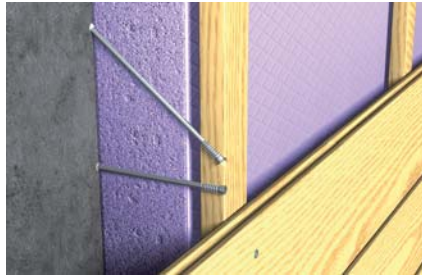
Adjustable screw JUSS



Item	Art.-No.	Effect. anchorage depth $h_{ef}$ [mm]	Max. distance $a$ [mm]	Screw $d_s \times l_s$ [mm]	Max. timber thickness $d_a$ [mm]	Drive	Sales unit [pcs]
JUSS 6 x 60	059040	30	30	6 x 60	20	T25	100
JUSS 6 x 70	059041	30	40	6 x 70	25	T25	100
JUSS 6 x 80	059042	30	50	6 x 80	25	T25	100
JUSS 6 x 90	059043	30	60	6 x 90	25	T25	100
JUSS 6 x 100	059044	30	70	6 x 100	25	T25	100
JUSS 6 x 110	059045	30	80	6 x 110	25	T25	100
JUSS 6 x 120	059046	30	90	6 x 120	25	T25	100
JUSS 6 x 145	059047	30	115	6 x 145	25	T25	100



## The spacing screw for flexible positioning and alignment of wooden fixtures



Stand-off installations



Stand-off installations

### BUILDING MATERIALS

- Without plug: suitable for wooden materials and wooden panels
- With SX or UX plugs: all concrete and masonry materials

### ADVANTAGES

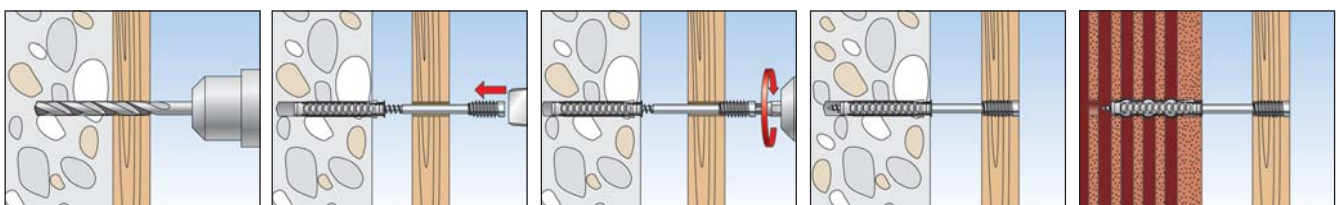
- The coordinated threads with the same pitch allow for the pin-point positioning and alignment of the fixture, which can even be mounted at an angle to the screw. This allows for an exact and flexible fixing.
- During the installation, the fixture is not pulled onto the substrate, instead it is brought directly to the desired distance and position. This allows for a simple and exact installation.
- When combined with SX 8 and UX 8 plugs, it can be used in almost all wall materials, guaranteeing a secure fixing.

### APPLICATIONS

- Window frames
- Door frames
- Squared timbers
- Claddings
- Substructures made of wood

### FUNCTIONING

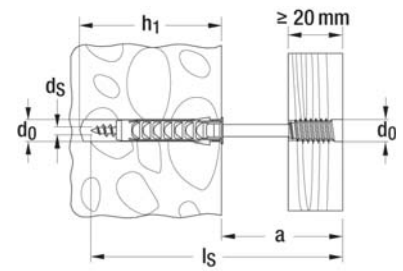
- The ASL is suitable for push-through installation.
- Pre-drill the fixture at the desired angle in order to achieve the correct positioning and alignment.
- When screwing in the screw, the external thread cuts into the pre-drilled fixture, and fixes it into the stipulated position.
- The angled position of the screws (15° - 30°) allows high shear loads to be supported.



## TECHNICAL DATA



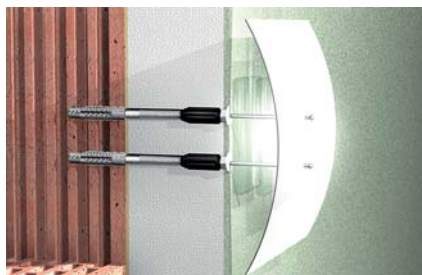
Spacing screw **ASL**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Max. distance $a$ [mm]	Screw $d_S \times l_S$ [mm]	Drive	Sales unit [pcs]
<b>ASL 4,5 x 60</b>	<b>059050</b>	6	40	25	4,5 x 60	T25	100
<b>ASL 4,5 x 70</b>	<b>059051</b>	6	40	35	4,5 x 70	T25	100
<b>ASL 4,5 x 80</b>	<b>059052</b>	6	40	45	4,5 x 80	T25	100
<b>ASL 4,5 x 100</b>	<b>059054</b>	6	40	65	4,5 x 100	T25	100
<b>ASL 6 x 80</b>	<b>059061</b>	8	55	35	6 x 80	T25	100
<b>ASL 6 x 100</b>	<b>059062</b>	8	55	55	6 x 100	T25	100
<b>ASL 6 x 120</b>	<b>059063</b>	8	55	75	6 x 120	T25	100
<b>ASL 6 x 150</b>	<b>059064</b>	8	55	105	6 x 150	T25	50



## The thermally separated stand-off installation in external thermal insulation composite systems (ETICS)



External lighting



Down pipes

### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Building brick
- Aerated concrete
- Wood

### ADVANTAGES

- The stand-off installation allows for the fixture to be adjusted to the exact position required, whereby pressure marks and damage to the ETICS are avoided.
- The plastic cone creates a thermal barrier between the fixture and the inner fixture, and offers an energy-optimised fixing.
- The glass-fibre-reinforced plastic cone cuts its own way through the ETICS with a positive fit, and allows for a simple and fast installation without the need for any special tools.
- Combining Thermax 8 and 10 with the universal plug UX provides a secure anchoring in the substrate.
- Without UX plug direct mounting in wood substrate is possible after pre-drilling.

### APPLICATIONS

#### For the thermally separated fixing of:

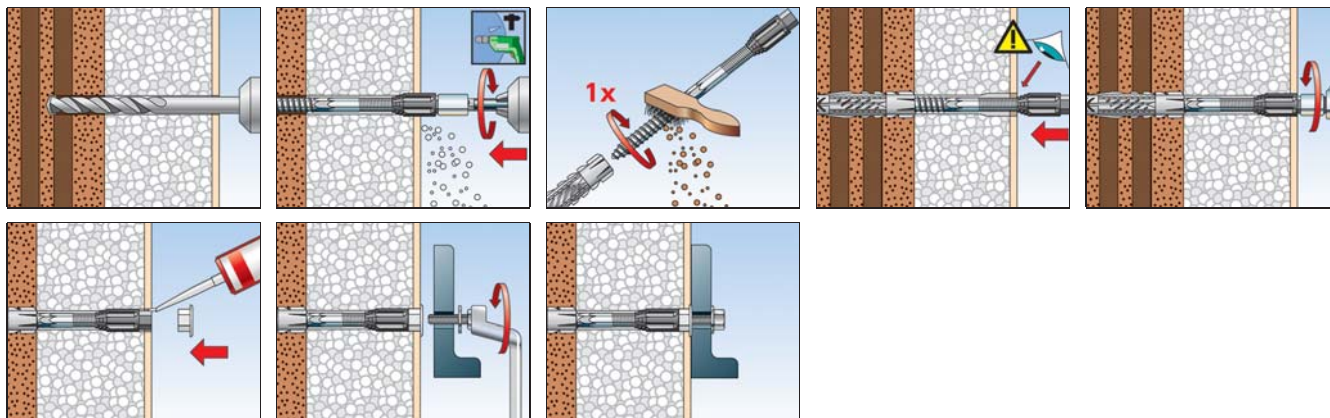
- Signs
- Lighting
- Letter boxes
- Motion detectors
- Downpipes
- Lightning rods
- Blind guide rails

### FUNCTIONING

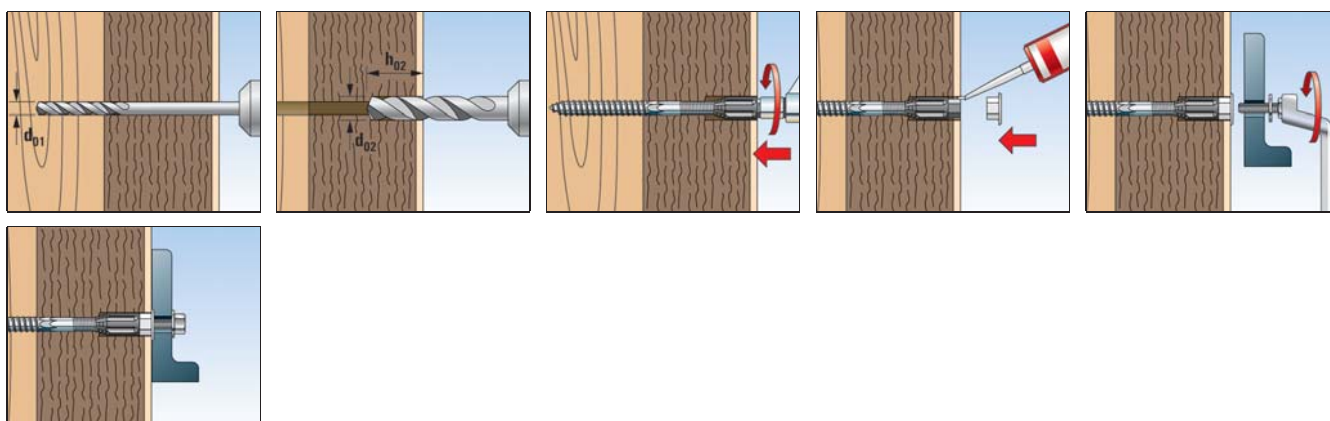
- The Thermax 8 and 10 systems are suitable for pre-positioned installation.
- The self-tapping, glass-fibre-reinforced cone cuts its own way through the plaster into the insulation during installation.
- The anti-cold cone uses a thermal barrier to minimise heat losses.
- Installation without any special tools.
- For use in wood without plug, the wood (footnote below load table) as well as the plaster has to be pre-drilled:  
Thermax 8:  
 $d_{02} = 14 \text{ mm}$ ,  $h_{02} = 50 \text{ mm}$ ;  
Thermax 10:  
 $d_{02} = 18 \text{ mm}$ ,  $h_{02} = 50 \text{ mm}$
- The extensive range features fitting options with metric screws (M6/8/10), sheet screws (6.3 mm), chipboard screws (6.0 mm) or chipboard screws (4.5 - 5.5 mm) when using an SX 5 expansion plug.



## INSTALLATION - MASONRY



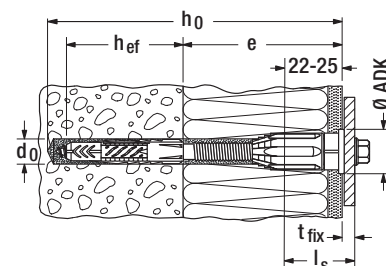
## INSTALLATION - WOOD SUBSTRATE



## TECHNICAL DATA



Thermax 8 and 10



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Drill hole depth $h_0$ [mm]	Usable length $e$ [mm]	Anchorage depth $h_{ef}$ [mm]	Cover cap-Ø ADK [mm]	Width across nut Ø SW [mm]	Chipboard / metric / sheet metal screw	Sales unit [pcs]
<b>Thermax 8/60 M6</b>	<b>045685</b> 1) 2)	10	120	45 - 60	60	18	10	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 8/80 M6</b>	<b>045686</b> 1) 2)	10	140	60 - 80	60	18	10	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 8/100 M6</b>	<b>045687</b> 1) 2)	10	160	80 - 100	60	18	10	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 8/120 M6</b>	<b>045688</b> 1) 2)	10	180	100 - 120	60	18	10	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 8/140 M6</b>	<b>045689</b> 1) 2)	10	200	120 - 140	60	18	10	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 8/160 M6</b>	<b>045690</b> 1) 2)	10	220	140 - 160	60	18	10	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 8/180 M6</b>	<b>045691</b> 1) 2)	10	240	160 - 180	60	18	10	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 10/100 M6</b>	<b>045692</b> 1) 2)	12	160	80 - 100	70	22	13	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 10/120 M6</b>	<b>045693</b> 1) 2)	12	180	100 - 120	70	22	13	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 10/140 M6</b>	<b>045694</b> 1) 2)	12	200	120 - 140	70	22	13	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 10/160 M6</b>	<b>045695</b> 1) 2)	12	220	140 - 160	70	22	13	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 10/180 M6</b>	<b>045696</b> 1) 2)	12	240	160 - 180	70	22	13	4,5 - 6,0 / M6 / 6,3	20
<b>Thermax 10/200 M6</b>	<b>512605</b> 1) 2)	12	260	180 - 200	70	22	13	4,5 - 6,0 / M6 / 6,3	20

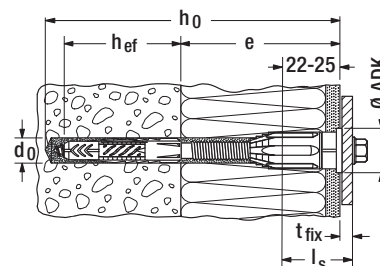
1) including SX 5

2) Min. screw length  $l_S = 22\text{mm} + \text{thickness of mounting member } e$ ; for use in wood without universal plug UX, consider drill hole diameter in footnote under load table.

## TECHNICAL DATA



Thermax 8 and 10



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Drill hole depth $h_0$ [mm]	Usable length $e$ [mm]	Anchorage depth $h_{ef}$ [mm]	Cover cap-Ø ADK [mm]	Width across nut Ø SW [mm]	Chipboard / metric / sheet metal screw	Sales unit [pcs]
Thermax 10/220 M6	514250 <sup>1) 2)</sup>	12	280	200 - 220	70	22	13	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/240 M6	514251 <sup>1) 2)</sup>	12	300	220 - 240	70	22	13	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/100 M8	045697 <sup>2)</sup>	12	160	80 - 100	70	22	13	M8	20
Thermax 10/120 M8	045698 <sup>2)</sup>	12	180	100 - 120	70	22	13	M8	20
Thermax 10/140 M8	045699 <sup>2)</sup>	12	200	120 - 140	70	22	13	M8	20
Thermax 10/160 M8	045700 <sup>2)</sup>	12	220	140 - 160	70	22	13	M8	20
Thermax 10/180 M8	514252 <sup>2)</sup>	12	240	160 - 180	70	22	13	M8	20
Thermax 10/200 M8	514253 <sup>2)</sup>	12	260	180 - 200	70	22	13	M8	20
Thermax 10/220 M8	514254 <sup>2)</sup>	12	280	200 - 220	70	22	13	M8	20
Thermax 10/240 M8	514255 <sup>2)</sup>	12	300	220 - 240	70	22	13	M8	20
Thermax 10/100 M10	045702 <sup>2)</sup>	12	160	80 - 100	70	22	13	M10	20
Thermax 10/120 M10	045703 <sup>2)</sup>	12	180	100 - 120	70	22	13	M10	20
Thermax 10/140 M10	045704 <sup>2)</sup>	12	200	120 - 140	70	22	13	M10	20
Thermax 10/160 M10	045705 <sup>2)</sup>	12	220	140 - 160	70	22	13	M10	20
Thermax 10/180 M10	514256 <sup>2)</sup>	12	240	160 - 180	70	22	13	M10	20
Thermax 10/200 M10	514257 <sup>2)</sup>	12	260	180 - 200	70	22	13	M10	20
Thermax 10/220 M10	514258 <sup>2)</sup>	12	280	200 - 220	70	22	13	M10	20
Thermax 10/240 M10	514259 <sup>2)</sup>	12	300	220 - 240	70	22	13	M10	20

1) including SX 5

2) Min. screw length  $l_s = 22 \text{ mm} + \text{thickness of mounting member } e$ ; for use in wood without universal plug UX, consider drill hole diameter in footnote under load table.

## LOADS

### Stand-off installation Thermax 8 and 10

Highest recommended loads <sup>1)</sup> of a single anchor in concrete and masonry.

Type		Thermax 8	Thermax 10
Supplied type of plug for the anchorage in the base material		UX 10 x 60	UX 12 x 70
Recommended tensile loads in the respective base material $N_{rec}$ <sup>2)</sup>			
Concrete <sup>3) 4)</sup>	$\geq \text{C20/25}$ [kN]	1,00	1,00
Solid brick <sup>3) 4)</sup>	$\geq \text{Mz 12}$ [kN]	0,50	0,70
Perforated sand-lime brick <sup>3) 4)</sup>	$\geq \text{KSL 12}$ [kN]	0,60	0,80
Vertically perforated brick <sup>4)</sup>	$\geq \text{Hz 12}$ [kN]	0,20	0,30
Aerated concrete <sup>3) 4)</sup>	$\geq \text{PB 4}$ [kN]	0,40	0,60
Recommended shear load $V_{rec}$ , valid für all above mentioned base materials for the stated insulation thickness			
External Thermal Insulation Composite System <sup>5)</sup>	$\leq 240 \text{ mm}$ [kN]	0,15	0,20

<sup>1)</sup> Required safety factors are considered.

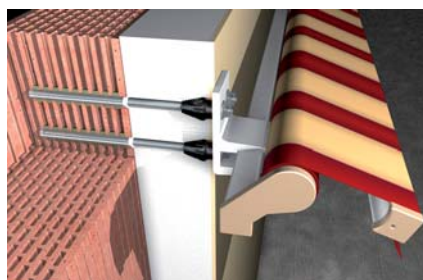
<sup>2)</sup> The drilling method is to be adapted to the building material used. As different joint qualities are possible, the given values only apply for installation in the brick.

<sup>3)</sup> The given recommended tensile loads apply for fastenings with metric screws. When using chipboard screws with diameter 6,0 mm they have to be reduced to 0,35 kN.

<sup>4)</sup> The given recommended tensile loads apply for fastenings with metric screws. When using a SX 5-plug chipboard screws with diameter 4,5 - 5,5 mm they have to be reduced to 0,1 kN.

<sup>5)</sup> Values are valid for an ETICS made from PS- respectively PU-rigid foam panels. Thickness of rendering minimum 6 mm.

## The approved stand-off installation with thermal barrier in external thermal insulation composite systems (ETICS)



Awnings



Satellite dishes and air conditioning units

### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

#### Approved for:

- Concrete, cracked and non-cracked
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick
- Aerated concrete

### CERTIFICATES



### ADVANTAGES

- When combined with the injection mortars FIS EM Plus, FIS V, FIS SB and FIS GREEN, the stand-off installation is approved for high loads in a range of materials. This allows for a secure fixing.
- Usable lengths of 62 to 290 mm can be covered with just one Thermax.
- The plastic cone creates a thermal barrier between the fixture and the inner fixture, and offers an energy-optimised fixing.
- The glass-fibre-reinforced plastic cone cuts its own way through the ETICS with a positive fit, and allows for a simple, fast and adjustable installation without the need for any special tools.

### APPLICATIONS

#### For the thermally separated fixing of:

- Awnings
- Canopies
- French balcony railings
- Air conditioning units
- Satellite dishes

### FUNCTIONING

- The Thermax 12 and 16 systems are suitable for pre-positioned installation.
- The self-tapping, glass-fibre-reinforced cone cuts its own way through the plaster into the insulation during installation.
- The anti-cold cone uses a thermal barrier to minimise heat losses.
- In the case of resistant plaster (e.g. thick cement plaster), it is recommended that the Thermax cutting blade included is used for grinding out the plaster.
- The sealing of the annular gap with sealing adhesive KD or construction sealant Premium DKM seals the facade at plaster level.

### SEE ALSO



**FIS EM PLUS**  
mortar  
Page 86



**FIS V**  
mortar  
Page 101

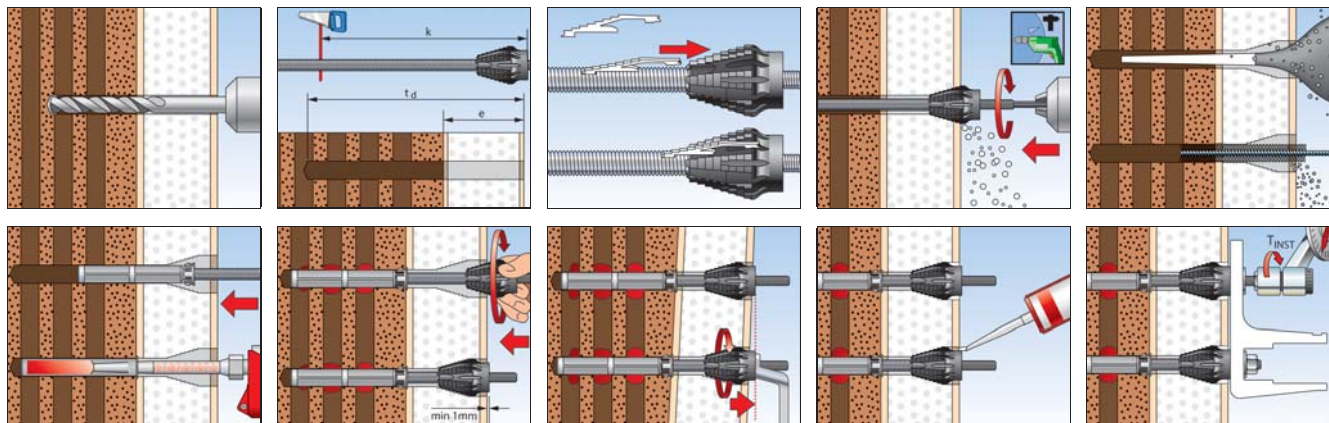


**FIS SB**  
mortar  
Page 64



**FIS GREEN**  
mortar  
Page 126

## INSTALLATION



## TECHNICAL DATA



Thermax 12/110 M12



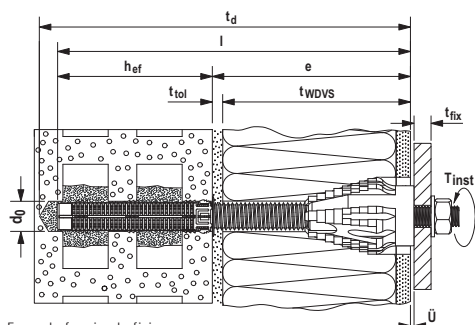
Thermax 16/170 M12



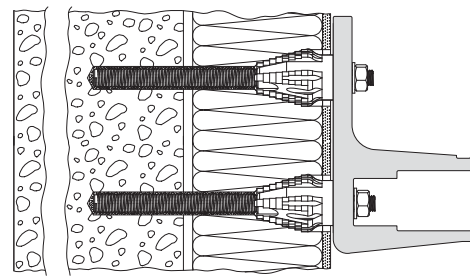
	Zinc-plated steel	Stainless steel	Approval	Contents	Sales unit
	Art.-No.	Art.-No.	DIBt		[pcs]
Item	gvz	A4			
Thermax 12/110 M12	051291	—	●	20 Thermax M12, 20 perforated sleeves 20 x 130, 5 bits, 5 cutting blades, 5 user manuals	20
Thermax 12/110 M12	—	051537	●	10 Thermax M12 A4, 10 perforated sleeves 20 x 130, 3 bits, 3 cutting blades, 3 user manuals	10
Thermax 12/110 M12 B	051290	—	●	2 Thermax M12, 2 perforated sleeves 20 x 130, 1 bit, 1 cutting blade, 1 user manual	1
Thermax 16/170 M12	051293	—	●	20 Thermax M16, 20 perforated sleeves 20 x 200, 5 bits, 5 cutting blades, 5 applicator tip extension hoses, 5 user manuals	20
Thermax 16/170 M12	—	051543	●	10 Thermax M16 A4, 10 perforated sleeves 20 x 200, 3 bits, 3 cutting blades, 3 applicator tip extension hoses, 3 user manuals	10
Thermax 16/170 M12 B	051292	—	●	2 Thermax M16, 2 perforated sleeves 20 x 200, 1 bit, 1 cutting blade, 1 applicator tip extension hose, 1 user manual	1



## INSTALLATION DATA



Example for simple fixing



Example for multiple fixing

Type	Length of Thermax incl. anti-cold cone l [mm]	Threaded rod in building material	Building material + insulation						Fixture			
			Building material	Suitable injection anchor sleeve	Drill hole diameter d <sub>0</sub> [mm]	Min. anchorage depth h <sub>ef</sub> [mm]	Drill hole depth t <sub>d</sub> [mm]	Thickness of non-bearing layer e [mm]	Max. fixture thickness t <sub>fix</sub> [mm]	Con-nection thread [mm]	Max. instal-lation torque T <sub>inst</sub> [Nm]	Required resin quantity [Scale unit]
Thermax M12	240	M12	Concrete		14	70	$h_{ef} + e$	62 - 170	16 <sup>1)</sup>	M12	20	5
			Solid brick		14	80	$h_{ef} + e$	62 - 160				6
			Perforated brick	FIS H 20x130 K	20	130	$h_{ef} + e + 10 \text{ mm}$	62 - 110				26
			Aerated concrete		14	100	$h_{ef} + e$	62 - 140				8
Thermax M16	370	M16	Concrete		18	80	$h_{ef} + e$	62 - 290	16 <sup>1)</sup>	M12	20	7
			Solid brick		18	80	$h_{ef} + e$	62 - 290				7
			Perforated brick	FIS H 20x200 K	20	200	$h_{ef} + e + 10 \text{ mm}$	62 - 170				40
			Aerated concrete		18	100	$h_{ef} + e$	62 - 270				9

1) The setscrews may be replaced by a setscrew / fixing screw up to a length 200 mm.

## TECHNICAL DATA



Epoxy mortar  
**FIS EM Plus 390 S**



Superbond mortar  
**FIS SB 390 S**



Injection mortar  
**FIS V 360 S**



All-round adhesive gluing and sealing  
**KD-290**



Injection mortar  
**FIS GREEN 300 T**



Construction sealant Premium  
**DKM WHITE 290ML**

Item	Art.-No.	Approval		Languages on the cartridge	Contents	Sales unit
		DIBt	ETA			
<b>FIS EM Plus 390 S</b>	<b>544154</b>	●	■	DE, EN, FR, NL, ES, PT	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS EM Plus 390 S</b>	<b>544155</b>	●	■	EN, ZH, EL, KO, HU, PL	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS V 360 S</b>	<b>094404</b>	●	■	DE, FR, NL, TR, HU, AR	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS V 360 S</b>	<b>094405</b>	●	■	EN, IT, PT, ES, ZH, JA	1 cartridge 360 ml, 2 x FIS MR Plus	6
<b>FIS SB 390 S</b>	<b>519451</b>	●	■	DE, FR, NL	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS SB 390 S</b>	<b>518831</b>	●	■	EN, ES, PT	1 cartridge 390 ml, 2 x FIS MR Plus	6
<b>FIS GREEN 300 T</b>	<b>522989</b>	—	■	FR	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	4
<b>FIS GREEN 300 T</b>	<b>523245</b>	—	■	IT	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
<b>FIS GREEN 300 T</b>	<b>538219</b>	—	■	CS, SK	1 cartridge 300 ml, 2 x FIS MR Plus	12
<b>FIS GREEN 300 T</b>	<b>532972</b>	—	■	DA, SV, NO, FI	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
<b>KD WHITE 290ML</b>	<b>059389</b>	—	—	DE, EN	1 cartridge 290 ml	12
<b>DKM-290ML</b>	<b>517598</b>	—	—	DE, EN	1 cartridge 290 ml	12

## ACCESSORIES DRILL HOLE CLEANING



Item	Art.-No.	Length L <sub>1</sub> [mm]	Length L <sub>2</sub> [mm]	Brush diameter [mm]	For drill diameter [mm]	Sales unit [pcs]
<b>BS ø 14</b>	<b>078180</b>	250	80	16	14	1
<b>BS ø 16/18</b>	<b>078181</b>	250	80	20	16/18	1
<b>BS ø 20/22</b>	<b>052277</b>	180	80	25	20/22	1

## ACCESSORIES DRILL HOLE CLEANING



Item	Art.-No.	Sales unit [pcs]
<b>Blow-out pump ABG</b>	<b>089300</b>	1



## LOADS

**Stand-off installation Thermax 12 and 16 with load-bearing anchor rod made of zinc-plated steel 8.8 and a displacement of 1 mm**

The below load table is valid for short-term loading (e.g. wind load). If the sealing of the annular gap between Thermax and plaster is assured by fischer all-round sealing KD, the Thermax version with an anchor rod on base substrate side made of zinc-plated steel may be used.

Highest permissible loads<sup>1) 5) 7)</sup> of a Thermax within an anchor group<sup>2)</sup> in concrete with the injection mortars FIS V or FIS SB and in masonry with the injection mortar FIS V.

Type	Minimum effective anchorage depth $h_{ef}^{4)8)}$ [mm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load at $e = 62 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 100 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 120 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 140 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 160 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 180 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 200 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 250 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 300 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Minimum member thickness $h_{min}$ [mm]	Minimum spacing $s_{min} \parallel / \perp$ [mm]	Minimum edge distance $c_{min}$ [mm]
<b>Concrete, cracked and non-cracked, strength class <math>\geq C20/25</math></b>														
<b>Thermax 12<sup>3)</sup></b>	70	3,40 <sup>5)</sup>	1,07	0,69	0,58	0,42	0,32	0,24	0,18	0,08	0,04	100	55	55
<b>Thermax 16<sup>3)</sup></b>	80	3,40 <sup>5)</sup>	1,51	0,98	0,83	0,71	0,63	0,48	0,34	0,16	0,08	116	65	65
<b>Solid brick, Mz, EN 771-1; <math>f_b \geq 12 \text{ N/mm}^2</math>; <math>\rho \geq 1,8 \text{ kg/dm}^3</math>; <math>LxWxH \geq 240x115x71 \text{ mm}</math>, NF</b>														
<b>Thermax 12<sup>3)</sup></b>	200	2,71	0,85	0,55	0,47	0,40	0,32	0,24	0,18	0,08	0,04	240	80/80	60
<b>Thermax 16<sup>3)</sup></b>	200	2,71	1,29	0,98	0,83	0,71	0,63	0,48	0,34	0,16	0,08	240	80/80	60
<b>Solid sand-lime brick, KS, EN 771; <math>f_b \geq 20 \text{ N/mm}^2</math>; <math>\rho \geq 2,0 \text{ kg/dm}^3</math>; <math>LxWxH \geq 250x240x240 \text{ mm}</math>, 8DF</b>														
<b>Thermax 12<sup>3)</sup></b>	50	2,86	0,85	0,55	0,47	0,40	0,32	0,24	0,18	0,08	0,04	240	80/80	60
<b>Thermax 16<sup>3)</sup></b>	50	2,14	1,51	0,98	0,83	0,71	0,63	0,48	0,34	0,16	0,08	240	80/80	60
<b>Vertically perforated brick type B, HLz, EN 771-1; <math>f_b \geq 12 \text{ N/mm}^2</math>; <math>\rho \geq 1,0 \text{ kg/dm}^3</math>; <math>LxWxH = 370x240x237 \text{ mm}</math> resp. <math>500x175x237 \text{ mm}</math></b>														
<b>Thermax 12<sup>4)</sup></b>	110	1,14	0,57	0,55	0,47	0,40	0,32	0,24	0,18	0,08	0,04	175	100/100	100
<b>Thermax 16<sup>4)</sup></b>	110	1,14	0,57	0,57	0,57	0,57	0,57	0,48	0,34	0,16	0,08	175	100/100	100
<b>Perforated sand-lime brick, KSL, EN 771-2; <math>f_b \geq 12 \text{ N/mm}^2</math>; <math>\rho \geq 1,4 \text{ kg/dm}^3</math>; <math>LxWxH = 240x175x113 \text{ mm}</math>, 3DF</b>														
<b>Thermax 12<sup>4)</sup></b>	85	1,00	0,85	0,55	0,47	0,40	0,32	0,24	0,18	0,08	0,04	175	100/115	80
<b>Thermax 16<sup>4)</sup></b>	85	1,00	1,14	0,98	0,83	0,71	0,63	0,48	0,34	0,16	0,08	175	100/115	80
<b>Hollow block made of light weight concrete, Hbl, EN 771-3; <math>f_b \geq 2 \text{ N/mm}^2</math>; <math>\rho \geq 1,0 \text{ kg/dm}^3</math>; <math>LxWxH = 362x240x240 \text{ mm}</math></b>														
<b>Thermax 12<sup>4)</sup></b>	110	0,43	0,26	0,26	0,26	0,26	0,26	0,24	0,18	0,08	0,04	240	100/240	60
<b>Thermax 16<sup>4)</sup></b>	180	0,71	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,16	0,08	240	100/240	60
<b>Aerated concrete (cylindrical drill hole), EN 771-4; <math>f_b \geq 2 \text{ N/mm}^2</math>; <math>\rho \geq 0,35 \text{ kg/dm}^3</math>; <math>LxWxH \geq 599x240x249 \text{ mm}</math></b>														
<b>Thermax 12<sup>3)</sup></b>	200	1,43	0,43	0,43	0,43	0,40	0,32	0,24	0,18	0,08	0,04	240	80/80	100
<b>Thermax 16<sup>3)</sup></b>	200	1,43	0,43	0,43	0,43	0,43	0,43	0,43	0,34	0,16	0,08	240	80/80	100

For the design the complete approval Z-21.8-1837 as well as the European Technical Assessments ETA-10/0383, ETA-02/0024 or ETA-12/0258 have to be considered.

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Set-up of one or more Thermax in a row in direction of shear, for which the clamping of the attachment prevents a torsion on attachment side due to a sufficient stiffness of the attachment or connecting construction. For a clamping on base substrate side only, see approval.

<sup>3)</sup> For combinations of tensile and shear loads as well as reduced edge distances or spacings (anchor groups) see approval. The values for tensile loads in masonry are valid only, if the joints of the masonry is completely filled with masonry mortar. If the joints are not filled with masonry mortar are not filled with masonry mortar and the edge distance towards the joints is less than  $c_{min}$ , the loads have to be reduced by the factor  $a_1 = 0,75$ . The values for shear loads are valid only, if the joints are filled with masonry mortar. For not completely filled joints they have to be handled like a free edge and a minimum edge distance  $c_{min}$  of the anchors to the joints has to be observed. For compression loads and perforated bricks or hollow blocks see approval. Calculative assumed thickness of the attachment  $t_{fix} = 6 \text{ mm}$ .

<sup>4)</sup> In vertically perforated bricks HLz, perforated sand-lime bricks KSL as well as hollow blocks made of light weight concrete Hbl the Thermax 12 (standard version) can bridge non-load bearing layers up to 110 mm and the Thermax 16 can bridge them up to 170 mm. Larger usable lengths up to 300 mm are possible, if other perforated sleeves and where required longer anchor rods are used and again the anchorage depth gets reduced - see approval.

<sup>5)</sup> The stated permissible loads are valid for anchorages in dry base substrates - use category d/d - and for temperatures up to +50 °C (resp. short-term up to +80 °C) in the area of the injection mortar and during drill hole cleaning in accordance with the approval. The load values apply to anchor rods on base substrate side made of zinc-plated steel grade 8.8 - for other steel grades or stainless steel see approval.

<sup>6)</sup> Complies with the permissible tensile load of the Thermax Cone.

<sup>7)</sup> Intermediate values of the shear load may be linearly interpolated in dependence of "e", if nothing else is mentioned in the approval.

<sup>8)</sup> In solid bricks Mz and solid sand-lime bricks KS the Thermax 12 (standard version) can bridge non-load bearing layers up to 190 mm (140 mm in aerated concrete) and the Thermax 16 can bridge them up to 300 mm (270 mm in aerated concrete) - but in solid brick Mz and aerated concrete the above load values have to be reduced. In concrete the Thermax 12 (standard version) can bridge non-loadbearing layers up to 170 mm and the Thermax 16 can bridge them up to 290 mm. Larger usable lengths up to 300 mm are possible, if longer anchor rods are used and again in solid bricks Mz if the anchorage depth (compared to above values) gets reduced where required - see approval.

<sup>9)</sup> Minimum spacings for at the same time reduced permissible loads, where required.

## LOADS

Stand-off installation Thermax 12 and 16 with load-bearing anchor rod made of stainless steel A4-70 and a displacement of 3 mm

The below load table is valid for short-term loading (e.g. wind load). Measures for sealing see approval, section 3.2.4.

Highest permissible loads<sup>1) 5) 7)</sup> of a Thermax within an anchor group<sup>2)</sup> in concrete with the injection mortars FIS V or FIS SB and in masonry with the injection mortar FIS V.

Type	Minimum effective anchorage depth $h_{ef}^{4)8)}$ [mm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load at $e = 62 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 100 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 120 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 140 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 160 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 180 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 200 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 250 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Permissible shear load at $e = 300 \text{ mm}$ $V_{perm}^{3)}$ [kN]	Minimum member thickness $h_{min}$ [mm]	Minimum spacing $s_{min} \parallel / \perp$ [mm]	Minimum edge distance $c_{min}$ [mm]
<b>Concrete, cracked and non-cracked, strength class <math>\geq C20/25</math></b>														
<b>Thermax 12<sup>8)</sup></b>	70	3,40 <sup>5)</sup>	1,07	0,69	0,58	0,50	0,44	0,39	0,35	0,24	0,12	100	55	55
<b>Thermax 16<sup>8)</sup></b>	80	3,40 <sup>5)</sup>	1,51	0,98	0,83	0,71	0,63	0,56	0,51	0,41	0,24	116	65	65
<b>Solid brick, Mz, EN 771-1; <math>f_b \geq 12 \text{ N/mm}^2</math>; <math>\rho \geq 1,8 \text{ kg/dm}^3</math>; <math>LxWxH \geq 240x115x71 \text{ mm}</math>, NF</b>														
<b>Thermax 12<sup>8)</sup></b>	200	2,71	0,59	0,39	0,33	0,28	0,25	0,22	0,20	0,16	0,12	240	80/80	60
<b>Thermax 16<sup>8)</sup></b>	200	2,71	1,29	0,96	0,81	0,70	0,62	0,56	0,50	0,41	0,24	240	80/80	60
<b>Solid sand-lime brick, KS, EN 771; <math>f_b \geq 20 \text{ N/mm}^2</math>; <math>\rho \geq 2,0 \text{ kg/dm}^3</math>; <math>LxWxH \geq 250x240x240 \text{ mm}</math>, 8DF</b>														
<b>Thermax 12<sup>8)</sup></b>	50	2,86	0,59	0,39	0,33	0,28	0,25	0,22	0,20	0,16	0,12	240	80/80	60
<b>Thermax 16<sup>8)</sup></b>	50	2,14	1,46	0,96	0,81	0,70	0,62	0,56	0,50	0,41	0,24	240	80/80	60
<b>Vertically perforated brick type B, HLz, EN 771-1; <math>f_b \geq 12 \text{ N/mm}^2</math>; <math>\rho \geq 1,0 \text{ kg/dm}^3</math>; <math>LxWxH = 370x240x237 \text{ mm}</math> resp. <math>500x175x237 \text{ mm}</math></b>														
<b>Thermax 12<sup>4)</sup></b>	110	1,14	0,57	0,39	0,33	0,28	0,25	0,22	0,20	0,16	0,12	175	100/100	100
<b>Thermax 16<sup>4)</sup></b>	110	1,14	0,57	0,57	0,57	0,57	0,57	0,56	0,50	0,41	0,24	175	100/100	100
<b>Perforated sand-lime brick, KSL, EN 771-2; <math>f_b \geq 12 \text{ N/mm}^2</math>; <math>\rho \geq 1,4 \text{ kg/dm}^3</math>; <math>LxWxH = 240x175x113 \text{ mm}</math>, 3DF</b>														
<b>Thermax 12<sup>4)</sup></b>	85	1,00	0,59	0,39	0,33	0,28	0,25	0,22	0,20	0,16	0,12	175	100/115	80
<b>Thermax 16<sup>4)</sup></b>	85	1,00	1,14	0,96	0,81	0,70	0,62	0,56	0,50	0,41	0,24	175	100/115	80
<b>Hollow block made of light weight concrete, Hbl, EN 771-3; <math>f_b \geq 2 \text{ N/mm}^2</math>; <math>\rho \geq 1,0 \text{ kg/dm}^3</math>; <math>LxWxH = 362x240x240 \text{ mm}</math></b>														
<b>Thermax 12<sup>4)</sup></b>	110	0,43	0,26	0,26	0,26	0,26	0,25	0,22	0,20	0,16	0,12	240	100/240	60
<b>Thermax 16<sup>4)</sup></b>	180	0,71	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,24	240	100/240	60
<b>Aerated concrete (cylindrical drill hole), EN 771-4; <math>f_b \geq 2 \text{ N/mm}^2</math>; <math>\rho \geq 0,35 \text{ kg/dm}^3</math>; <math>LxWxH \geq 599x240x249 \text{ mm}</math></b>														
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<b>Thermax 16<sup>8)</sup></b>	200	1,43	0,43	0,43	0,43	0,43	0,43	0,43	0,43	0,41	0,24	240	80/80	100

For the design the complete approval Z-21.8-1837 as well as the European Technical Assessments ETA-10/0383, ETA-02/0024 or ETA-12/0258 have to be considered.

- <sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.
- <sup>2)</sup> Set-up of one or more Thermax in a row in direction of shear, for which the clamping of the attachment prevents a torsion on attachment side due to a sufficient stiffness of the attachment or connecting construction. For a clamping on base substrate side only, see approval.
- <sup>3)</sup> For combinations of tensile and shear loads as well as reduced edge distances or spacings (anchor groups) see approval. The values for tensile loads in masonry are valid only, if the joints of the masonry is completely filled with masonry mortar. If the joints are not filled with masonry mortar are not filled with masonry mortar and the edge distance towards the joints is less than  $c_{min}$ , the loads have to be reduced by the factor  $a_j = 0,75$ . The values for shear loads are valid only, if the joints are filled with masonry mortar. For not completely filled joints they have to be handled like a free edge and a minimum edge distance  $c_{min}$  of the anchors to the joints has to be observed. For compression loads and perforated bricks or hollow blocks see approval. Calculative assumed thickness of the attachment  $t_{fix} = 6 \text{ mm}$ .
- <sup>4)</sup> In vertically perforated bricks HLz, perforated sand-lime bricks KSL as well as hollow blocks made of light weight concrete Hbl the Thermax 12 (standard version) can bridge non-load bearing layers up to 110 mm and the Thermax 16 can bridge them up to 170 mm. Larger usable lengths up to 300 mm are possible, if other perforated sleeves and where required longer anchor rods are used and again the anchorage depth gets reduced - see approval.
- <sup>5)</sup> The stated permissible loads are valid for anchorages in dry base substrates - use category d/d - and for temperatures up to +50 °C (resp. short-term up to +80 °C) in the area of the injection mortar and during drill hole cleaning in accordance with the approval. The load values apply to anchor rods on base substrate side made of stainless steel of the grade A4-70.
- <sup>6)</sup> Complies with the permissible tensile load of the Thermax Cone.
- <sup>7)</sup> Intermediate values of the shear load may be linearly interpolated in dependence of "e", if nothing else is mentioned in the approval.
- <sup>8)</sup> In solid bricks Mz and solid sand-lime bricks KS the Thermax 12 (standard version) can bridge non-load bearing layers up to 190 mm (140 mm in aerated concrete) and the Thermax 16 can bridge them up to 300 mm (270 mm in aerated concrete) - but in solid brick Mz and aerated concrete the above load values have to be reduced. In concrete the Thermax 12 (standard version) can bridge non-loadbearing layers up to 170 mm and the Thermax 16 can bridge them up to 290 mm. Larger usable lengths up to 300 mm are possible, if longer anchor rods are used and again in solid bricks Mz if the anchorage depth (compared to above values) gets reduced where required - see approval.
- <sup>9)</sup> Minimum spacings for at the same time reduced permissible loads, where required.

## The quick façade repair for two-leaf cavity walls



### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

- Facing masonry with and without an air layer

### CERTIFICATES



### ADVANTAGES

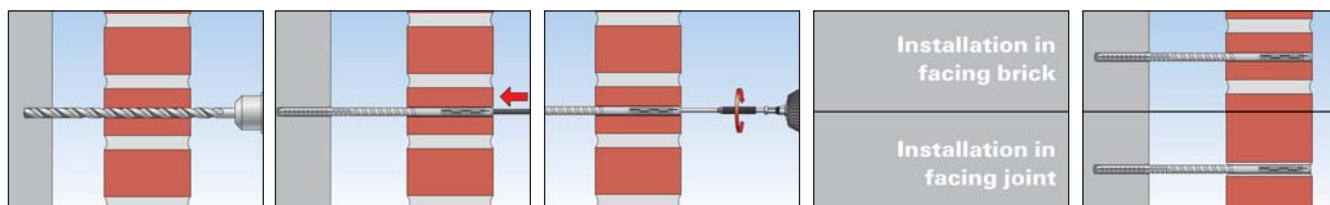
- The approved fixing in stone and in joints from at least 50 mm facing masonry provides a high degree of flexibility and security.
- Use in joints and with a low anchorage depth of just 50 mm allows for a quick and economical installation.
- The small anchor rim and screw head allow for a surface-flush or deep-set installation.
- The drill hole can be retrospectively sealed so that it is no longer visible in the façade.
- A drip coil prevents condensate running into the load-bearing layer, thus preventing frost and corrosive damage.

### APPLICATIONS

- VBS-M is especially suitable for applications where external thermal insulation composite systems (ETICS) have been previously installed.
- Retrospective repair of facing masonry.

### FUNCTIONING

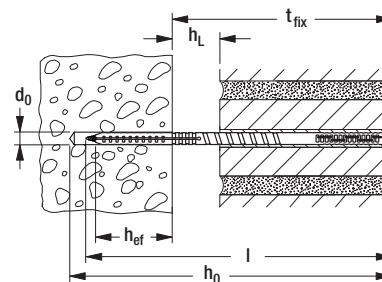
- The remedial wall tie VBS-M is set in the load-bearing layer and into facing masonry using push-through installation.
- In accordance with the approval, no drill hole cleaning is required.
- The two expansion zones in the load-bearing layer and in the facing masonry ensure a secure fixation.
- The plug doesn't fix into the facing masonry until the head grips into the load-bearing layer. This ensures the very best installation safety.



## TECHNICAL DATA



Remedial wall tie **VBS-M**



	Zinc-plated steel	Stainless steel	Max. shell distance at 115 mm facing masonry, flush installation	Max. shell distance at 115 mm facing masonry, 20 mm sunk installation	Facing masonry + cavity	Drill diameter	Drill hole depth	Effect. anchorage depth	Anchor length	Sales unit
	Art.-No.	Art.-No.	[mm]	[mm]	t <sub>fix</sub> [mm]	d <sub>0</sub> [mm]	h <sub>0</sub> [mm]	h <sub>ef</sub> [mm]	l [mm]	[pcs]
Item	gvz	A4								
<b>VBS-M 8 x 120</b>	<b>514243</b>	<b>514236</b>	20*	—	70	8	140	>50	120	100
<b>VBS-M 8 x 185</b>	<b>514244</b>	<b>514237</b>	20	40	135	8	205	>50	185	100
<b>VBS-M 8 x 205</b>	<b>514245</b>	<b>514238</b>	40	60	155	8	225	>50	205	100
<b>VBS-M 8 x 225</b>	<b>514246</b>	<b>514239</b>	60	80	175	8	245	>50	225	100
<b>VBS-M 8 x 245</b>	<b>514247</b>	<b>514240</b>	80	100	195	8	265	>50	245	100
<b>VBS-M 8 x 265</b>	<b>514248</b>	<b>514241</b>	100	120	215	8	285	>50	265	100
<b>VBS-M 8 x 285</b>	<b>514249</b>	<b>514242</b>	120	140	235	8	305	>50	285	100

\* Max. 20 mm mortar layer in the case of 50 mm thick economy facing.

The drill hole depth is to be adapted accordingly in the case of sunk installation of the anchor.

## ACCESSORIES / DRILLS



**SDS Plus IV 8/100/400**



**SDS Plus II Pointer  
8/400/460**



**Masonry drill bit 8/100/400**

Item	Art.-No.	Description	Sales unit [pcs]
<b>SDS Plus IV 8/100/400</b>	<b>517689</b>	fischer Quattric drill bit with SDS fixture and short flute for drilling in concrete	1
<b>Masonry drill bit 8/100/400</b>	<b>517690</b>	fischer masonry drill bit with SDS fixture and short flute, ground sharp, for rotary drilling in perforated brick and in the bed joint	1
<b>SDS Plus II 8/400/460</b>	<b>531785</b>	fischer hammer drill bit for drilling in concrete and in the facing brick	1

## ACCESSORIES / BITS



**FPB TX 25/5 long**



**FPB T 25 PROFi**

Item	Art.-No.	Description	Sales unit [pcs]
<b>FPB TX 25/5 long</b>	<b>517693</b>	fischer Profi-Bit long, which can be extended to 50 mm bit, allows for deep setting in stone and in the bed joint	12
<b>FPB T 25 PROFi Bit W 10</b>	<b>533115</b>	fischer Profi-Bit	10





























## 6 General fixings

		Page
<b>DUOPOWER</b>		<b>348</b>
<b>Universal plug UX</b>		<b>351</b>
<b>Universal plug UX GREEN</b>		<b>356</b>
<b>Expansion plug SX</b>		<b>358</b>
<b>Expansion plug SX GREEN</b>		<b>361</b>
<b>Expansion plug S</b>		<b>363</b>
<b>Threaded rod plug RODFORCE FGD</b>		<b>366</b>
<b>Metal expansion anchor FMD</b>		<b>368</b>
<b>Expansion plug M-S</b>		<b>370</b>
<b>Anchor M</b>		<b>372</b>
<b>Brass fixing MS</b>		<b>374</b>
<b>Aircrete anchor GB</b>		<b>376</b>
<b>Aircrete anchor GB GREEN</b>		<b>378</b>
<b>Turbo aircrete anchor FTP K</b>		<b>380</b>
<b>Turbo aircrete anchor FTP M</b>		<b>382</b>
<b>Brass fixing PA 4</b>		<b>384</b>
<b>Balcony cladding fixing P 9 K</b>		<b>386</b>
<b>Stair-tread fixing TB / TBB</b>		<b>388</b>
<b>Repair pad FIX.it</b>		<b>389</b>
<b>Doorstop TS</b>		<b>390</b>

## The duo of power and intelligence



Wall cabinets



TV-brackets

### BUILDING MATERIALS

- Concrete
- Solid brick
- Solid sand-lime brick
- Aerated concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Plasterboard
- Gypsum plasterboard and gypsum fibreboards
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete or similar
- Natural stone
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

### CERTIFICATES



### ADVANTAGES

- Two component materials for top load values and intelligent functioning (expansion, folding, knotting), depending on building material - solid, perforated or pannel material.
- Great feedback (feel-good-factor) of the plug. You can feel exactly when the plug is installed perfectly.
- The narrow plug rim prevents slipping into the drill hole.
- The serrated anti-rotation feature interlock in the building material and prevents rotation in the drill hole during installation.
- The greater anchorage depth of the DUOPOWER 6 x 50, 8 x 65 and 10 x 80 means that the plug is especially suited to fixings in hollow building materials, aerated concrete and to bridge plaster.

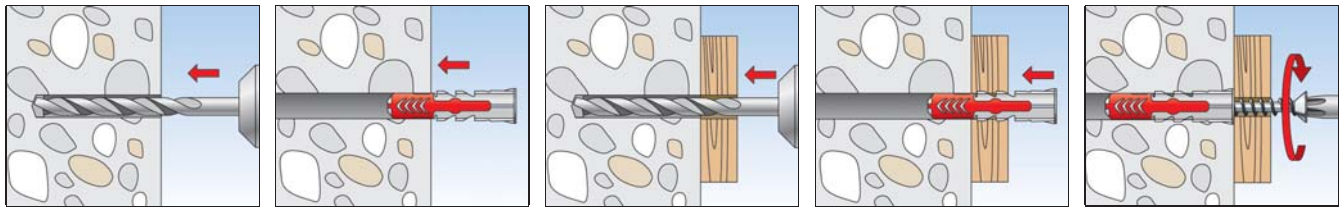
### APPLICATIONS

- TV consoles
- Lighting
- Shelves
- Mirror cabinets
- Letter boxes
- Pictures
- Fixing blinds
- Curtain rails
- Wash basin fixings
- Plumbing and heating fixings
- Bath and toilet installations
- Wall cabinets
- Range hood

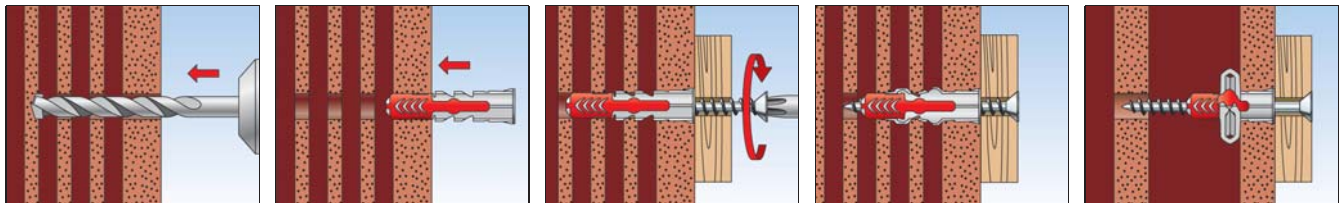
### FUNCTIONING

- The grey component made from high quality nylon automatically activates for the optimum product function (expansion, folding, knotting) for the best hold.
- The red expansion wings support the safe expansion and offer additional safety for the grey component.
- The smooth-running opening allows the simple positioning of the screw and the secure guiding and fixing in the screw channel.
- The required screw length is given by the plug length + fixture thickness + the screw diameter.
- Suitable for wood and chipboard screws, as well as stud screws.
- In the case of fixing boards, the threadless part of the screw must not be longer than the fixture.

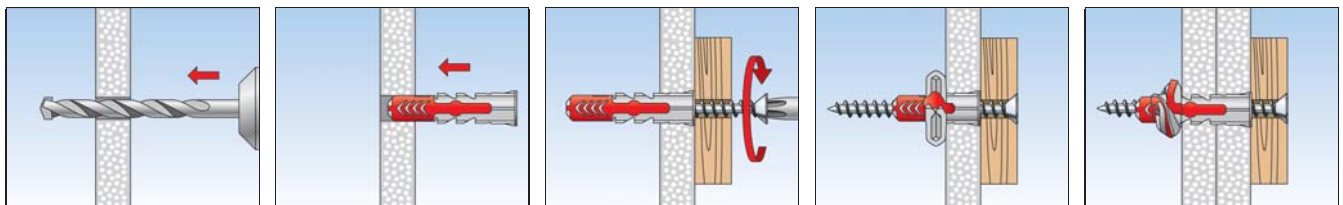
## INSTALLATION IN SOLID BUILDING MATERIALS



## INSTALLATION IN HOLLOW BUILDING MATERIALS



## INSTALLATION IN PANEL BUILDING MATERIALS



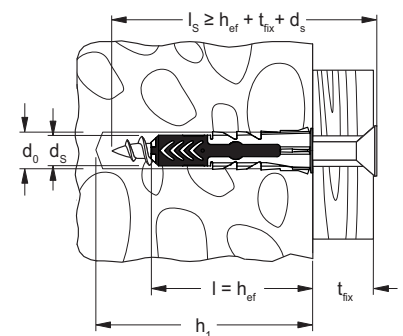
## TECHNICAL DATA



DUOPOWER



DUOPOWER with greater anchorage depth



	Art.-No. without screw	Art.-No. with screw	Drill hole diameter d <sub>0</sub> [mm]	Min. drill hole depth h <sub>1</sub> [mm]	Min. panel thickness d <sub>p</sub> [mm]	Min. bolt penetration l <sub>E,min</sub> [mm]	Anchor length l [mm]	Wood and chipboard screws d <sub>S</sub> / d <sub>S</sub> x l <sub>S</sub> [mm]	Drive	Max. fixture thickness t <sub>fix</sub> [mm]	Sales unit [pcs]
Item											
<b>DUOPOWER 5 x 25</b>	<b>555005</b>	—	5	35	12,5	29	25	3 - 4	—	—	100
<b>DUOPOWER 6 x 30</b>	<b>555006</b>	—	6	40	12,5	35	30	4 - 5	—	—	100
<b>DUOPOWER 6 x 50</b>	<b>538240</b>	—	6	60	12,5	55	50	4 - 5	—	—	100
<b>DUOPOWER 8 x 40</b>	<b>555008</b>	—	8	50	12,5	46	40	4,5 - 6	—	—	100
<b>DUOPOWER 8 x 65</b>	<b>538241</b>	—	8	75	2 x 12,5	71	65	4,5 - 6	—	—	50
<b>DUOPOWER 10 x 50</b>	<b>555010</b>	—	10	70	12,5	58	50	6 - 8	—	—	50
<b>DUOPOWER 10 x 80</b>	<b>538242</b>	—	10	100	—	88	80	6 - 8	—	—	25
<b>DUOPOWER 12 x 60</b>	<b>538243</b>	—	12	80	—	70	60	8 - 10	—	—	25
<b>DUOPOWER 14 x 70</b>	<b>538244</b>	—	14	90	—	82	70	10 - 12	—	—	20
<b>DUOPOWER 5 x 25 S</b>	—	<b>555105</b>	5	40	12,5	29	25	4 x 35	PZ2	6	50
<b>DUOPOWER 6 x 30 S</b>	—	<b>555106</b>	6	45	12,5	35	30	4,5 x 40	PZ2	5	50
<b>DUOPOWER 6 x 50 S</b>	—	<b>538245</b>	6	75	12,5	55	50	4,5 x 70	PZ2	15	50
<b>DUOPOWER 8 x 40 S</b>	—	<b>555108</b>	8	65	12,5	45	40	5 x 60	PZ2	15	50
<b>DUOPOWER 8 x 65 S</b>	—	<b>538246</b>	8	85	2 x 12,5	70	65	5 x 80	PZ2	10	25
<b>DUOPOWER 10 x 50 S</b>	—	<b>555110</b>	10	74	12,5	57	50	7 x 69	SW 13 / TX 40	13	25
<b>DUOPOWER 10 x 80 S</b>	—	<b>538247</b>	10	112	—	87	80	7 x 107	SW 13	20	10

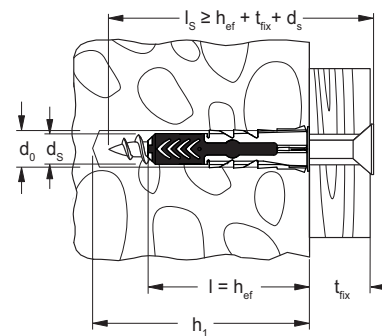
## TECHNICAL DATA



## DUOPOWER



**DUOPOWER** with greater anchorage depth



	Art.-No.	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. panel thickness $d_p$ [mm]	Min. bolt penetration $l_{E,min}$ [mm]	Anchor length $l$ [mm]	Wood and chipboard screws $d_s / d_s \times l_s$ [mm]	Drive	Max. fixture thickness $t_{fix}$ [mm]	Sales unit [pcs]
Item	without screw	with screw									
<b>DUOPOWER 12 x 60 S</b>	—	<b>538248</b>	12	85	—	68	60	8 x 80	SW 13	12	10
<b>DUOPOWER 14 x 70 S</b>	—	<b>538249</b>	14	100	—	80	70	10 x 95	SW 17	15	8

## LOADS

**DUOPOWER**

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type			DUOPOWER								
			5 x 25	6 x 30	6 x 50	8 x 40	8 x 65	10 x 50	10 x 80	12 x 60	14 x 70
Wood screw diameter	Ø	[mm]	4	5	5	6	6	8	8	10	12
Min. edge distance concrete	c <sub>min</sub>	[mm]	30	35	35	50	50	65	65	80	100
<b>Recommended loads in the respective base material F<sub>rec</sub><sup>2)</sup></b>											
Concrete	≥ C20/25	[kN]	0,40	0,95	1,65	1,10	2,30	2,15	4,20	3,30	5,30
Solid brick	≥ Mz 12	[kN]	0,30	0,50	0,55	0,62	0,69	1,20	1,45	1,30	1,35
Solid sand-lime brick	≥ KS 12	[kN]	0,50	1,00	1,60	1,25	2,25	2,20	3,85	2,80	4,50
Aerated concrete	≥ PB 2, PP 2 (G 2)	[kN]	0,05	0,10	0,15	0,10	0,16	0,20	0,30	0,24	0,35
Aerated concrete	≥ PB 4, PP 4 (G 4)	[kN]	0,25	0,38	0,55	0,42	0,60	0,60	1,10	1,00	1,45
Vertically perforated brick	≥ Hlz 12 (ρ ≥ 0,9 kg/dm³)	[kN]	0,13	0,15	0,17	0,25	0,40	0,25	0,40	0,35	0,40
Perforated sand-lime brick	≥ KSL 12 (ρ ≥ 1,6 kg/dm³)	[kN]	0,40	0,60	0,60	0,70	1,00	0,70	2,00	0,75	1,50
Gypsum block	(ρ ≥ 0,9 kg/dm³)	[kN]	0,10	0,18	0,37	0,25	0,50	0,35	0,65	0,50	0,50
Gypsum fibreboard	12,5 mm	[kN]	0,24	0,33	0,35	0,35	-	0,50	-	-	-
Gypsum plasterboard	12,5 mm	[kN]	0,12	0,15	0,15	0,15	-	0,15	-	-	-
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,13	0,15	0,24	0,20	0,32	0,30	-	-	-
Mattone Forato Typ F8		[kN]	0,30	0,30	-	0,25	-	0,25	-	-	-
Tramezza Doppio UNI 19		[kN]	0,15	0,15	0,23	0,15	0,30	0,20	0,52	0,35	0,35
Sepa Parpaina		[kN]	0,30	0,45	0,25 <sup>3)</sup>	0,45	0,45 <sup>3)</sup>	0,45	0,45 <sup>3)</sup>	0,60 <sup>3)</sup>	0,60 <sup>3)</sup>

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> The load data are valid for tension, shear and combined tension and shear load.

<sup>3)</sup> Load determination on plastered wall.



## The nylon plug for all building materials



Mirror fixings



Pictures

### BUILDING MATERIALS

- Concrete
- Gypsum plasterboard and gypsum fibreboards
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone
- Aerated concrete
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



6

General fixings

### ADVANTAGES

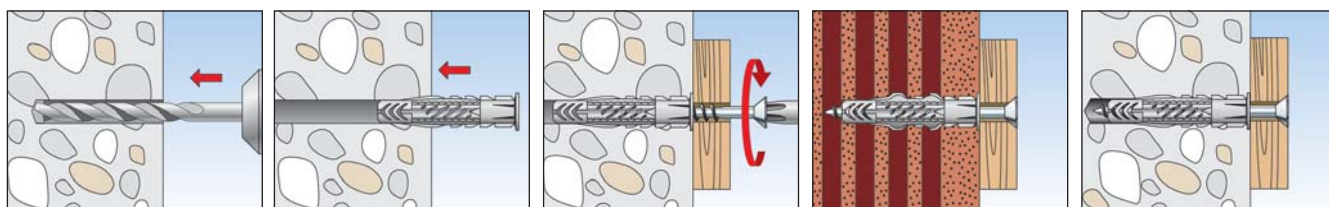
- The universal operating principle (knotting or expanding) allows for use in all solid, hollow and board building materials. Thus the UX is the correct choice for unknown base materials.
- The UX's angled connection ridges allow for optimum screw guidance. Serrated anti-rotation locks prevent rotation in the drill hole. This guarantees the greatest possible installation safety.
- Fixing sets with screws, eye screws and hooks provide the right solution for all applications.

### APPLICATIONS

- Pictures
- Lighting
- Skirting
- Light cabinets
- Towel rails
- Mirror cabinets
- Curtain rails
- Wash basin fixings
- TV consoles
- Plumbing and heating fixings

### FUNCTIONING

- The UX with rim is suitable for pre-positioned installation; the UX without rim is suitable for push-through installation.
- Turning in the screw causes the UX to expand in the solid building material and to knot within the cavity.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Suitable for wood and chipboard screws, as well as stud screws.
- In the case of board building materials, the threadless part of the screw must not be longer than the fixture, and the UX with rim is to be used.
- The edge distance must be at least one plug length.



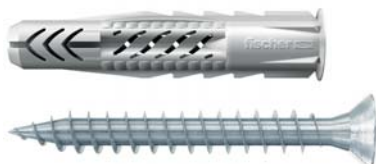
## TECHNICAL DATA



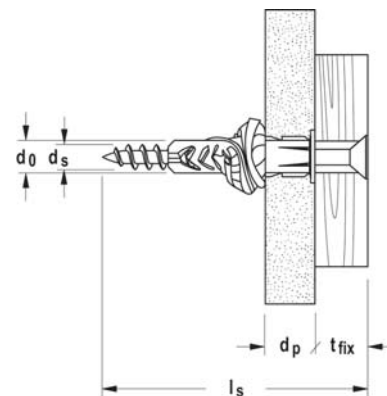
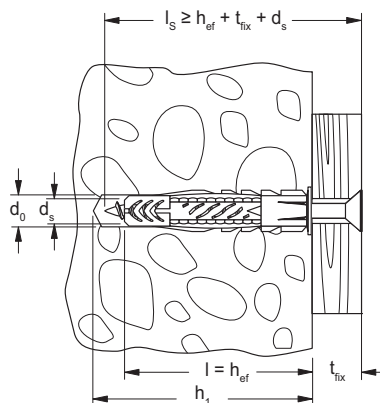
UX - without rim



UX - with collar



UX R S - with rim and screw



	Without rim	With rim	With rim and screw	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. panel thickness $d_p$ [mm]	Anchor length $l$ [mm]	Wood and chip-board screws $d_s / d_s \times l_s$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Sales unit [pcs]
Item	Art.-No.	Art.-No.	Art.-No.							
	UX	UX R	UX R S							
UX 5 x 30	094721	094722	—	5	40	9,5	30	3 - 4	—	100
UX 6 x 35	062754	062756	—	6	45	9,5	35	4 - 5	—	100
UX 6 x 35	—	—	094758	6	65	9,5	35	4,5 x 60	20	25
UX 6 x 50	072094	072095	—	6	60	9,5	50	4 - 5	—	100
UX 6 x 50	—	—	094759	6	80	9,5	50	4,5 x 75	20	25
UX 8 x 40	—	505483	—	8	50	9,5	40	4,5 - 6	—	100
UX 8 x 50	077869	077870	—	8	60	9,5	50	4,5 - 6	—	100
UX 8 x 50	—	—	094762	8	75	9,5	50	5 x 70	15	25
UX 8 x 50	—	—	094760	8	85	9,5	50	5 x 80	25	25
UX 10 x 60	077871	077872	—	10	75	12,5	60	6 - 8	—	50
UX 10 x 60	094761 <sup>1)</sup>	—	—	10	90	12,5	60	6 x 85	20	10
UX 12 x 70	062758	—	—	12	85	—	70	8 - 10	—	25
UX 14 x 75	062757	—	—	14	95	—	75	10 - 12	—	20

1) with screw



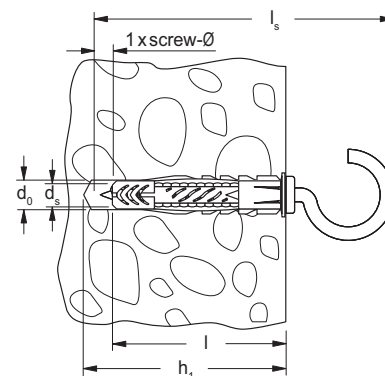
## TECHNICAL DATA



**UX RH** - with rim and round hook



**UX WH** - with rim and angle hook



**UX RH N** - with rim and round hook  
(white coated)



**UX WH N** - with rim and angle hook  
(white coated)



**UX OH N** - with rim and eyebolt  
(white coated)

	With rim and round hook	With round hook (white coated)	With rim and angle hook	With angle hook (white coated)	With eyebolt (white coated)	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. panel thickness $d_p$ [mm]	Anchor length $l$ [mm]	Screw dimension $d_s \times l_s$ [Ø mm]	Sales unit [pcs]
Item	RH	RH N	WH	WH N	OH N						
<b>UX 6 x 35</b>	<b>094407</b>	—	—	—	—	6	45	9,5	35	4,5 x 67	25
<b>UX 6 x 35</b>	—	—	<b>094408</b>	—	—	6	45	9,5	35	4,5 x 51	25
<b>UX 8 x 50</b>	<b>094409</b>	<b>094412</b>	—	—	<b>094414</b>	8	60	9,5	50	5,5 x 87	25
<b>UX 8 x 50</b>	—	—	<b>094410</b>	<b>094413</b>	—	8	60	9,5	50	5,5 x 70	25

## TECHNICAL DATA



**UX** in bucket

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. panel thickness $d_p$ [mm]	Fixing length $l$ [mm]	Wood and chipboard screws $d_s / d_s \times l_s$ [mm]	Sales unit [pcs]
<b>UX 6 x 35 R in bucket</b>	<b>508027</b>	6	45	9,5	35	4 - 5	2500
<b>UX 8 x 50 R in bucket</b>	<b>508028</b>	8	60	9,5	50	4,5 - 6	1000
<b>UX 10 x 60 R in bucket</b>	<b>508029</b>	10	75	12,5	60	6 - 8	600

## TECHNICAL DATA



6

General fixings

Assortment box UX / SX

Box UX / SX-S

Meister-Box

Item	Art.-No.	Contents	Sales unit [pcs]
<b>Box UX 6/8/10</b>	<b>093182</b>	100 plugs UX 6 x 35, 70 plugs UX 8 x 50, 20 plugs UX 10 x 60	1
<b>Box UX-R 6/8/10</b>	<b>093819</b>	100 plugs UX 6 x 35 R, 70 plugs UX 8 x 50 R, 20 plugs UX 10 x 60 R	1
<b>Box UX / SX-S</b>	<b>093181</b>	50 plugs UX 6 x 35, 50 screws 4,5 x 50, 50 plugs SX 6 x 30, 50 screws 4,5 x 45, 25 plugs UX 8 x 50, 25 screws 5 x 65, 25 plugs SX 8 x 40, 25 screws 5 x 50	1
<b>Assortment box UX / SX</b>	<b>040991</b>	60 plugs SX 6 x 30, 50 plugs SX 8 x 40, 20 plugs SX 10 x 50, 60 plugs UX 5 x 30 R, 40 plugs UX 6 x 50 R, 50 plugs UX 8 x 50 R, 10 plugs UX 10 x 60 R	1
<b>Profi-Box UX + screws + hooks</b>	<b>518526</b>	International version: 50 Universal plugs UX 6 x 35 R, 25 Universal plugs UX 8 x 50 R, 20 Chipboard screws 4,5 x 60, 15 Chipboard screws 5 x 70, 4 Angle hooks 5,5 x 70, 4 Round hooks 5,5 x 80	1
<b>Profi-Box UX / UX-R</b>	<b>518527</b>	International version: 25 Universal plugs UX 6 x 35, 25 Universal plugs UX 6 x 35 R, 25 Universal plugs UX 8 x 50, 25 Universal plugs UX 8 x 50 R, 10 Universal plugs UX 10 x 60	1
<b>Meister-Box UX + screws + hooks</b>	<b>513894</b>	German version: 50 Universal plugs UX 6 x 35 R, 25 Universal plugs UX 8 x 50 R, 20 Chipboard screws 4,5 x 60, 15 Chipboard screws 5 x 70, 4 Angle hooks 5,5 x 70, 4 Round hooks 5,5 x 80	1
<b>Meister-Box UX / UX-R</b>	<b>513893</b>	German version: 25 Universal plugs UX 6 x 35, 25 Universal plugs UX 6 x 35 R, 25 Universal plugs UX 8 x 50, 25 Universal plugs UX 8 x 50 R, 10 Universal plugs UX 10 x 60	1

## LOADS

### Universal plug UX

Highest recommended tensile loads<sup>1)</sup> for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type			UX 5 x 30	UX 6 x 35	UX 6 x 50	UX 8 x 40 UX 8 x 50	UX 10 x 60	UX 12 x 70	UX 14 x 75
Wood screw diameter	Ø	[mm]	4	5	5	6	8	10	12
<b>Recommended loads in the respective base material F<sub>rec</sub><sup>2)</sup></b>									
Concrete	≥ C20/25	[kN]	0,30	0,40	0,60	0,60	1,00	1,50	1,80
Solid brick	≥ Mz 12	[kN]	0,20	0,20	0,30	0,30	0,50	0,70	0,80
Perforated sand-lime brick	≥ KSL 12	[kN]	0,30	0,40	0,40	0,50	0,60	0,80	0,80
Vertically perforated brick	≥ Hlz 12	[kN]	0,20	0,20	0,20	0,20	0,20	0,30	0,40
Aerated concrete	≥ AAC 4	[kN]	0,15	0,20	0,20	0,30	0,40	0,60	0,70
Gypsum plasterboard	12,5 mm	[kN]	0,10	0,10	0,10	0,10	0,10	-	-
Gypsum plasterboard	25 mm	[kN]	0,10	0,15	0,15	0,15	0,15	-	-
Gypsum fibreboard	(Fermacell)	[kN]	0,20	0,20	0,20	0,20	0,25	-	-
Gypsum block	ρ ≥ 0,9 kg/dm <sup>3</sup>	[kN]	-	-	-	0,15	0,35	0,45	0,50

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## LOADS

### Universal plug UX with hook screws respective eye screws

Highest recommended tensile loads<sup>1)</sup> for a single anchor.

The given loads are valid for the included hook screws respective eye screws.

Type			UX 6 x 35 RH	UX 6 x 35 WH	UX 8 x 50 RH	UX 8 x 50 WH	UX 8 x 50 OE
<b>Recommended loads in the respective base material F<sub>rec</sub><sup>2)</sup></b>							
Concrete	≥ C20/25	[kN]	0,25	0,30	0,40	0,45	0,40
Vertically perforated brick	≥ Hlz 12	[kN]	0,20	0,20	0,20	0,20	0,20
Gypsum plasterboard	12,5 mm	[kN]	0,05	0,05	0,05	0,05	0,05

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The nylon plug for all building materials



Curtain rails



Shelves

### BUILDING MATERIALS

- Concrete
- Gypsum plasterboard and gypsum fibreboards
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone
- Aerated concrete
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

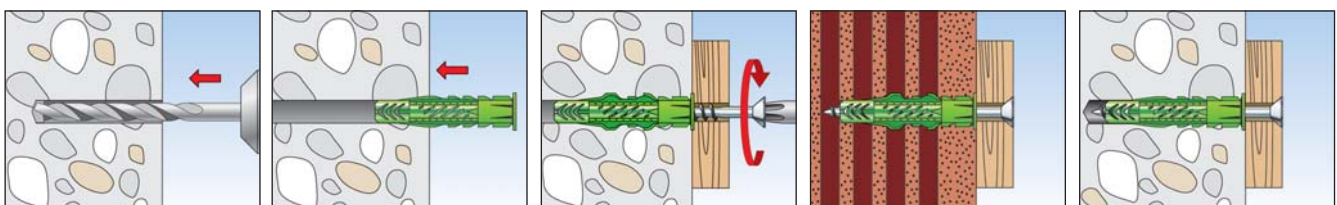
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular UX plugs.
- The universal operating principle (knotting or expanding) allows for use in all solid, hollow and board building materials. Thus the UX GREEN is the correct choice for unknown base materials.
- Plug collar for anti-slip safety and saw tooth sides as turning lock ensure the highest installation safety.

### APPLICATIONS

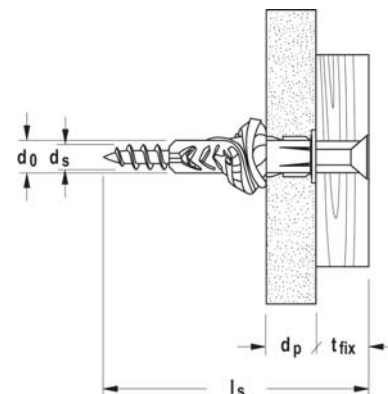
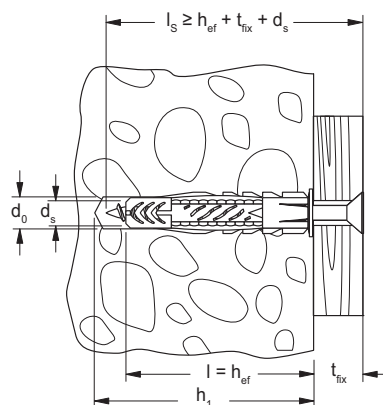
- Pictures
- Lighting
- Skirting
- Light cabinets
- Towel rails
- Mirror cabinets
- Curtain rails
- Wash basin fixings
- TV consoles
- Plumbing and heating fixings

### FUNCTIONING

- The Universal plug UX with rim is suitable for pre-positioned installation; the UX without rim is suitable for push-through installation.
- When screwing in the screw, the UX GREEN expands in solid building materials and knots itself into cavities.
- Suitable for wood and chipboard screws, as well as stud screws.
- The required screw length is given by: the plug length + fixture thickness + 1 x screw diameter.
- In the case of board building materials, the threadless part of the screw must not be longer than the fixture.
- The edge distance must be at least one plug length.



## TECHNICAL DATA



Universal plug **UX GREEN R** - with rim

	With rim	Without rim	Drill hole diameter	Min. drill hole depth	Min. panel thickness	Anchor length	Wood and chip-board screws	Sales unit
	Art.-No.	Art.-No.	$d_0$ [mm]	$h_1$ [mm]	$d_p$ [mm]	$l$ [mm]	$d_s / d_s \times l_s$ [mm]	[pcs]
Item	UX R	UX						
<b>UX GREEN 6 x 35</b>	<b>518885</b>	—	6	45	9,5	35	4 - 5	40
<b>UX GREEN 6 x 50</b>	<b>524855</b>	—	6	60	9,5	50	4 - 5	40
<b>UX GREEN 8 x 50</b>	<b>518886</b>	—	8	60	9,5	50	4,5 - 6	40
<b>UX GREEN 10 x 60</b>	<b>518887</b>	—	10	75	12,5	60	6 - 8	20
<b>UX GREEN 12 x 70</b>	—	<b>524858</b>	12	85	—	70	8 - 10	18

## LOADS

### Universal plug UX GREEN

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type		UX GREEN 6 x 35	UX GREEN 6 x 50	UX GREEN 8 x 50	UX GREEN 10 x 60	UX GREEN 12 x 70
Screw diameter	$\emptyset$ [mm]	5	5	6	8	10
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>						
Concrete	≥ C20/25 [kN]	0,40	0,60	0,60	1,00	1,50
Solid brick	≥ Mz 12 [kN]	0,20	0,30	0,30	0,50	0,70
Perforated sand-lime brick	≥ KSL 12 [kN]	0,40	0,40	0,50	0,60	0,80
Vertically perforated brick	≥ Hlz 12 [kN]	0,20	0,20	0,20	0,20	0,30
Aerated concrete	≥ AAC 4 [kN]	0,20	0,20	0,30	0,40	0,60
Gypsum plasterboard	12,5 mm [kN]	0,10	0,10	0,10	0,10	-
Gypsum plasterboard	25 mm [kN]	0,15	0,15	0,15	0,15	-
Gypsum fibreboard	(Fermacell) [kN]	0,20	0,20	0,20	0,25	-
Gypsum block	$\rho \geq 0,9 \text{ kg/dm}^3$ [kN]	-	-	0,15	0,35	0,45

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The powerful nylon plug with 4-way expansion



Wall consoles



Curtain rails

### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

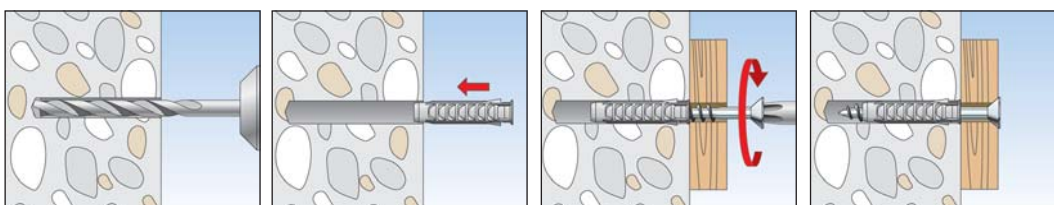
- The 4-way expansion provides the optimum force distribution in the material, and offers high load-bearing capacities in solid and hollow building materials.
- The expansion-free plug neck prevents the creation of expansion forces on the material surface whilst screwing in the screw. This helps to prevent damage to tiles and plaster.
- The pronounced rim prevents the plug from slipping into the drill hole, thus allowing for a simple installation.
- The greater anchorage depth of the SX 6x50, 8x65 and 10x80 means that the plug is especially suited to fixings in hollow building materials, aerated concrete and to bridge plaster.

### APPLICATIONS

- Lighting
- Wardrobes
- Motion detectors
- Skirting
- Light shelves
- Mirror cabinets
- Letter boxes
- TV consoles
- Trellis
- Folding shutters
- Bath and toilet installations

### PLFUNCTIONING

- The SX is suitable for pre-positioned and push-through installation.
- When turning in the screw, the SX expands in four directions, thus providing a secure anchoring in the building material.
- The required screw length is given by: Plug length + fixture thickness + 1 x screw diameter.
- Suitable for wood, chipboard and spacing screws (fischer ASL, see page 332).





## TECHNICAL DATA



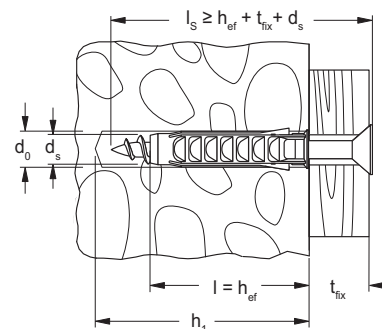
Plug **SX** with rim



Plug **SX** - with greater anchorage depth, without rim



Plug **SX** with rim and screw



	With rim	With greater anchorage depth, without rim	With rim and screw	Drill hole diameter	Min. drill hole depth	Anchor length	Wood and chip-board screws	Max. fixture thickness	Sales unit
	Art.-No.	Art.-No.	Art.-No.	$d_0$ [mm]	$h_1$ [mm]	$l$ [mm]	$d_s / d_s \times l_s$ [mm]	$t_{fix}$ [mm]	[pcs]
Item	SX	SX	SX-S						
<b>SX 4 x 20</b>	<b>070004</b>	—	—	4	25	20	2 - 3	—	200
<b>SX 5 x 25</b>	<b>070005</b>	—	—	5	35	25	3 - 4	—	100
<b>SX 6 x 30</b>	<b>070006</b>	—	—	6	40	30	4 - 5	—	100
<b>SX 6 x 30</b>	—	—	<b>070021</b>	6	45	30	4,5 x 40	5	50
<b>SX 6 x 50</b>	<b>078185</b>	<b>024827</b>	—	6	60	50	4 - 5	—	100
<b>SX 8 x 40</b>	<b>070008</b>	—	—	8	50	40	4,5 - 6	—	100
<b>SX 8 x 40</b>	—	—	<b>070022</b>	8	65	40	5 x 60	15	50
<b>SX 8 x 65</b>	—	<b>024828</b>	—	8	75	65	4,5 - 6	—	50
<b>SX 10 x 50</b>	<b>070010</b>	—	—	10	70	50	6 - 8	—	50
<b>SX 10 x 80</b>	—	<b>024829</b>	—	10	95	80	6 - 8	—	25
<b>SX 12 x 60</b>	<b>070012</b>	—	—	12	80	60	8 - 10	—	25
<b>SX 14 x 70</b>	<b>070014</b>	—	—	14	90	70	10 - 12	—	20
<b>SX 16 x 80</b>	<b>070016</b>	—	—	16	100	80	12 (1/2")	—	10

## TECHNICAL DATA



**SX** in bucket

Item	Art.-No.	Drill hole diameter	Min. drill hole depth	Anchor length	Max. fixture thickness	Wood and chipboard screws	Sales unit
		$d_0$ [mm]	$h_1$ [mm]	$l$ [mm]	$t_{fix}$ [mm]	$d_s$ [mm]	[pcs]
<b>SX 6 in bucket</b>	<b>507900</b>	6	40	30	—	4 - 5	3200
<b>SX 8 in bucket</b>	<b>507904</b>	8	50	40	—	4,5 - 6	1200
<b>SX 10 in bucket</b>	<b>507909</b>	10	70	50	—	6 - 8	720
<b>SX 12 in bucket</b>	<b>523269</b>	12	80	60	—	8 - 10	350

## TECHNICAL DATA



Box SX 5/6/8

Profi-Box

Box UX / SX-S

Assortment box UX / SX

Item	Art.-No.	Contents	Sales unit [pcs]
<b>Box SX 5/6/8</b>	<b>030191</b>	100 plugs SX 5 x 25, 100 plugs SX 6 x 30, 100 plugs SX 8 x 40	1
<b>Box UX / SX-S</b>	<b>093181</b>	50 plugs UX 6 x 35, 50 screws 4,5 x 50, 50 plugs SX 6 x 30, 50 screws 4,5 x 45, 25 plugs UX 8 x 50, 25 screws 5 x 65, 25 plugs SX 8 x 40, 25 screws 5 x 50	1
<b>Assortment box UX / SX</b>	<b>040991</b>	60 plugs SX 6 x 30, 50 plugs SX 8 x 40, 20 plugs SX 10 x 50, 60 plugs UX 5 x 30 R, 40 plugs UX 6 x 50 R, 50 plugs UX 8 x 50 R, 10 plugs UX 10 x 60 R	1
<b>Profi-Box SX</b>	<b>518524</b>	International version: 60 Expansion plugs SX 6 x 30, 60 Expansion plugs SX 8 x 40, 12 Expansion plugs SX 10 x 50	1
<b>Profi-Box SX + screws</b>	<b>518525</b>	International version: 50 Expansion plugs SX 6 x 30, 30 Expansion plugs SX 8 x 40, 50 Chipboard screws 4,5 x 40, 30 Chipboard screws 5 x 60	1
<b>Meister-Box SX-plug</b>	<b>041648</b>	German version: 60 plugs SX 6 x 30, 60 plugs SX 8 x 40, 12 plugs SX 10 x 50	1
<b>Meister-Box SX + screws</b>	<b>513777</b>	German version: 50 Expansion plugs SX 6 x 30, 30 Expansion plugs SX 8 x 40, 50 Chipboard screws 4,5 x 40, 30 Chipboard screws 5 x 60	1

## LOADS

### Expansion plug SX

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type			SX 4 x 20	SX 5 x 25	SX 6 x 30 SX 6 x 50	SX 8 x 40 SX 8 x 65	SX 10 x 50	SX 10 x 80	SX 12 x 60	SX 14 x 70	SX 16 x 80
Wood screw diameter	Ø	[mm]	3	4	5	6	8	8	10	12	12
Min. edge distance concrete	c <sub>min</sub>	[mm]	20	25	35	40	50	50	65	100	120
<b>Recommended loads in the respective base material F<sub>rec</sub><sup>2)</sup></b>											
Concrete	≥ C20/25	[kN]	0,16	0,30	0,65	0,70	1,20	1,20	1,70	2,00	2,60
Solid brick	≥ Mz 12	[kN]	0,11	0,25	0,30	0,60	0,65	1,20	0,70	0,80	0,90
Solid sand-lime brick	≥ KS 12	[kN]	0,17	0,30	0,50	0,60	1,20	1,20	1,70	2,00	2,60
Aerated concrete	≥ AAC 2	[kN]	0,03	0,03	0,03	0,04	0,09	0,20	0,14	0,30	0,40
Aerated concrete	≥ AAC 4	[kN]	0,07	0,09	0,09	0,14	0,30	0,60	0,45	0,50	0,60
Vertically perforated brick	≥ Hlz 12 (ρ ≥ 1.0 kg/dm³)	[kN]	0,13	0,07	0,07	0,17	0,17	0,50	0,26	0,40	0,60
Perforated sand-lime brick	≥ KSL 12	[kN]	0,15	0,17	0,30	0,35	0,30	0,80	0,35	0,30	0,40
Gypsum block		[kN]	-	-	-	0,26	0,37	-	1,00	1,00	-

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The powerful nylon plug with 4-way expansion



Mirror fixings



Wall consoles

### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

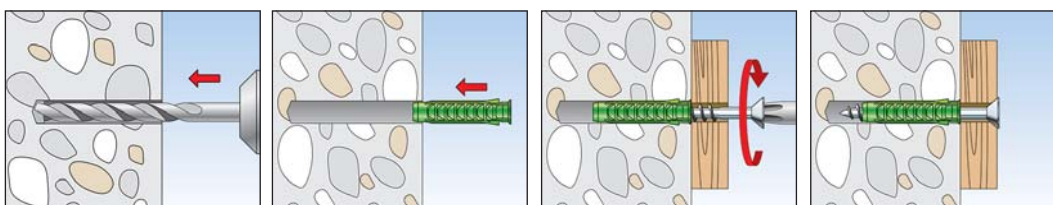
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular SX plugs.
- The powerful 4-way expansion provides optimum force transmission in the building material, thus enabling high load values and security.
- The anti-rotation lock prevents the plug from spinning in the drill hole.
- The expansion-free plug neck prevents the creation of expansion forces on the material whilst screwing in the screw. This helps to prevent damage to tiles and plaster.
- Fast and easy push-through installation reduces installation time.

### APPLICATIONS

- Lighting
- Wardrobes
- Motion detectors
- Skirting
- Light shelves
- Mirror cabinets
- Letter boxes
- TV consoles
- Trellis
- Folding shutters
- Bath and toilet installations

### FUNCTIONING

- The SX GREEN is suitable for pre-positioned and push-through installation.
- When screwing in the screw, the SX GREEN expands in four directions, thus providing a secure anchoring in the building material.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Suitable for wood, chipboard and spacing screws.



## TECHNICAL DATA



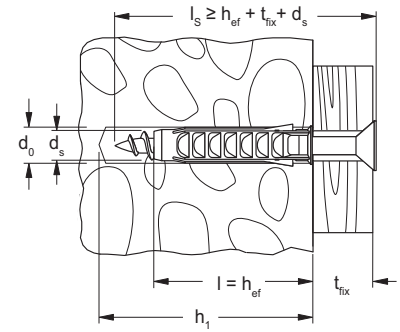
Plug **SX GREEN** - with rim



Plug **SX GREEN** - with greater anchorage depth, without rim



Plug **SX GREEN S** - with rim and screw



	With rim	Without rim and large anchorage depth	With rim and screw	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Wood and chip-board screws $d_s / d_s \times l_s$ [mm]	Sales unit [pcs]
Item	Art.-No.	Art.-No.	Art.-No.						
<b>SX GREEN 5 x 25</b>	<b>524859</b>	—	—	5	35	25	—	3 - 4	90
<b>SX GREEN 6 x 30</b>	<b>524860</b>	—	—	6	40	30	—	4 - 5	90
<b>SX GREEN 6 x 30</b>	—	—	<b>524866</b>	6	40	30	5	4,5 x 40	45
<b>SX GREEN 6 x 50</b>	—	<b>524861</b>	—	6	60	50	—	4 - 5	90
<b>SX GREEN 8 x 40</b>	<b>524862</b>	—	—	8	50	40	—	4,5 - 6	90
<b>SX GREEN 8 x 40</b>	—	—	<b>524867</b>	8	60	40	15	5 x 60	45
<b>SX GREEN 8 x 65</b>	—	<b>524863</b>	—	8	75	65	—	4,5 - 6	45
<b>SX GREEN 10 x 50</b>	<b>524864</b>	—	—	10	70	50	—	6 - 8	45
<b>SX GREEN 12 x 60</b>	<b>524865</b>	—	—	12	80	60	—	8 - 10	20

## LOADS

### Expansion plug SX GREEN

Highest recommended loads<sup>1)</sup> for a single anchor.

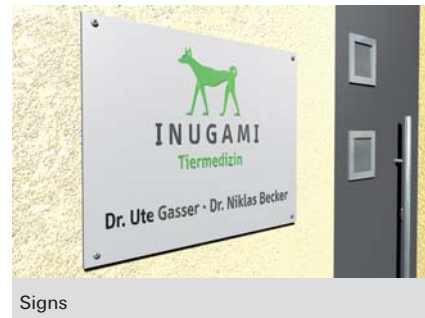
The given loads are valid for wood screws with the specified diameter.

Type		SX GREEN 5 x 25	SX GREEN 6 x 30 SX GREEN 6 x 50	SX GREEN 8 x 40 SX GREEN 8 x 65	SX GREEN 10 x 50	SX GREEN 12 x 60
Wood screw diameter	$\emptyset$ [mm]	4	5	6	8	10
Min. edge distance concrete	$c_{min}$ [mm]	25	35	40	50	65
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>						
Concrete	$\geq C20/25$ [kN]	0,30	0,65	0,70	1,20	1,70
Solid brick	$\geq Mz 12$ [kN]	0,25	0,30	0,60	0,65	0,70
Solid sand-lime brick	$\geq KS 12$ [kN]	0,30	0,50	0,60	1,20	1,70
Aerated concrete	$\geq AAC 2$ [kN]	0,03	0,03	0,04	0,09	0,14
Aerated concrete	$\geq AAC 4$ [kN]	0,09	0,09	0,14	0,30	0,45
Vertically perforated brick	$\geq Hlz 12$ ( $\rho \geq 1.0 \text{ kg/dm}^3$ ) [kN]	0,07	0,07	0,17	0,17	0,26
Perforated sand-lime brick	$\geq KSL 12$ [kN]	0,17	0,30	0,35	0,30	0,35
Gypsum block	[kN]	-	-	0,26	0,37	1,00

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The installation-friendly nylon plug with 2-way expansion



### BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

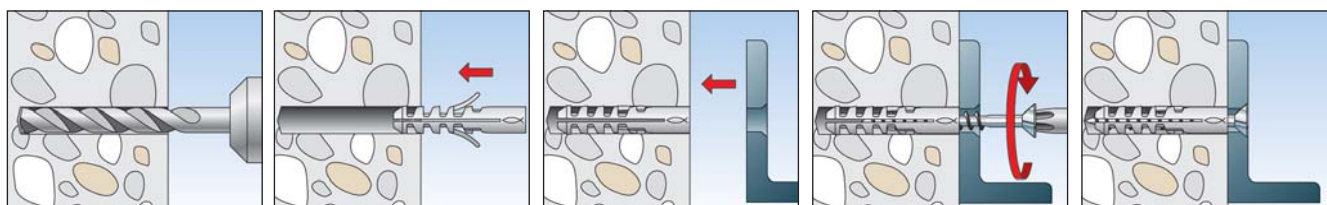
- The rimless plug sleeve allows for the plug to be set as deep as required below the plaster to the bearing substrate to achieve the maximum load-bearing capacity.
- As the plug only expands in two directions, it is possible to direct the expansion forces so that they run parallel to the edge of the building material by turning the plug. This allows for smaller edge distances.
- The slimline plug geometry makes it easy to push the plug into the drill hole. For a fast and simple installation.
- The anti-rotation lock prevents the plug rotating in the drill hole, thus guaranteeing a high level of installation safety.

### APPLICATIONS

- Pictures
- Lighting
- Skirting
- Light shelves
- Mirror cabinets
- Letter boxes
- Motion detectors
- Information boards
- Curtain rails
- Electrical installations

### FUNCTIONING

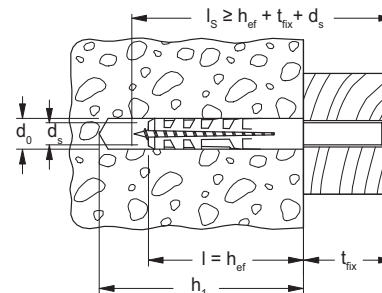
- The expansion plug S is suitable for pre-positioned and push-through installation.
- When turning in the screw, the expansion plug S expands in two directions, thus providing a secure anchoring in the building material.
- The required screw length is given by the plug length + plaster and/or insulation material thickness + fixture thickness + 1 x screw diameter.
- Suitable for wood and chipboard screws.
- The edge distance must be at least one plug length.
- For installations close to the edge, turn the plug so that the expansion force acts parallel to the edge.



## TECHNICAL DATA



Expansion plug S



6

General fixings

	Art.-No.	Art.-No.	Drill hole diameter $d_0$ [mm]	Anchor length $l$ [mm]	Min. drill hole depth $h_1$ [mm]	Wood and chipboard screws $d_s$ [mm]	Sales unit [pcs]		
Item	Standard	Doublepack							
<b>S 4</b>	<b>050104</b>	—	4	20	25	2 - 3	200		
<b>S 5</b>	<b>050105</b>	—	5	25	35	3 - 4	100		
<b>S 5</b>	—	<b>050124</b>	5	25	35	3 - 4	200		
<b>S 6</b>	<b>050106</b>	—	6	30	40	4 - 5	100		
<b>S 6</b>	—	<b>050125</b>	6	30	40	4 - 5	200		
<b>S 8</b>	<b>050108</b>	—	8	40	55	4,5 - 6	100		
<b>S 8</b>	—	<b>050126</b>	8	40	55	4,5 - 6	200		
<b>S 10</b>	<b>050110</b>	—	10	50	70	6 - 8	50		
<b>S 10</b>	—	<b>050127</b>	10	50	70	6 - 8	100		
<b>S 12</b>	<b>050112</b>	—	12	60	80	8 - 10	25		
<b>S 14</b>	<b>050114</b>	—	14	75	90	10 - 12	20		
<b>S 16</b>	<b>050116</b>	—	16	80	100	12 (1/2")	10		
<b>S 20</b>	<b>050120</b>	—	20	90	120	16	5		

## TECHNICAL DATA



S in bucket

	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Wood and chipboard screws $d_s$ [mm]	Sales unit [pcs]	
Item	Art.-No.	$d_0$ [mm]	$h_1$ [mm]	$l$ [mm]	$d_s$ [mm]	[pcs]	
<b>S 6 in bucket</b>	<b>508024</b>	6	40	30	4 - 5	3200	
<b>S 8 in bucket</b>	<b>508025</b>	8	55	40	4,5 - 6	1400	



## TECHNICAL DATA



Stacking box ST

fischerbox

Item	Art.-No.	Contents	Sales unit [pcs]
<b>ST 1 S8 S</b>	<b>060510</b>	34 plugs S 8, 34 countersunk wood screws SH 5 x 60	1
<b>ST 1 S6 S</b>	<b>060509</b>	50 plugs S 6, 50 countersunk wood screws SH 4,5 x 45	1
<b>ST 1 S6/8</b>	<b>060499</b>	50 plugs S 6, 30 plugs S 8	1
<b>Box S 5.6.8</b>	<b>060513</b>	100 plugs S 5, 100 plugs S 6, 100 plugs S 8	1
<b>Box S 6.8.10</b>	<b>060515</b>	100 plugs S 6, 100 plugs S 8, 25 plugs S 10	1
<b>Box empty</b>	<b>060500</b>	—	1

## LOADS

### Expansion plug S

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type			S4	S5	S6	S8	S10	S12	S14	S16	S20
Wood screw diameter	Ø	[mm]	3	4	5	6	8	10	12	12	16
Min. edge distance concrete	c <sub>min</sub>	[mm]	20	25	30	40	50	60	70	80	100
<b>Recommended loads in the respective base material F<sub>rec</sub></b> <sup>2)</sup>											
Concrete	≥ C20/25	[kN]	0,16	0,28	0,40	0,60	1,10	1,50	1,85	2,26	3,88
Solid brick	≥ Mz 12	[kN]	0,14	0,24	0,28	0,50	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>
Solid sand-lime brick	≥ KS 12	[kN]	0,14	0,24	0,28	0,55	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>
Aerated concrete	≥ AAC 4	[kN]	- <sup>3)</sup>	- <sup>3)</sup>	0,05	0,07	0,16	0,28	0,40	- <sup>3)</sup>	- <sup>3)</sup>
Gypsum block		[kN]	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>	0,15	0,23	0,37	0,60	- <sup>3)</sup>	- <sup>3)</sup>

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>3)</sup> Due to that the failure of the substrate varies too much no reproducible values can be given.

## The economical hammer-set plug - easy and quick fixing of threaded rods



Suspended ceilings



Single pipe suspension

### BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Solid brick

### ADVANTAGES

- The innovative plug geometry allows quick and easy installation of the threaded rod with a few hammer blows.
- The short plug length prevents reinforcement hits and guarantees a secure utilization in reinforced concrete.
- The teeth inside the plug allow standard, metric threads to be held: This saves a large assortment of stud screws.
- Installation without special tools: The only thing needed to set the plug is a hammer. Visible edge of the plug serves as visual setting check and guarantees correct setting.
- The visible edge of the plug serves as visual setting check and guarantees correct setting.
- Easy to check and adjust: To check the setting depth, the closed plug tip is used as a stop point. This predetermined break point also allows the threaded rod to be hammered-in deeper.

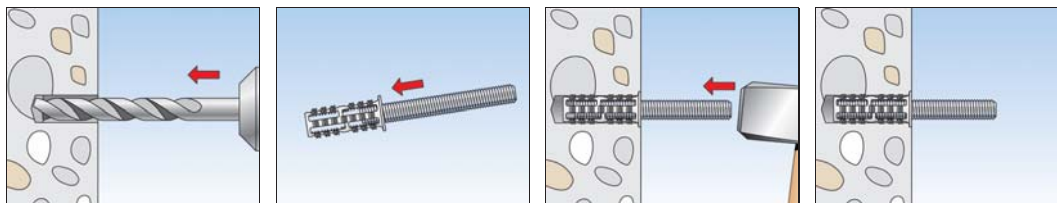
### APPLICATIONS

- Suspension for individual pipes
- Plumbing and heating fixings
- Cable and pipe clips
- Suspended ceilings
- Ceiling lights
- Consoles
- Mounting rails

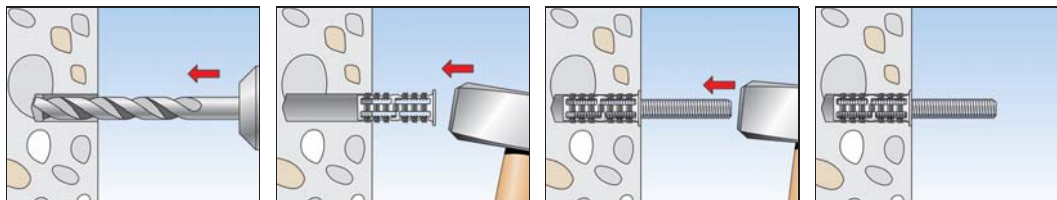
### FUNCTIONING

- When hammering-in the threaded rod, the plug expands in four directions as a result of the conical inner geometry.
- The plug is set using pre-positioned installation and this is possible in two different ways: Pre-installation of the threaded rods in the plug with both being hammered into the wall together or pre-inserting of the RODFORCE into the drill hole followed by hammering-in of the threaded rod.
- The teeth inside the plug mechanically interlock the metric thread securely with the threaded rod.
- The unique elements on the outside of the plug brace against the wall of the drill hole.

## INSTALLATION WITHIN THE SYSTEM



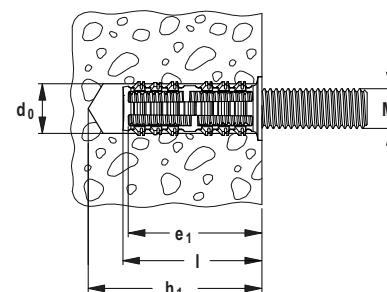
## INSTALLATION WITH INDIVIDUAL COMPONENTS



## TECHNICAL DATA



Threaded rod plug **RODFORCE FGD**



Item	Art.-No.	Drill diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Min. drop-in penetration $e_1$ [mm]	Threaded rod $\emptyset \times \text{length}$ [mm]	Sales unit [pcs]
<b>RODFORCE FGD 10 M6</b>	<b>542106</b>	10	40	35	33	—	50
<b>RODFORCE FGD 10 M6 TR 50</b>	<b>542107</b>	10	40	35	33	M 6 x 50	25
<b>RODFORCE FGD 10 M6 TR 60</b>	<b>542108</b>	10	40	35	33	M 6 x 60	25
<b>RODFORCE FGD 10 M6 TR 80</b>	<b>542109</b>	10	40	35	33	M 6 x 80	25
<b>RODFORCE FGD 12 M8</b>	<b>542111</b>	12	40	35	33	—	50
<b>RODFORCE FGD 12 M8 TR 50</b>	<b>542112</b>	12	40	35	33	M 8 x 50	25
<b>RODFORCE FGD 12 M8 TR 60</b>	<b>542113</b>	12	40	35	33	M 8 x 60	25
<b>RODFORCE FGD 12 M8 TR 80</b>	<b>542114</b>	12	40	35	33	M 8 x 80	25

## LOADS

### Threaded rod plug RODFORCE FGD

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for machine screws or threaded rods with the specified thread size.

Type			RODFORCE FGD M6	RODFORCE FGD M8
Thread size	Ø	[mm]	M6	M8
Recommended loads in the respective base material $F_{rec}$ <sup>2)</sup>				
Concrete	≥ C20/25	[kN]	0,31	0,36
Solid brick	≥ Mz 12	[kN]	0,19	0,33
Solid sand-lime brick	≥ KS 12	[kN]	0,31	0,36

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The metal anchor for wood and chipboard screws



Pipes



Gas meters

### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid panel made from gypsum

### ADVANTAGES

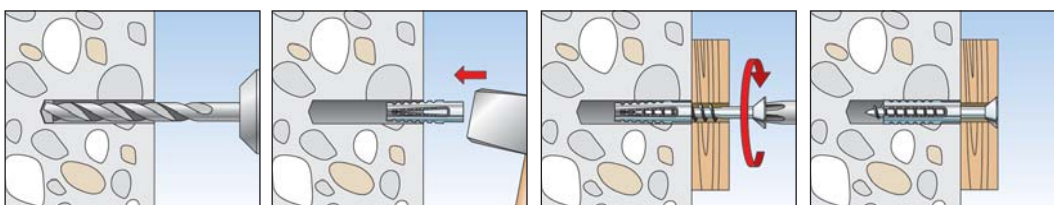
- The metal expansion anchor FMD is especially suited to applications in installation technology.
- The external teeth expand in the building material, thus ensuring a high load-bearing capacity.
- The ribbed internal geometry of the FMD is suitable for wood and chipboard screws, and makes it possible to guide the screw securely. This offers increased installation safety, and enables a broad range of applications.

### APPLICATIONS

- Gas pipes
- Water pipes
- Cable and pipe clips

### FUNCTIONING

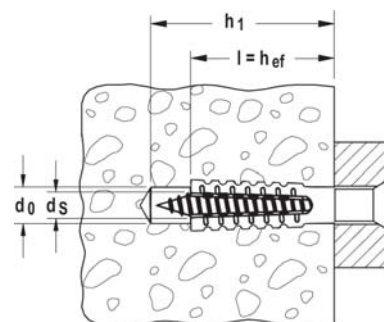
- The FMD is suitable for pre-positioned installation.
- Inserting the screw causes the FMD to expand, and the metal teeth fix the anchor securely in the building material.
- The required (stud) screw length is given by: Anchor length + plaster and/or insulation layer thickness + fixture thickness or installation spacing + 1 x screw diameter.
- Suitable for wood and chipboard screws.
- The drill diameter is relative to the compressive strength of the building material. The higher the compressive strength, the greater the drill diameter. The 6x32 and 8x38 sizes can be hammered directly into low-strength aerated concrete without the need for pre-drilling.



## TECHNICAL DATA



Metal expansion fixing FMD



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Screw diameter $d_s$ [mm]	Sales unit [pcs]		
<b>FMD 6 x 32</b>	<b>061224</b> <sup>1)</sup>	6 - 7	38	32	5 - 6	100		
<b>FMD 8 x 38</b>	<b>061225</b> <sup>1)</sup>	10 - 12	46	38	6 - 8	100		
<b>FMD 8 x 60</b>	<b>061226</b> <sup>1)</sup>	10 - 12	68	60	6 - 8	50		
<b>FMD 10 x 60</b>	<b>061209</b> <sup>1)</sup>	12 - 14	68	60	8 - 10	50		

<sup>1)</sup> The drill diameter is relative to the substrate compressive strength. Generally, the higher the compressive strength, the greater the drill diameter.

Details see table "Recommended drill hole diameter".

## RECOMMENDED DRILL HOLE DIAMETER [mm]

Type		FMD 6 x 32	FMD 8 x 38	FMD 8 x 60	FMD 10 x 60
Concrete	C 20/25	7	10	12	14
Aerated concrete	PB4	6	10	10	12
Vertically perforated brick	HLZ 12	7	10	10	12

## LOADS

### Metal expansion fixing FMD

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for wood screws with maximum diameter.

Type			FMD 8 x 38	FMD 8 x 60	FMD 10 x 60
Wood screw diameter	$\emptyset$	[mm]	8	8	10
<b>Recommended loads in the respective base material <math>F_{rec}</math> <sup>2)</sup></b>					
Aerated concrete	$\geq$ PB 2, PP 2 (G 2)	[kN]	0,20	0,30	0,40
Aerated concrete	$\geq$ AAC 4	[kN]	0,30	0,40	0,60

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The expansion plug for metric screws and threaded bolts



Downpipes



Folding shutters

### BUILDING MATERIALS

- Concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick made from lightweight concrete
- Solid brick
- Solid panel made from gypsum
- Vertically perforated brick
- Aerated concrete

### CERTIFICATES



### ADVANTAGES

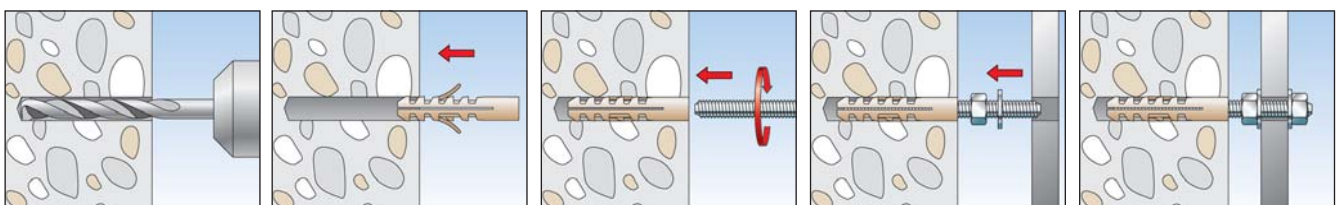
- The internal geometry of the M-S allows for the use of standard metric screws or threaded rods for the ideal adaptation to suit the intended use.
- The rimless plug sleeve allows for the plug to be set as deep as required below the plaster to the bearing substrate to achieve the maximum load-bearing capacity.
- As the plug only expands in two directions, it is possible to direct the expansion forces so that they run parallel to the edge of the building material by turning the plug. This allows for smaller edge distances.
- The slimline plug geometry makes it easy to push the plug into the drill hole, for a fast and simple installation.

### APPLICATIONS

- Handles
- Folding shutters
- Trellis
- Downpipes
- Stand-off installation
- Window fittings
- Gratings

### FUNCTIONING

- The M-S is suitable for pre-positioned and push-through installation.
- When turning in the screw, the M-S expands in two directions, thus providing a secure anchoring in the building material.
- The required screw length is given by: Plug length + plaster and/or insulation layer thickness + fixture thickness + 1 x screw diameter.
- Suitable for metric screws and threaded bolts.
- Chamfer the thread to make it easier to screw in screws and threaded rods.

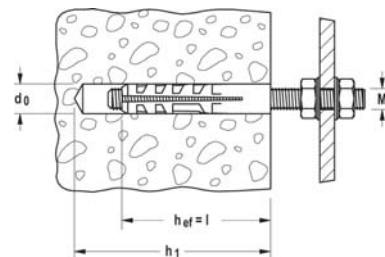




## TECHNICAL DATA



Anchor **M-S** for metric screws



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Thread M	Sales unit [pcs]		
<b>M 6 S</b>	<b>050152</b>	8	55	40	M 6	100		
<b>M 8 S</b>	<b>050153</b>	10	70	50	M 8	50		
<b>M 10 S</b>	<b>050154</b>	14	90	70	M 10	20		
<b>M 12 S</b>	<b>050155</b>	16	100	80	M 12	10		

## LOADS

### Anchor M-S

Highest recommended loads<sup>1)</sup> for a single anchor.

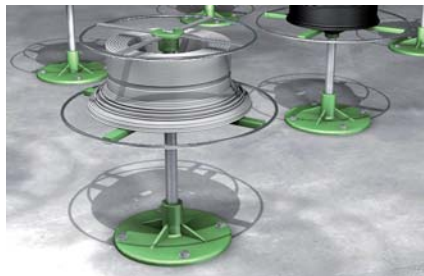
The given loads are valid for metric screws with the specified thread size.

Type		M 6 S	M 8 S	M 10 S	M 12 S
Thread size	[M]	M6	M8	M10	M12
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>					
Concrete	C20/25 [kN]	0,30	0,54	0,66	1,06
Solid brick	Mz 12 [kN]	0,24	0,33	0,46	0,79
Solid sand-lime brick	KS 12 [kN]	0,24	0,33	0,43	0,71

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The powerful nylon expansion anchor with brass cone for metric threads



Plant construction



Protective grilles

### BUILDING MATERIALS

- Concrete
- Natural stone with dense structure
- Solid brick
- Solid sand-lime brick
- Solid brick made from lightweight concrete
- Aerated concrete
- Solid panel made from gypsum
- Hollow blocks made from lightweight concrete

### CERTIFICATES



### ADVANTAGES

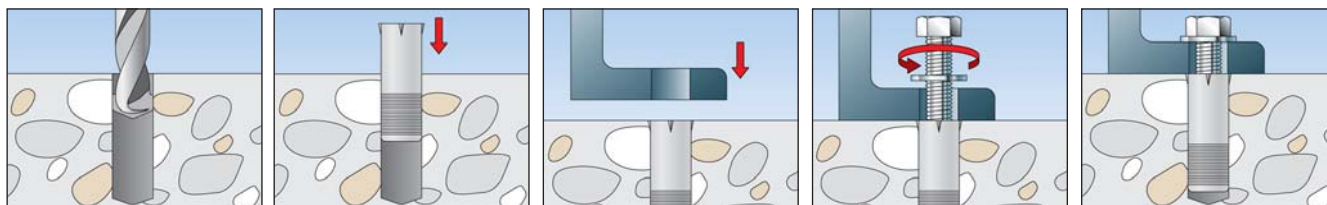
- The anchor's large external diameter helps to achieve a large applied load in the building material. This allows for maximum load-bearing capacity.
- The anchor's high expansion makes it insensitive to building material tolerances. This guarantees a simple and secure installation.
- The internal thread allows for the use of standard metric screws or threaded rods, and for surface flush removal and reuse of the fixing point. This provides great flexibility.

### APPLICATIONS

- Machines
- Curbs
- Control boxes

### FUNCTIONING

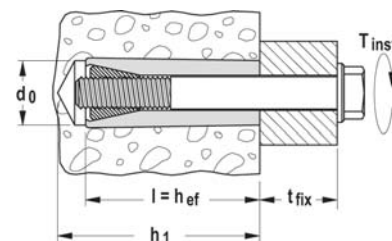
- The M anchor is suitable for pre-positioned installation.
- Turning in the screw causes the internal brass cone to expand the M anchor, thus reliably anchoring it in the building material.
- The required screw length is given by anchor length + fixture thickness.
- Suitable for metric screws and threaded bolts.



## TECHNICAL DATA



Anchor **M** for metric screws



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Thread $M$	Max. installation torque $T_{inst}$ [Nm]	Sales unit [pcs]	
<b>M 5</b>	<b>050505</b> <sup>1)</sup>	10	45	35	M 5	4	50	
<b>M 6</b>	<b>050506</b> <sup>1)</sup>	12	50	40	M 6	7	50	
<b>M 8</b>	<b>050508</b> <sup>1)</sup>	16	65	50	M 8	16	20	
<b>M 10</b>	<b>050510</b> <sup>1)</sup>	20	80	60	M 10	32	10	
<b>M 12</b>	<b>050512</b> <sup>1)</sup>	24	90	65	M 12	54	5	

<sup>1)</sup> The given torque values apply to screws of strength class  $\geq 5.8$ .

## LOADS

### Anchor M

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for metric screws with the specified thread size.

Type		<b>M 5</b>	<b>M 6</b>	<b>M 8</b>	<b>M 10</b>	<b>M 12</b>
Thread size	[M]	M5	M6	M8	M10	M12
<b>Recommended loads in the respective base material <math>F_{rec}</math> <sup>2)</sup></b>						
Concrete	$\geq C20/25$ [kN]	1,10	1,80	2,60	4,40	5,00

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The brass expansion fixing with metric thread



Protective wall panels



Small shelves

### BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

### ADVANTAGES

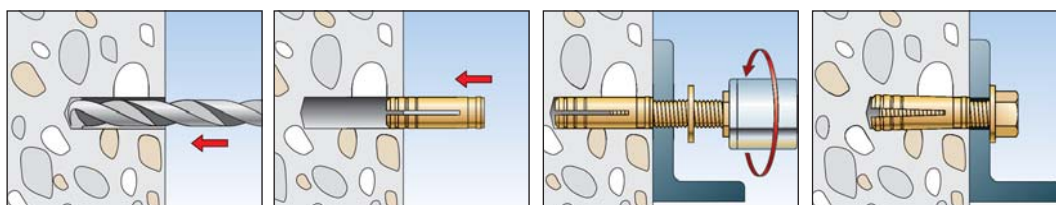
- The compact design of the brass fixing reduces the amount of drilling required, helping to ensure a fast installation.
- The special surface structure of the MS prevents the fixing from rotating in the drill hole. This provides increased installation safety.
- The internal thread allows for the use of standard metric screws or threaded rods, and for surface flush removal and reuse of the fixing point. This provides great flexibility.

### APPLICATIONS

- Cellar shelves
- Substructures made of wood and metal
- Boilers
- Aggregates
- Control boxes
- Curtain rails

### FUNCTIONING

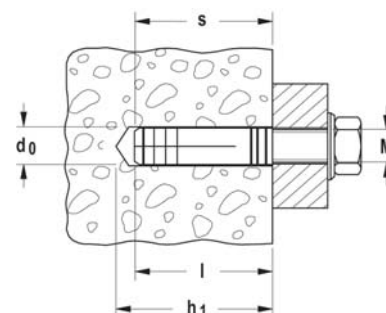
- The MS brass fixing is suitable for pre-positioned installation.
- Turning in the metric screw causes the front part of the brass fixing to expand, thus securely anchoring it in the substrate.
- Calculating screw length for flush fixing installation: Fixing length + fixture thickness = min. screw length.
- Suitable for metric screws and threaded bolts.



## TECHNICAL DATA



Brass fixing **MS** for metric screws



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Internal thread A1	Min. bolt penetration $l_{E,min}$ [mm]	Sales unit [pcs]	
<b>MS 4 x 15</b>	<b>026424</b>	5	20	15	M 4	15	100	
<b>MS 5 x 18</b>	<b>026425</b>	6	25	18	M 5	18	100	
<b>MS 6 x 22</b>	<b>078660</b>	8	27	22	M 6	22	100	
<b>MS 8 x 28</b>	<b>078981</b>	10	35	28	M 8	28	50	
<b>MS 10 x 32</b>	<b>078661</b>	12	39	32	M 10	32	25	
<b>MS 12 x 37</b>	<b>078662</b>	15	46	37	M 12	37	10	
<b>MS 16 x 43</b>	<b>078663</b>	20	50	43	M 16	43	10	

## LOADS

### Brass fixing MS

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for metric screws with the specified thread size.

Type		MS 4 x 15	MS 5 x 18	MS 6 x 22	MS 8 x 28	MS 10 x 32	MS 12 x 37	MS 16 x 43	
Thread size	[M]	M4	M5	M6	M8	M10	M12	M16	
Recommended loads in the respective base material $F_{rec}^{2)}$									
Concrete	≥ C20/25	[kN]	0,25	0,40	0,65	1,10	1,60	2,20	3,30
Solid brick		[kN]	0,20	0,35	0,55	0,90	1,30	1,60	2,30

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The special plug for different fixings in aerated concrete



### BUILDING MATERIALS

Approved for (GB 10) resp. suitable for (GB 8 and GB 14):

- Aerated concrete  $\geq$  AAC 2

Also suitable for:

Aerated concrete and ceiling panels of compressive strength  $\geq$  3.3

### CERTIFICATES



### ADVANTAGES

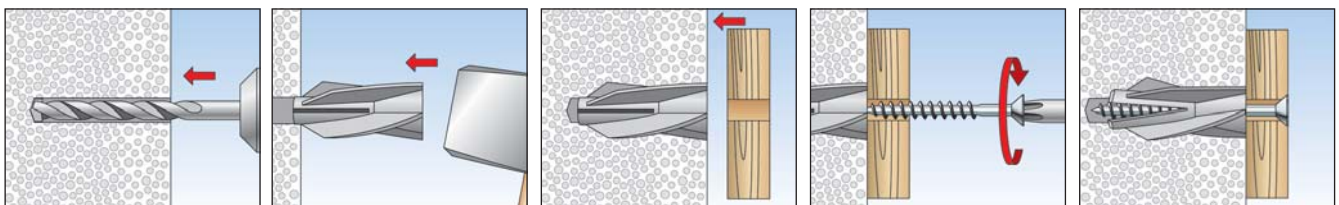
- The general building approval guarantees approved safety for use in safety-relevant applications.
- The spiral-shaped outer ribs cut a positive fit in the soft building material, thus ensuring the best pressure distribution and load-bearing capacity.
- Can be applied with a hammer - there is no need for special tools, thus saving time and money for the installation.
- The GB can also be used safely outside (e.g. in façade installation) when combined with the approved fischer safety screw in A4.

### APPLICATIONS

- Light cable trays
- Pipelines
- Guard rails
- Façade and roof constructions made of wood and metal
- Light canopy brackets
- Letter boxes
- Trellis

### FUNCTIONING

- The GB is suitable for pre-positioned installation.
- The spiral-shaped outer ribs ensure a positive fit connection between the building material and anchor.
- The required screw length is given by: Anchor length + fixture thickness + 1 x screw diameter.
- The GB 10 must be used with fischer safety screws to fulfil the approval and to achieve the maximum load-bearing capacity.
- Use rotary drilling to create the drill hole
- Can be used in unplastered aerated concrete

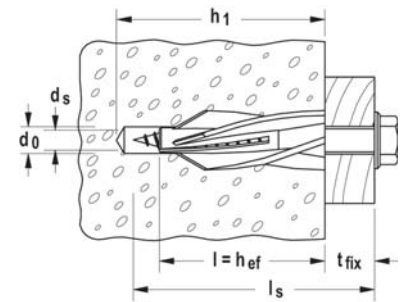




## TECHNICAL DATA







Aircrete anchor GB



Item	Art.-No.	Approval DIBt	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Plug length = min. anchorage depth $l = h_{ef}$ [mm]	fischer safety screw $d_s \times l_s$ [mm]	Sales unit [pcs]		
GB 8	050491	—	8	60	50	5	25		
GB 10	050492	●	10	65	55	7	20		
GB 14	050493	—	14	90	75	10	10		

## FISCHER SAFETY SCREW FOR GB

Fixing type	Usable length $t_{fix}$		Screw dimension * $\emptyset \times l_s$	Screw material			
	[mm] min.	[mm] max.		Zinc plated and passivated steel  Art.-No.	 Art.-No.	Stainless steel of the corrosion resistance classe III, e.g. A4  Art.-No.	 Art.-No.
GB 8	5	30	5 x 85	089230 <sup>1)</sup>		089240 <sup>1)</sup>	
GB 10	0	5	7 x 67		080404		
	5	25	7 x 87	089170	080405	089244	080261
	25	45	7 x 107	089172			
	40	58	7 x 120	089174	080407		
	60	78	7 x 140	089176	080408		
GB 14	85	105	7 x 167	089178			
	0	10	10 x 95		080412		
	0	20	10 x 105	089186	080413		080271
	35	55	10 x 140	089188	080415		
	60	80	10 x 165		080416		

<sup>1)</sup> Cross drive recess Z

\* Further sizes on request

## LOADS

### Aircrete anchor GB

Highest permissible, respectively recommended loads<sup>1) 2)</sup> for a single anchor in aerated concrete.

The given loads are valid for fischer safety screws<sup>4)</sup> acc. to selection table.

Type			GB 10 <sup>2)</sup>	GB 8 <sup>9)</sup>	GB14 <sup>9)</sup>
Diameter fischer safety screw	Ø	[mm]	7	5	10
Min. spacings <sup>6)</sup>	smin	[mm]	100	150 (100) <sup>8)</sup>	300 (200) <sup>8)</sup>
Min. edge distance <sup>7)</sup>	cmin	[mm]	100	100 (75) <sup>8)</sup>	200 (150) <sup>8)</sup>
Minimum member thickness	hmin	[mm]	120	75	200
Anchorage depth	hef (hv)	[mm]	55	50	75
Load in the respective base material			Permissible loads F <sub>perm</sub> <sup>3)</sup>	Recommended loads F <sub>rec</sub> <sup>3)</sup>	
Aerated concrete	AAC 2	[kN]		0,21	0,20
Aerated concrete	AAC 3	[kN]		0,32 (0,43) <sup>5)</sup>	0,30
Aerated concrete	AAC 4	[kN]		0,54 (0,71) <sup>5)</sup>	0,40

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> In case of the design of the GB 10 for tension, shear and bending the complete approval Z-21.2-123 has to be considered.

<sup>3)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>4)</sup> Galvanised steel (gvz) and stainless steel A4.

<sup>5)</sup> The values in brackets are decisive for member thickness  $\geq 150$  mm.

<sup>6)</sup> Minimum possible axial spacing while reducing the permissible load.

<sup>7)</sup> Minimum possible edge distance.

<sup>8)</sup> Values in brackets apply to AAC 2.

<sup>9)</sup> GB 8 and GB 14 are not part of the approval.

## Secure in aerated concrete



Radiators



Suspended ceilings

### BUILDING MATERIALS

- Aerated concrete  $\geq$  AAC 2
- Aerated concrete and ceiling panels of compressive strength  $\geq$  3.3

### CERTIFICATES



### ADVANTAGES

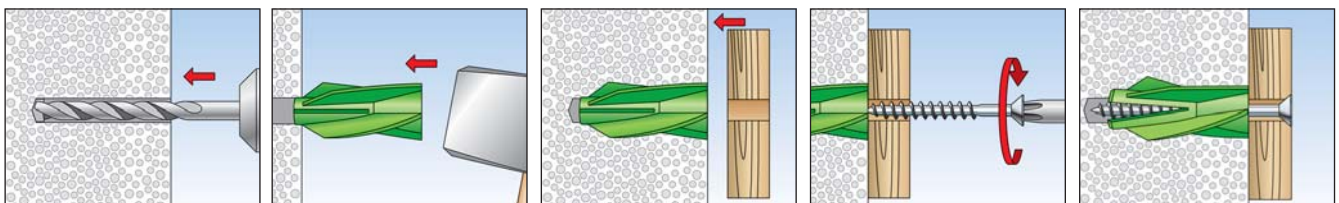
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- The spiral-shaped outer ribs cut a positive fit in the soft building material, thus ensuring best pressure distribution and load-bearing capacity.
- Can be applied with a hammer – there is no need for special tools, thus saving time and money for the installation.

### APPLICATIONS

- Pipelines
- Letter boxes
- Trellis
- Handles
- Gratings
- Electrical installations

### FUNCTIONING

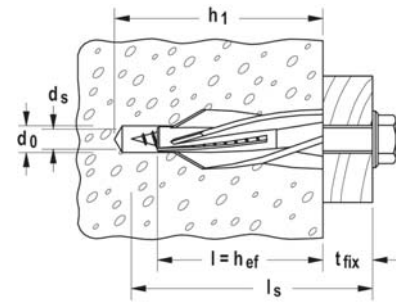
- The aircrete anchor GB GREEN is suitable for pre-positioned installation.
- The spiral-shaped outer ribs cut a positive fit into the soft building material when knocked in, thus ensuring optimal pressure distribution and load-bearing capacity.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Rotary drilling of the hole is required.
- Can be used in unplastered aerated concrete.



## TECHNICAL DATA



Aircrete anchor **GB GREEN**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Plug length = min. anchorage depth $l = h_{ef}$ [mm]	fischer safety screw $d_s \times l_s$ [mm]	Sales unit [pcs]
<b>GB GREEN 8</b>	<b>524870</b>	8	60	50	5	20
<b>GB GREEN 10</b>	<b>524871</b>	10	65	55	7	18

## LOADS

### Aircrete anchor GB GREEN

Highest recommended loads<sup>1)</sup> for a single anchor in aerated concrete.

The given loads are valid for fischer safety screws<sup>4)</sup> acc. attached table.

Type			GB GREEN 8	GB GREEN 10
Diameter fischer safety screw	$\emptyset$	[mm]	5	7
Min. spacing <sup>6)</sup>	$s_{min}$	[mm]	150 (100) <sup>7)</sup>	100
Min. edge distance <sup>2)</sup>	$c_{min}$	[mm]	100 (75) <sup>7)</sup>	100
Minimum member thickness	$h_{min}$	[mm]	75	120
Anchorage depth	$h_{ef} (h_v)$	[mm]	50	55
<b>Recommended load in the respective base material <math>F_{rec}</math><sup>3)</sup></b>				
Aerated concrete	AAC 2	[kN]	0,20	0,21
Aerated concrete	AAC 3	[kN]	0,30	0,32 (0,43) <sup>5)</sup>
Aerated concrete	AAC 4	[kN]	0,40	0,54 (0,71) <sup>5)</sup>

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Minimum possible edge distance.

<sup>3)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>4)</sup> Galvanised steel (gvz) and stainless steel A4.

<sup>5)</sup> The values in brackets are decisive for member thickness  $\geq 150$  mm.

<sup>6)</sup> Minimum possible axial spacing while reducing the recommended load.

<sup>7)</sup> Values in brackets apply to AAC 2.

## The versatile nylon anchor for aerated concrete



External lighting



Radiators

### BUILDING MATERIALS

- Aerated concrete
- Solid panel made from gypsum

### CERTIFICATES



### ADVANTAGES

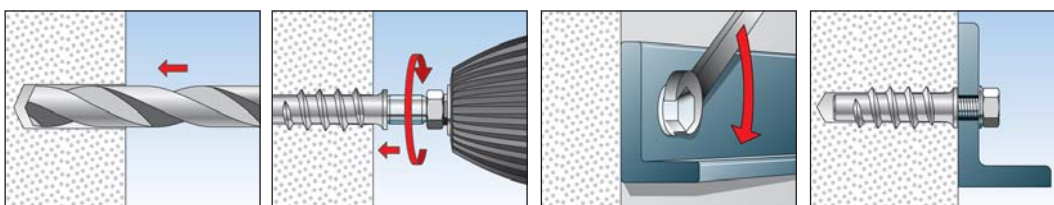
- The FTP K is suitable for both wood screws and metric screws, and thus offers flexibility in screw choice.
- The spiral-shaped outer thread taps itself into the soft aerated concrete with a positive fit, thus ensuring a secure hold.
- Setting with the FTP EK setting tool requires only a small amount of force. For a convenient installation.
- The special geometry allows for an almost expansion-force-free anchoring. This allows for small edge and spacing distances, and avoids splitting in the case of plastered surfaces.

### APPLICATIONS

- Pictures
- Lighting
- Shelves
- Mirror cabinets
- Letter boxes
- Signs
- Motion detectors
- Cable and pipe clips
- Stand-off installations

### FUNCTIONING

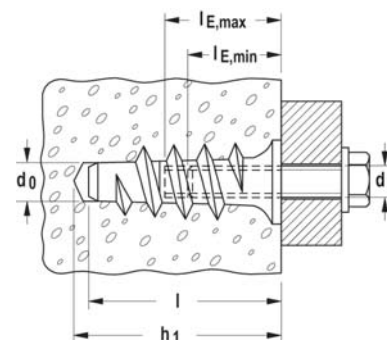
- The FTP K is suitable for pre-positioned installation.
- Set the FTP K with setting tool FTP EK. The aircrete anchor taps itself into the aerated concrete with a positive fit during the installation process.
- Suitable for wood and metric screws with diameter 4 to 10 mm.



## TECHNICAL DATA



Turbo aircrete anchor **FTP K** (nylon)



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Woodscrew diameter $d_s$ [mm]	Metric screw $M$	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Sales unit [pcs]
<b>FTP K 4</b>	<b>078411</b> <sup>1)</sup>	8 - (10)	60	50	4 - 4,5	M 4	35	60	25
<b>FTP K 6</b>	<b>078412</b> <sup>1)</sup>	8 - (10)	60	50	5 - 6	M 5 - 6	40	60	25
<b>FTP K 8</b>	<b>078413</b> <sup>1)</sup>	10 - (12)	70	60	7 - 8	M 8	45	70	25
<b>FTP K 10</b>	<b>078414</b> <sup>1)</sup>	12 - (14)	80	70	9 - 10	M 8 - 10	50	80	10

<sup>1)</sup> Values in brackets for drill hole diameter apply for aerated concrete, compressive strength of 5,0 N/mm<sup>2</sup> or higher.

## ACCESSORIES



**FTP EK 4/6**



**FTP EK 8**



**FTP EK 10**

Item		Match	Sales unit [pcs]
<b>FTP EK 4/6</b>	<b>090990</b>	FTP K4 / FTP K6	1
<b>FTP EK 8</b>	<b>090991</b>	FTP K8	1
<b>FTP EK 10</b>	<b>090992</b>	FTP K10	1

## LOADS

### Turbo aircrete anchor FTP K

Highest recommended loads<sup>1)</sup> for a single anchor in aerated concrete and gypsum blocks.

The given loads are valid for screws with the specified diameter.

Type			<b>FTP K 4</b>	<b>FTP K 6</b>	<b>FTP K 8</b>	<b>FTP K 10</b>
Wood screw diameter	$\emptyset$	[mm]	4	5-6	8	8-10
Min. edge distance	$c_{min}$	[mm]	100	100	150	200
<b>Recommended loads in the respective base material <math>F_{rec}</math> <sup>2)</sup></b>						
Aerated concrete	AAC 2 ( $\geq 2,5$ N/mm <sup>2</sup> )	[kN]	0,15	0,20	0,30	0,40
Aerated concrete	AAC 4 ( $\geq 5,0$ N/mm <sup>2</sup> )	[kN]	0,25	0,30	0,40	0,50
Gypsum block		[kN]	-	-	0,29	0,54

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The metal anchor for metric screws for aerated concrete



Wall consoles



Shelves

### BUILDING MATERIALS

- Aerated concrete
- Solid panel made from gypsum

### ADVANTAGES

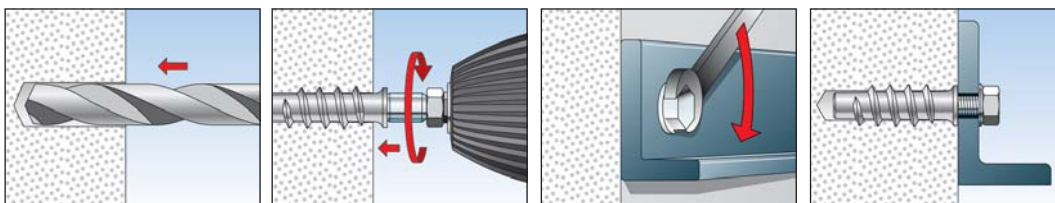
- The Allen key chuck makes it possible to set the FTP M without the need for a special setting tool. This allows for a simple installation.
- The FTP M achieves a very high load-bearing capacity in aerated concrete for increased safety.
- The spiral-shaped outer thread taps itself into the aerated concrete with a positive fit. This means that it can be set without the need for much force.
- The special geometry allows for an almost expansion-force-free anchoring. This allows for small edge and spacing distances, and avoids splitting in the case of plastered surfaces.

### APPLICATIONS

- Pictures
- Lighting
- Shelves
- Mirror cabinets
- Curtain rails
- Cable and pipe clips
- Stand-off installations
- Radiators
- TV consoles

### FUNCTIONALITY

- The FTP M is suitable for pre-positioned installation.
- The aircrete anchor taps itself into the aircrete with a positive fit during the installation process.
- Suitable for metric screws with diameter 6 to 10 mm.
- For installation with a hexagon socket: Size of the hexagon socket corresponds to screw diameter, e.g. FTP M6 is installed with hexagon socket size 6.
- For installation with cordless screwdriver: use a low torque and use the correct 6-kt bit FTP EM.

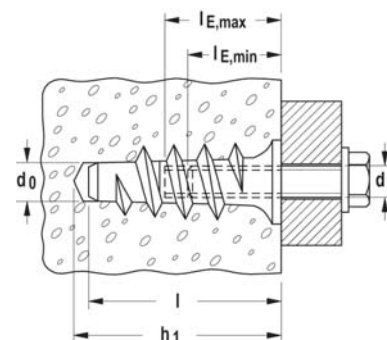




## TECHNICAL DATA



Turbo aircrete anchor **FTP M** (metal)



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Metric screw $M$	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Sales unit [pcs]
<b>FTP M 6</b>	<b>078415</b> <sup>1)</sup>	8 - (10)	60	50	M 6	15	20	25
<b>FTP M 8</b>	<b>078416</b> <sup>1)</sup>	10 - (12)	70	60	M 8	20	25	25
<b>FTP M 10</b>	<b>078417</b> <sup>1)</sup>	12 - (14)	80	70	M 10	25	30	25

<sup>1)</sup> Values in brackets for drill hole diameter apply for aerated concrete, compressive strength of 5,0 N/mm<sup>2</sup> or higher.

## ACCESSORIES



Setting tool **FTP EM**  
for FTP M (metal)

Item	Art.-No.	Match	Sales unit [pcs]
<b>FTP EM 6</b>	<b>078577</b>	FTP M6	1
<b>FTP EM 8</b>	<b>078578</b>	FTP M8	1
<b>FTP EM 10</b>	<b>078579</b>	FTP M10	1

## LOADS

### Turbo aircrete anchor FTP M

Highest recommended loads<sup>1)</sup> for a single anchor in aerated concrete and gypsum blocks.

The given loads are valid for metric screws with the specified thread size.

Type			FTP M 6	FTP M 8	FTP M 10
Thread size	[M]		M 6	M 8	M 10
Min. edge distance	$c_{min}$ [mm]		100	150	200
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>					
Aerated concrete	AAC 2 ( $\geq 2,5$ N/mm <sup>2</sup> )	[kN]	0,30	0,45	0,60
Aerated concrete	AAC 4 ( $\geq 5,0$ N/mm <sup>2</sup> )	[kN]	0,50	0,65	0,70
Aerated concrete	AAC 6 ( $\geq 7,5$ N/mm <sup>2</sup> )	[kN]	0,70	0,80	0,90
Gypsum block		[kN]	-	0,45	0,65

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The brass fixing for thin board building materials and solid building materials



Furniture fittings



Furniture hinges

### BUILDING MATERIALS

- Wooden board building materials
- Plastic boards
- Concrete
- Solid brick
- Solid sand-lime brick
- Natural stone with dense structure

### ADVANTAGES

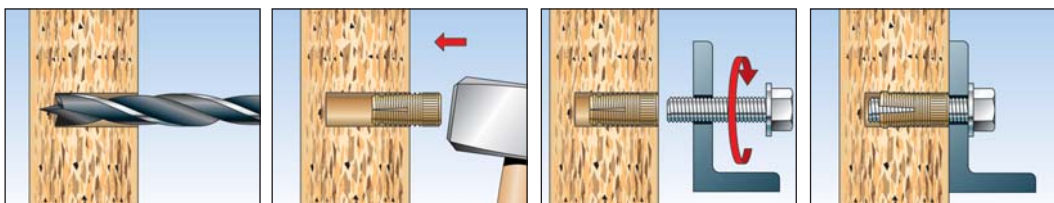
- The short brass fixing PA 4 only requires a very low anchorage depth and is therefore the solution for thin board building materials.
- The special surface structure of the PA 4 prevents the fixing from rotating in the drill hole. This provides increased installation safety.
- The internal thread allows for the use of standard metric screws and enables the ideal adaptation to suit the intended use.

### APPLICATIONS

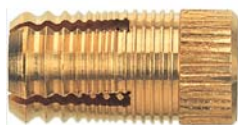
- Handles
- Angle brackets
- Furniture fittings
- Lamps

### FUNCTIONING

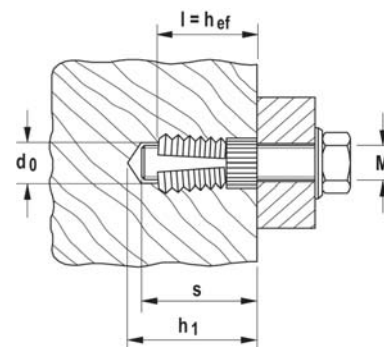
- The PA 4 is suitable for pre-positioned installation.
- Turning in the metric screw causes the front part of the brass fixing to expand, thus securely anchoring it in the substrate.
- Calculating screw length for flush fixing installation: Fixing length + fixture thickness = min. screw length



## TECHNICAL DATA



Brass fixing **PA4**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Thread $M$	Bolt penetration $s$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Sales unit [pcs]
<b>PA 4 M 6/7,5</b>	<b>050484</b> <sup>1)</sup>	8	7,5	7.5	M 6	7,5	7,5	200
<b>PA 4 M 6/10,5</b>	<b>058484</b> <sup>1)</sup>	8	10,5	10.5	M 6	10,5	10,5	100
<b>PA 4 M 6/13,5</b>	<b>059484</b> <sup>1)</sup>	8	13,5	13.5	M 6	13,5	13,5	100
<b>PA 4 M 8/25</b>	<b>050485</b> <sup>1)</sup>	10	25	25	M 8	25	25	50
<b>PA 4 M 10/25</b>	<b>050486</b> <sup>1)</sup>	12	25	25	M 10	25	25	25

<sup>1)</sup> Values of drill hole diameter apply for hard building materials. For soft building materials the drill diameter needs to be reduced by 0.5 mm.

## LOADS

### Brass fixing PA 4

Highest recommended loads<sup>1)</sup> for a single anchor.

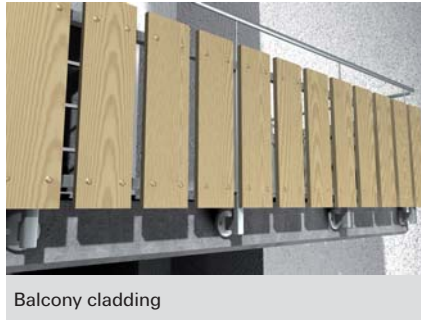
The given loads are valid for metric screws with the specified thread size.

Type		PA 4 M 6/7,5	PA 4 M 6/10,5	PA 4 M 6/13,5	PA 4 M 8/25	PA 4 M 10/25
Thread size	[M]	M 6	M 6	M 6	M 8	M 10
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>						
Chipboard	[kN]	0,20	0,30	0,40	-	-
Fir wood	[kN]	0,18	0,25	0,38	-	-
Beech wood	[kN]	0,50	0,75	1,00	-	-
Plastic material	[kN]	0,75	1,50	2,00	-	-
Solid brick	Mz 12 [kN]	-	-	0,80	1,95	2,30

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## For the rear-ventilated stand-off fastening of balcony cladding to hollow profiles



### BUILDING MATERIALS

- For fixing onto hollow metal profiles

### ADVANTAGES

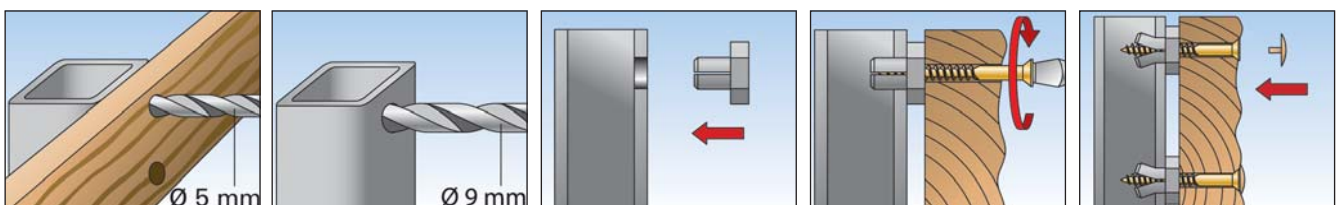
- The wide collar of the P9K plug fixes the balcony cladding to the hollow profile with a spacing. This avoids the formation of rot.
- The expansion within the railing post means that no second drilling on the opposite side of the post is necessary. This allows for a practically invisible fixing of the balcony cladding.
- The material quality of the P9K creates an elastic yet load-bearing connection. This allows for the absorption of thermal stresses, thus increasing the lifespan of the cladding.
- The short expansion element means that the balcony cladding fixing only requires a very small cavity. It is therefore suitable for narrow hollow profiles.

### APPLICATIONS

- Balcony cladding
- Fittings
- Electrical switches
- Lamps
- Motion detectors

### FUNCTIONING

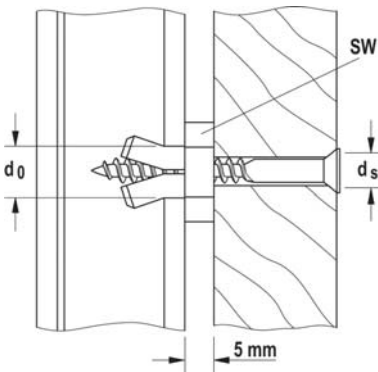
- Turning in the screw causes the plug to expand in the hollow profile, thus ensuring a load-bearing connection.
- The wide collar prevents direct contact between the fixture and the hollow profile.



## TECHNICAL DATA



Plug **P 9 K**



6

General fixings

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Screw diameter $d_s$ [mm]	Collar height [mm]	Width across nut $\varnothing$ SW [mm]	Sales unit [pcs]
<b>P 9 K</b>	<b>059395</b>	9	5,0	5	15	50

## LOADS

### Balcony board fixing P 9 K

Highest recommended loads<sup>1)</sup> for a single anchor.

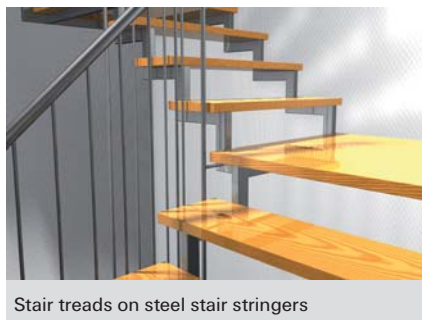
The given loads are valid for wood screws with the specified diameter.

Type			P 9 K
Screw diameter	Ø	[mm]	5
Recommended loads in the respective base material F <sub>rec</sub> <sup>2)</sup>			
Wall thickness of hollow profile	2 mm	[kN]	0,27
Wall thickness of hollow profile	3 mm	[kN]	0,29
Wall thickness of hollow profile	4 mm	[kN]	0,31

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## To fix wooden step treads in concrete and steel sub-structures



Stair treads on steel stair stringers



Stair treads on concrete stair stringers

### BUILDING MATERIALS

#### TB for fixing in:

- Hollow steel profiles

#### TBB for fixing in:

- Concrete
- Solid building materials

### ADVANTAGES

- The elastic shaft geometry allows for the absorption of vibrations, prevents creaking, and thus increases comfort.
- The stair-tread fixing for steel sub-structures (TB) only requires a very small cavity due to the short expansion element. Thus it is suitable even for narrow steel profiles.

### APPLICATIONS

- Wooden step treads

### FUNCTIONING

- The plastic expansion plugs are suitable for anchoring wooden step treads and wooden boards >30 mm to steel profiles (TB) or in solid building materials (TBB).
- The ideal retention forces are only achieved when using cold wood glue for the fixing in wooden step treads.
- The plastic washers included with the TBB allow you to level out any unevenness in the substrate.

### TECHNICAL DATA



Stair-tread fixing **TB** for installation on steel staircase stringers

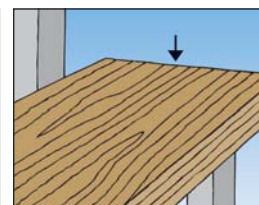
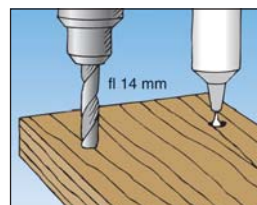
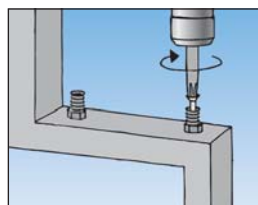
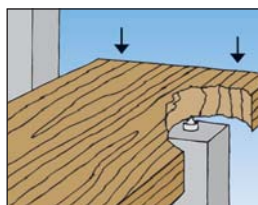
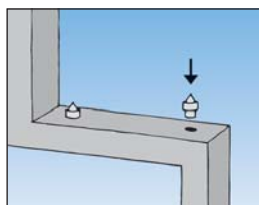


Stair-tread fixing **TBB** for installation on concrete staircase stringers



Stair-tread fixing **TBZ 2** for centre-marking the stair-tread holes

Item	Art.-No.	Drill hole in stair thread [Ø mm]	Drill hole in steel staircase stringer [Ø mm]	Drill hole in concrete [Ø mm]	Collar height [mm]	Screw d <sub>s</sub> x l <sub>s</sub> [mm]	Width across nut ○ SW [mm]	Adapted for	Sales unit [pcs]
<b>TB</b>	<b>060580</b>	14 x 25	9	—	5	5 x 40	15	—	50
<b>TBB</b>	<b>060583</b>	14 x 25	—	8 x 55	—	5,5 x 70	—	—	50
<b>TBZ 2</b>	<b>060584</b>	—	—	—	—	—	—	TB and TBB	10





## To repair over-sized or damaged drill holes



Repairing damaged drill holes



Repairing damaged drill holes

### BUILDING MATERIALS

- Concrete
- Cavity floor slabs made from bricks and concrete
- Vertically perforated brick made from lightweight concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

### ADVANTAGES

- Using FIX IT means that you can avoid having to drill another hole, and makes it possible to reuse a pre-existing drill hole.
- The repair pad FIX IT can be used as a single layer or as multiple layers, and thus can be flexibly adapted to suit various drill hole sizes and shapes.
- The pad, which is covered with a special mortar, hardens after only approx. three minutes in the drill hole. This allows for a fast installation of the fixture.

### APPLICATIONS

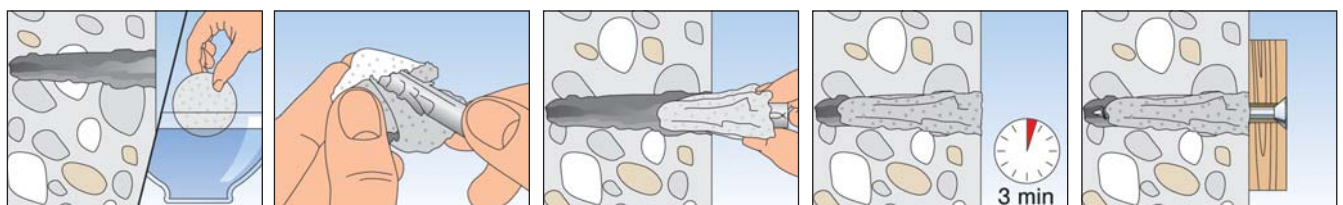
- To repair over-sized or damaged drill holes for use with plastic plugs

### FUNCTIONING

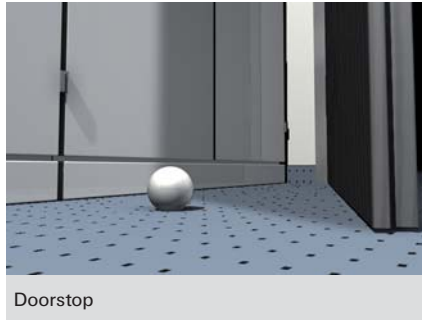
- The pad, which is covered with a special mortar, hardens in the drill hole, thus anchoring the plug securely in the damaged or over-sized drill hole.
- Wet the pad with water, wrap it around the plug and push it into the damaged drill hole.
- After about three minutes the special pad will harden and the fixture can then be attached.
- Use several pads for larger tolerances.
- The curing time for the first pad is approx. three minutes. Add an additional minute for each additional pad used.

### TECHNICAL DATA

Item	Art.-No.	Contents	Sales unit
FIX IT	092507	card with 10 FIX IT pads	[pcs] 10



## The installation-friendly doorstop



### BUILDING MATERIALS

- Concrete
- Floor screed

### CHARACTERISTICS



### ADVANTAGES

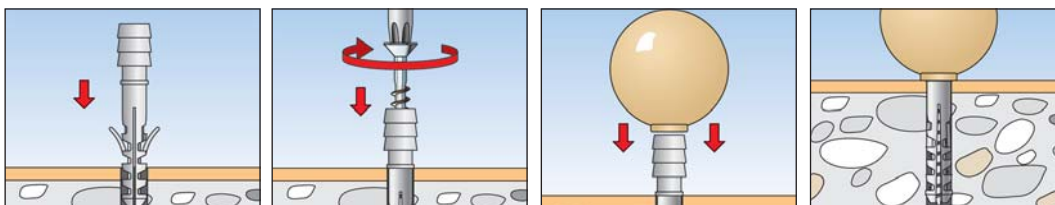
- The extended plug shaft makes it possible to attach the doorstop directly, thus simplifying installation.
- The invisible fixing ensures visual appeal.
- The TS contains all the components required for installation and is therefore a convenient complete solution.
- The doorstop is available in a range of colours to suit every floor covering and individual design wishes.

### APPLICATIONS

- Doorstop with flexible positioning

### FUNCTIONING

- The doorstop TS is suitable for pre-positioned installation.
- When turning in the screw, the plug expands and anchors itself in the building material.
- The plug must be pushed into the drill hole up to the point where the plug shaft thickens.
- It can be removed by removing the doorstop, unscrewing the screw, and pulling out the plug.



## TECHNICAL DATA



Doorstop **TS**

Doorstop assortment **TS-SORT**









Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Colour	Contents	Sales unit [pcs]
<b>TS 8 G</b>	<b>060535</b>	8	50	grey	—	10
<b>TS 8 W</b>	<b>060536</b>	8	50	white	—	10
<b>TS 8 S</b>	<b>060539</b>	8	50	black	—	10
<b>TS 8 BR</b>	<b>060540</b>	8	50	brown	—	10
<b>TS 8 BG</b>	<b>060551</b>	8	50	beige	—	10
<b>TS-SORT</b>	<b>060521</b>	8	50	assortment	5 x grey, white, beige, black brown	1



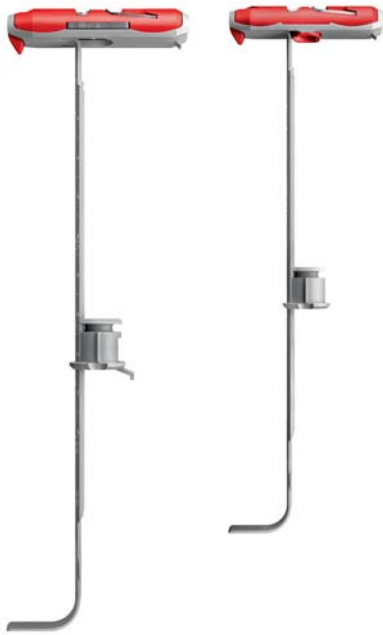




## 7 Cavity fixings

		Page
Nylon toggle DUOTEC		394
Metal cavity fixing HM		397
Gravity- and spring-toggle K, KD, KDH, KM		400
Board fixing PD		404
Plasterboard fixing DUOBLADE		406
Plasterboard fixing GK		408
Plasterboard fixing GK GREEN		410
Plasterboard fixing metal GKM		412

## Easy to install nylon toggle for high loads in all panel building materials



### BUILDING MATERIALS

#### Suitable for:

- Gypsum plasterboard
- Gypsum fibreboard
- Wooden panels, such as OSB boards, chipboard, MDF sheets
- Steel plates
- Plastic boards
- Hollow blocks made from concrete

#### Also functioning in:

- Solid materials, such as concrete and wood

### CERTIFICATES



### ADVANTAGES

- Flexible screw mount allows for the use of screws and hooks with different thread shapes.
- Glass fibre-reinforced plastics and a metal skeleton insert (fischer DUOTEC 12) allow the toggle to handle heavy tensile and transverse loads in all panel building materials.
- Soft grey nylon contact surface distributes the load over the panel surface, thereby minimising weakening of the supporting building material.
- Standard drill hole diameters and short tilting element for easy installation in narrow cavities, including cavities with insulation.
- White flush sleeve with snap function allows the plug to be pre-installed quickly and securely in the drill hole.
- With scale on the grip strap (fischer DUOTEC 12) for determining the required screw length (scale value + 20 mm).

### APPLICATIONS

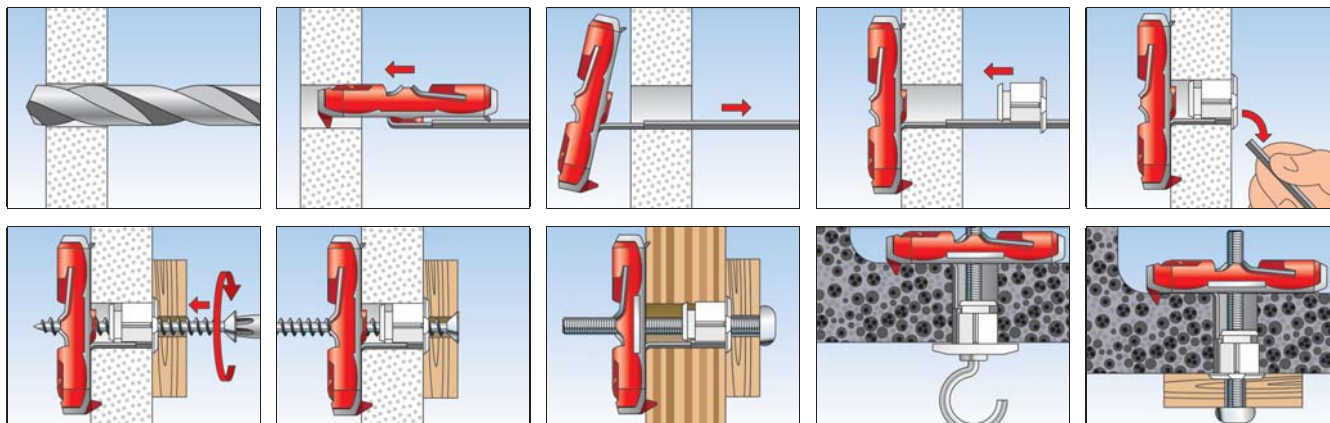
- Kitchen hanging cabinets
- Living room cabinets
- Shelves
- Wardrobes
- Handrails
- Pictures
- Mirrors
- Lamps
- Heavy hanging baskets

### FUNCTIONING

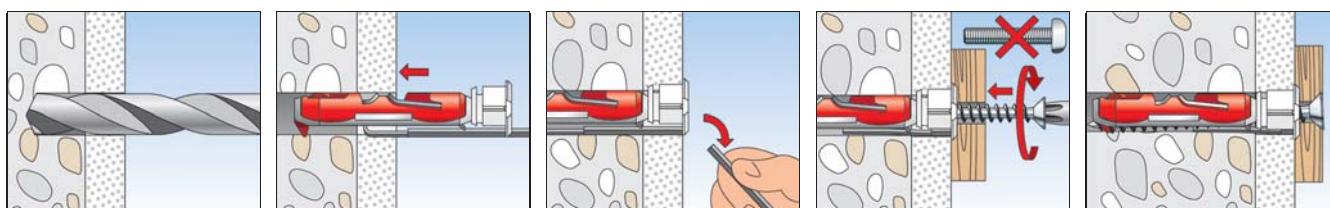
- The fischer DUOTEC is designed for pre-positioned installation.
- Simple installation with a standard diameter 10 or 12 mm drill bit.
- The short toggle element makes it suitable for narrow and even with mineral wool insulated cavities. Note the length of the toggle element!
- Functions like an expansion plug in solid building materials such as concrete or wood. Note, not with metric screws!
- Flexible screw insert allows for the use of wood, chipboard and metric screws and hooks.



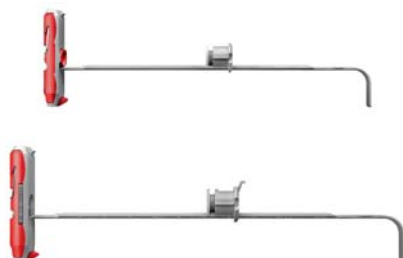
## INSTALLATION IN PLASTERBOARD AND CAVITY FIXINGS



## INSTALLATION HITTING IN SOLID MATERIALS

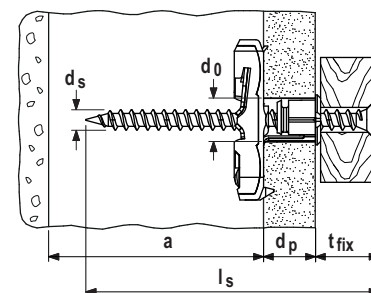


## TECHNICAL DATA BOARD MATERIAL



Nylon toggle **fischer DUOTEC 10**

Nylon toggle **fischer DUOTEC 12**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. panel thickness $d_p$ [mm]	Max. panel thickness $d_p$ [mm]	Min. cavity depth $a$ [mm]	Screw diameter $d_s$ [mm]	Screw length $l_s$ [mm]	Sales unit [pcs]
<b>fischer DUOTEC 10</b>	<b>537258</b>	10	12	55	40	4,5 - 5,0	$\geq d_p + t_{fix} + 20$	50
<b>fischer DUOTEC 10 S</b>	<b>537259</b> <sup>1)</sup>	10	12	55	40	5,0	70	25
<b>fischer DUOTEC 10 S PH</b>	<b>539025</b> <sup>2)</sup>	10	12	55	40	5,0	70	25
<b>fischer DUOTEC 12</b>	<b>542796</b>	12	12	55	50	5,0 - 6,0 / M6	$\geq d_p + t_{fix} + 20$	10
<b>fischer DUOTEC 12 S PH M</b>	<b>542797</b> <sup>2)3)</sup>	12	12	55	50	M6	55	10
<b>fischer DUOTEC 12 RH</b>	<b>542798</b> <sup>4)</sup>	12	12	55	50	5,5	70	10

1) fischer DUOTEC S - with chipboard screw countersunk head

2) DUOTEC S PH - with chipboard screw panhead

3) fischer DUOTEC S PH - with machine screw panhead

4) fischer DUOTEC RH - with screw with round hook

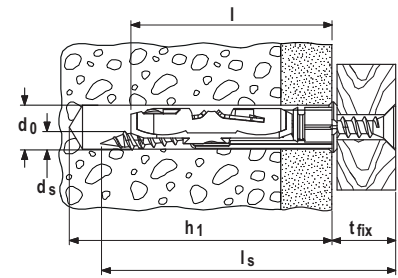
## TECHNICAL DATA HITTING IN SOLID MATERIALS



Nylon toggle **fischer DUOTEC 10**



Nylon toggle **fischer DUOTEC 12**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Screw diameter [mm]	Min. screw length $l_s$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Sales unit [pcs]
<b>fischer DUOTEC 10</b>	<b>537258</b>	10	$l_s - t_{fix} + 10$	4,5 - 5,0	$t_{fix} + 55$	50	$l_s - 55$	50
<b>fischer DUOTEC 10 S</b>	<b>537259</b> <sup>1)</sup>	10	65	5,0	70	50	15	25
<b>fischer DUOTEC 10 S PH</b>	<b>539025</b> <sup>2)</sup>	10	65	5,0	70	50	15	25
<b>fischer DUOTEC 12</b>	<b>542796</b>	12	$l_s - t_{fix} + 10$	5,0 - 6,0	$t_{fix} + 65$	60	$l_s - 65$	10
<b>fischer DUOTEC 12 RH</b>	<b>542798</b> <sup>3)</sup>	12	75	5,5	55	60	—	10

1) fischer DUOTEC S - with chipboard screw countersunk head

2) DUOTEC S PH - with chipboard screw panhead

3) fischer DUOTEC RH - with screw with round hook

## LOADS

### Nylon toggle fischer DUOTEC

Highest recommended loads <sup>1)4)</sup> for a single anchor.

Type		fischer DUOTEC 10				fischer DUOTEC 12			
		Chipboard screw	Metrical screw	fischer Hook		Chipboard screw	Metrical screw	fischer Hook	
Screw diameter	[mm]	4,5	5	5	5	5	6	6	5,5
<b>Recommended loads in the respective base material <math>F_{rec}^{2)}</math> for a span in the construction <math>b = 625</math> mm</b>									
Gypsum plasterboard	9,5 mm	[kN]	0,17	0,17	0,17	0,17	0,17	0,17	0,17
Gypsum plasterboard	12,5 mm	[kN]	0,20	0,20	0,20	0,20	0,20	0,20	0,20
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,43	0,43	0,43	0,43	0,43	0,43	0,43
Gypsum fibreboard	12,5 mm	[kN]	0,51	0,51	0,30 <sup>3)</sup>	0,51	0,51	0,51	0,50 <sup>3)</sup>
Chipboard	16 mm	[kN]	0,71	0,71	0,30 <sup>3)</sup>	0,75	0,80	0,80	0,50 <sup>3)</sup>
OSB board	18 mm	[kN]	0,75	0,75	0,30 <sup>3)</sup>	0,75	1,30	1,20	0,50 <sup>3)</sup>
<b>Recommended loads in the respective base material <math>F_{rec}^{2)}</math> for a span in the construction <math>b = 120</math> mm</b>									
Gypsum plasterboard	9,5 mm	[kN]	0,20	0,20	0,20	0,20	0,20	0,20	0,20
Gypsum plasterboard	12,5 mm	[kN]	0,36	0,36	0,36	0,36	0,36	0,36	0,20
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,59	0,59	0,30 <sup>3)</sup>	0,70	0,80	0,80	0,50 <sup>3)</sup>
Gypsum fibreboard	12,5 mm	[kN]	0,75	0,75	0,30 <sup>3)</sup>	0,80	1,10	1,10	0,50 <sup>3)</sup>
Chipboard	16 mm	[kN]	0,75	0,75	0,30 <sup>3)</sup>	0,80	1,40	1,30	0,50 <sup>3)</sup>
OSB board	18 mm	[kN]	0,75	0,75	0,30 <sup>3)</sup>	0,80	1,50	1,40	0,50 <sup>3)</sup>
<b>Recommended loads in solid building materials <math>F_{rec}^{2)}</math></b>									
Concrete	$\geq C20/25$	[kN]	0,45	0,75	-	0,30 <sup>3)</sup>	0,40	0,75	0,30
Wood		[kN]	0,30	0,75	-	0,30 <sup>3)</sup>	0,20	0,65	0,30
<b>Recommended loads in the respective base material <math>F_{rec}^{2)}</math></b>									
Hollow block of lightweight aggregate concrete 'Sepa Parpaing'	$f_b \geq 8$ N/mm <sup>2</sup>	[kN]	-	-	-	-	0,65	1,00	0,50 <sup>3)</sup>
Pre-stressed hollow-core concrete slabs		[kN]	-	-	-	-	1,00	1,40	0,50 <sup>3)</sup>
Hollow block of lightweight aggregate concrete Hbl acc. EN 771-3	$f_b \geq 2$ N/mm <sup>2</sup>	[kN]	-	-	-	-	0,90	1,00	0,50 <sup>3)</sup>

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>3)</sup> Bending of the hook is decisive. Only for tension load.

<sup>4)</sup> The recommended loads are reference values and depending to the building material and the workmanship. The values are only valid for the given screw diameter.

## The versatile metal cavity fixing with metric screws



### BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Cavity floor slabs
- Light building boards made of wood wool
- Chipboard
- Plywood boards

### ADVANTAGES

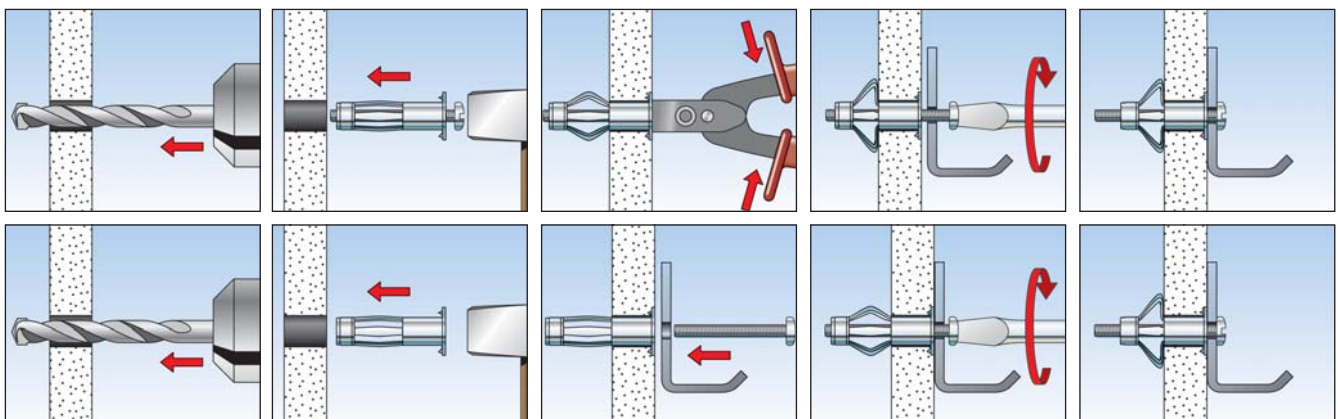
- Due to the extensive range, the HM is suitable for board building materials with a thickness of 3-50 mm and thus suitable for a number of different applications.
- The metric internal thread allows the attachment to be removed and refitted several times, thus offering the best possible flexibility.
- The HM's expanding arms ensure a large supporting surface, thus allowing a high load-bearing capacity.
- The claws around the edge of the fixing penetrate the board building material, preventing the fixing from rotating, thus ensuring a secure installation.

### APPLICATIONS

- Pictures
- Lighting
- Light shelves
- Towel rails
- Mirror cabinets
- Curtain rails
- Sub-structures

### FUNCTIONING

- The metal cavity fixing HM is suitable for pre-positioned installation.
- The fixing should be selected based on the thickness of the board building material, to allow the very best expansion in the cavity.
- During installation, the expanding arms swing open and press onto the reverse side of the board.
- The HM can be installed using installation pliers. If using a battery operated screwdriver or screwdriver for installation, the pre-assembled screws must be removed first. When screwing in and expanding the fixing, the attachment, or a max. 6 mm plate, needs to be used as a turning stop.



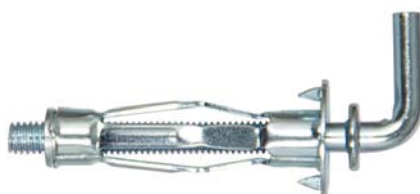
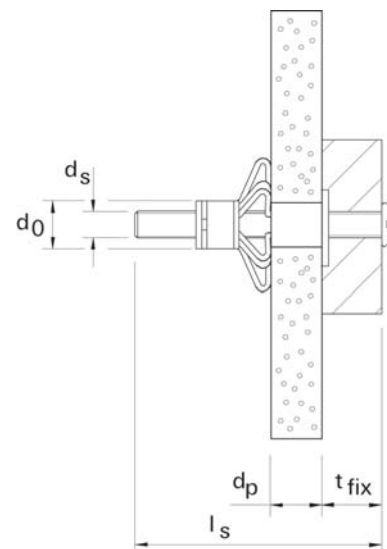
## TECHNICAL DATA



**HM-S** with metric screw



**HM-SS** with hexagon headed screw



**HM-H** with angle hook

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchor length $l$ [mm]	Screw $d_s \times l_s$ [mm]	Panel thickness $d_p$ [mm]	Fixture thickness $t_{fix}$ [mm]	Drive	Sales unit [pcs]
<b>HM 4 x 32 S</b>	<b>519769</b>	8	40	32	M 4 x 40	3 - 13	≤ 15 - 25	PH2	50
<b>HM 4 x 45 S</b>	<b>519770</b>	8	52	45	M 4 x 52	16 - 23	≤ 12 - 21	PH2	50
<b>HM 4 x 60 S</b>	<b>519771</b>	8	65	60	M 4 x 65	31 - 40	≤ 12 - 21	PH2	50
<b>HM 5 x 37 S</b>	<b>519772</b>	10	45	37	M 5 x 45	6 - 15	≤ 8 - 17	PH2	50
<b>HM 5 x 52 S</b>	<b>519774</b>	10	58	52	M 5 x 58	7 - 21	≤ 10 - 24	PH2	50
<b>HM 5 x 65 S</b>	<b>519775</b>	10	71	65	M 5 x 71	20 - 34	≤ 12 - 26	PH2	50
<b>HM 6 x 37 S</b>	<b>519777</b>	12	45	37	M 6 x 45	6 - 15	≤ 12 - 21	PH3	50
<b>HM 6 x 52 S</b>	<b>519778</b>	12	58	52	M 6 x 58	7 - 21	≤ 14 - 28	PH3	50
<b>HM 6 x 65 S</b>	<b>519782</b>	12	71	65	M 6 x 71	17 - 34	≤ 13 - 30	PH3	50
<b>HM 6 x 80 S</b>	<b>519779</b>	12	88	80	M 6 x 88	32 - 50	≤ 16 - 34	PH3	50
<b>HM 8 x 54 SS</b>	<b>519783</b> <sup>1)</sup>	12	60	54	M 8 x 60	7 - 21	≤ 16 - 30	SW13	50
<b>HM 4 x 32 H</b>	<b>519780</b>	8	45	32	—	3 - 13	—	—	50
<b>HM 5 x 65 H</b>	<b>519781</b>	10	71	65	—	20 - 34	—	—	50

1) with hexagon headed screw, assembly only by using the professional installation tool HM Z 1

## ACCESSORIES



**HM Z 1** - the professional installation tool



**HM Z 2** - the DIY installation tool

Item	Art.-No.	Adapted for	Sales unit [pcs]
<b>HM Z 1</b>	<b>062320</b>	HM 4 - HM 8	1
<b>HM Z 2</b>	<b>062321</b>	HM 4 - HM 6	1

## LOADS

### Metal cavity fixing HM

Highest recommended loads<sup>1)</sup> for a single anchor.

Type			HM 4 x 32 S	HM 4 x 46 S	HM 5 x 37 S	HM 5 x 52 S	HM 5 x 65 S	HM 6 x 37 S	HM 6 x 52 S	HM 6 x 65 S	HM 8 x 55 SS
Thread size	[M]		M4	M4	M5	M5	M5	M6	M6	M6	M8
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>											
Gypsum plasterboard	9,5 mm	[kN]	0,15	0,15	0,15	0,15	-	0,15	-	-	-
Gypsum plasterboard	12,5 mm	[kN]	0,20	0,20	0,20	0,20	-	0,20	0,20	-	0,20
Gypsum plasterboard	19 mm (2 x 9,5 mm)	[kN]	-	-	-	0,25	-	-	0,25	-	0,25
Gypsum plasterboard	25 mm (2 x 12,5 mm)	[kN]	-	-	-	-	0,30	-	-	0,30	-
Chipboard	10 mm	[kN]	0,25	0,25	0,25	0,25	-	0,25	0,25	-	0,25
Chipboard	13 mm	[kN]	0,25	0,25	0,25	0,25	-	0,25	0,25	-	0,25
Chipboard	28 mm	[kN]	-	-	-	-	0,50	-	-	0,50	-
Plywood	4 mm	[kN]	0,10	-	-	-	-	-	-	-	-
Hardboard	3 mm	[kN]	0,10	-	-	-	-	-	-	-	-
Wood wool slab	16 mm	[kN]	-	0,05	-	0,05	-	-	0,05	-	0,05
Wood wool slab	25 mm	[kN]	-	-	-	-	0,05	-	-	0,05	-
Fibre cement board	8 mm	[kN]	0,25	0,25	0,25	0,25	-	0,25	-	-	-
Gypsum fibreboard	10 mm	[kN]	0,25	0,25	0,25	0,25	-	0,25	0,25	-	0,25
Gypsum fibreboard	15 mm	[kN]	-	0,25	0,25	0,25	-	0,25	0,25	-	0,25

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.



## The cavity fixing for different board thicknesses and large usage lengths



Ceiling lamps



Wash basins

7

Cavity fixings

### BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Cavity floor slabs made from bricks and concrete
- Chipboard
- Plywood boards

### CERTIFICATES



### ADVANTAGES

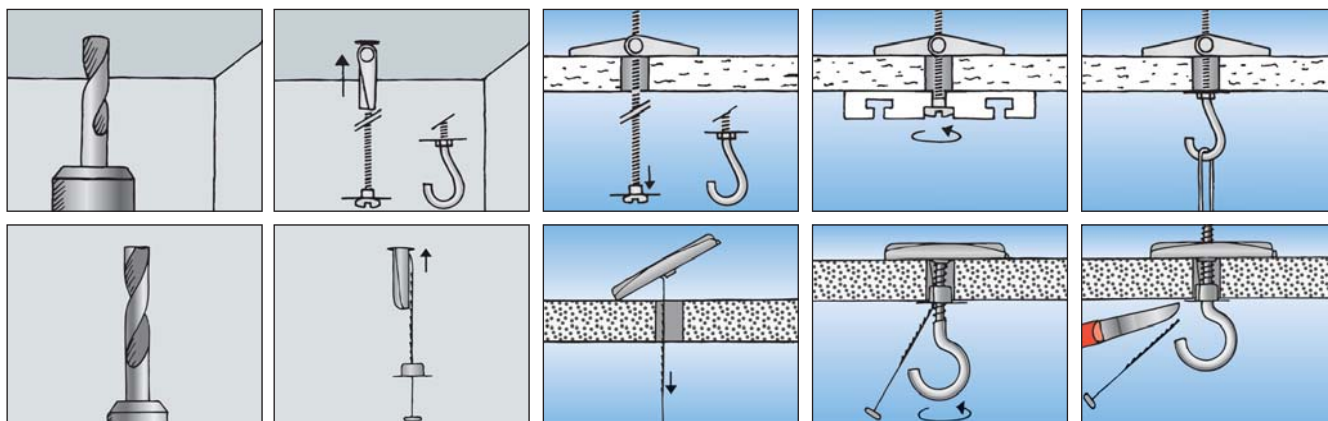
- Universal fixing for fastenings in a wide range of drywall and hollow wall materials.
- When the metal crosspiece is pushed through the drill hole, pull it firmly against the inner wall cavity by tugging the plastic pull ring on the outer wall.
- Afterwards cut the plastic legs off and fasten the fixture with e.g. a screw or screw in a hook or an eyebolt according to your demands.
- Suitable for pre-positioned installation.

### APPLICATIONS

- Pictures
- Lighting
- Light shelves
- Towel rails
- Mirror cabinets
- Light cabinets
- Wash basins and urinals (KM 10)
- Cable and pipe clips

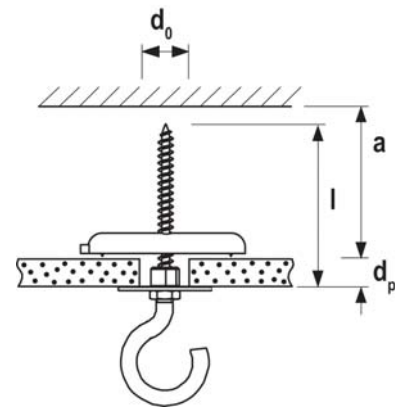
### FUNCTIONING

- The gravity and spring toggle are suitable for pre-positioned installation.
- When placed in the drill hole, the bearing elements of the gravity and spring toggles independently swing open behind the board.
- The KM 10 is specially suited to fixing wash basins and urinals into installation and cavity walls.
- No special installation tool required. For a fast and convenient installation.



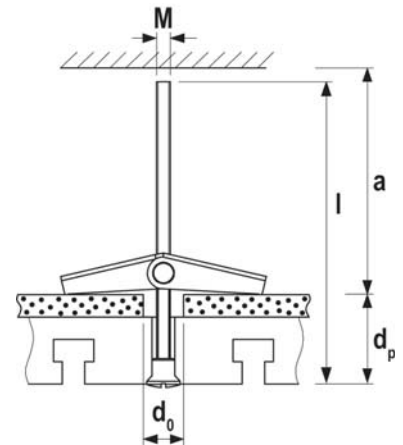


## TECHNICAL DATA

Nylon toggle **K 54**

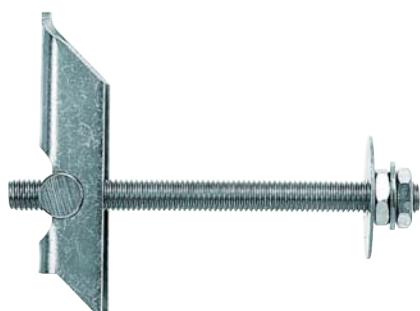
Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Max. panel thickness $d_p$ [mm]	Min. cavity depth $a$ [mm]	Anchor length $l$ [mm]	Thread $\emptyset \times \text{length}$ [mm]	Sales unit [pcs]
<b>K 54</b>	<b>050323</b>	10	65	58	125	woodscrew 4mm	25

## TECHNICAL DATA

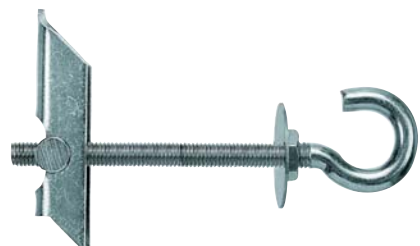
Spring toggle **KD 3 + 4**Spring toggle with hook **KDH 3 + 4**

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Max. panel thickness $d_p$ [mm]	Min. cavity depth $a$ [mm]	Anchor length $l$ [mm]	Thread $\emptyset \times \text{length}$ [mm]	Sales unit [pcs]
<b>KD 3</b>	<b>080181</b>	12	65	27	95	M 3 x 90	50
<b>KDH 3</b>	<b>080182</b>	12	51	27	105	M 3 x 80	25
<b>KD 3 B</b>	<b>080192</b>	12	65	27	95	M 3 x 90	10
<b>KD 4</b>	<b>080183</b>	14	69	34	105	M 4 x 100	25
<b>KDH 4</b>	<b>080184</b>	14	35	34	95	M 4 x 70	25
<b>KD 4 B</b>	<b>080193</b>	14	69	34	105	M 4 x 100	10

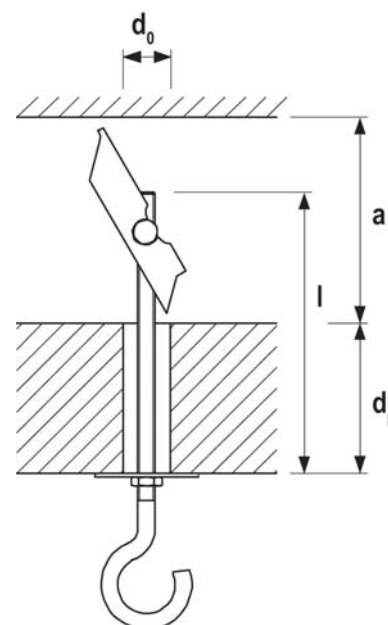
## TECHNICAL DATA



Gravity toggle **KD 5 + 6 + 8**

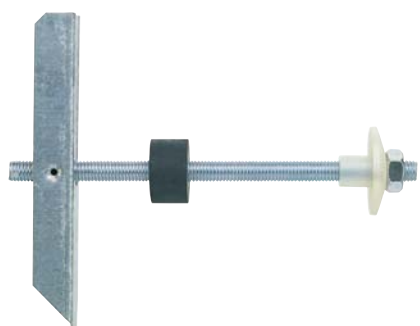


Gravity toggle with hook **KDH 5 + 6 + 8**

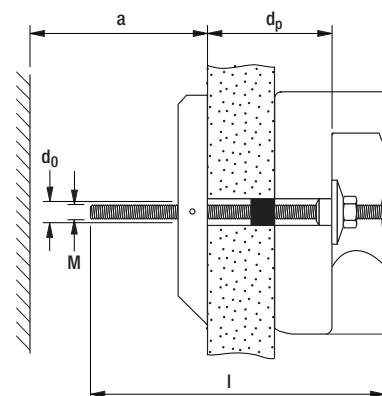


Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Max. panel thickness $d_p$ [mm]	Min. cavity depth $a$ [mm]	Anchor length $l$ [mm]	Thread $\emptyset \times \text{length}$ [mm]	Sales unit [pcs]
<b>KD 5</b>	<b>080187</b>	16	63	70	100	M 5 x 100	25
<b>KDH 5</b>	<b>080188</b>	16	60	70	130	M 5 x 90	20
<b>KD 6</b>	<b>080185</b>	16	63	70	100	M 6 x 100	25
<b>KDH 6</b>	<b>080186</b>	16	60	70	130	M 6 x 100	20
<b>KD 8</b>	<b>080178</b>	20	55	75	100	M 8 x 100	20
<b>KDH 8</b>	<b>080179</b>	20	55	75	130	M 8 x 100	20

## TECHNICAL DATA



Gravity toggle **KM 10**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Max. panel thickness $d_p$ [mm]	Min. cavity depth $a$ [mm]	Anchor length $l$ [mm]	Screw $d_s \times l_s$ [mm]	Sales unit [pcs]
<b>KM 10</b>	<b>050326</b>	30	90	140	180	M 10 x 180	25

## LOADS

## Toggle fixing KD

Highest recommended loads<sup>1)</sup> for a single anchor.

Type			KD3	KD4	KD5	KD6	KD8	KDH3	KDH4	KDH5	KDH6	KDH8
Thread size	[M]		M3	M4	M5	M6	M8	M3	M4	M5	M6	M8
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>												
Gypsum plasterboard	12,5 mm	[kN]	0,15	0,15	0,15	0,15	0,18	0,07 <sup>3)</sup>	0,13 <sup>3)</sup>	0,15	0,15	0,18
OSB board	≥15 mm	[kN]	0,34	0,58	0,85	0,85	0,89	0,07 <sup>3)</sup>	0,13 <sup>3)</sup>	0,30 <sup>3)</sup>	0,45 <sup>3)</sup>	0,89

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for axial tensile load.

<sup>3)</sup> Bending of the hook is decisive. Only for tension load.

## LOADS

## Toggle fixing KM10 and K54

Mean ultimate loads

Type		KM10	K54
Screw diameter		M10	4mm
<b>Mean ultimate loads <math>F_u</math><sup>1) 2) 3)</sup></b>	<b>[kN]</b>	<b>13,0</b>	<b>0,8</b>

<sup>1)</sup> Upon these failure loads an appropriate safety factor has to be considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>3)</sup> If the failure of the base material is not possible.

## The expansion plug for fixings in gypsum plasterboard, gypsum fibreboard and wooden panels



Towel rails



Small shelves

7

Cavity fixings

### BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Wooden boards
- MDF boards
- Multiplex boards
- OSB boards
- Plywood boards
- Chipboard
- Wood core plywood boards

### CERTIFICATES



### ADVANTAGES

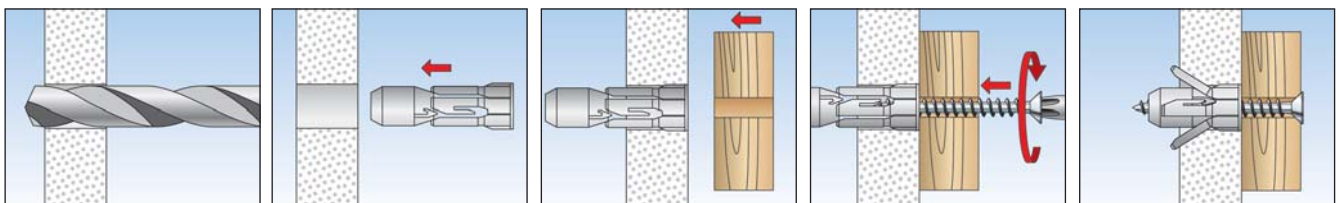
- The operating principle of the fixing allows for use in various board thicknesses, including in low cavity depths. This provides great flexibility.
- The special fixing geometry with a nylon cone ensures a high tightening torque that can be identified immediately. This offers a high level of installation safety.
- The longitudinal ribs prevent the fixing from rotating in the drill hole, thus allowing for a reliable installation.
- The board fixing PD can be used with the most wide-ranging screws, hooks and eye screws. This allows for a broad range of applications.

### APPLICATIONS

- Pictures
- Lighting
- Light shelves
- Towel rails
- Mirror cabinets
- Curtain rails

### FUNCTIONING

- The board fixing PD is suitable for pre-positioned installation.
- Use rotary drilling to create the drill hole.
- When the screw is tightened, the plastic cone is pulled into the sleeve and expands the fixing.
- Use full-thread screws, or alternatively, the part of the screw without thread may not be longer than the thickness of the item being attached.
- Do not use screws with double-start threads.



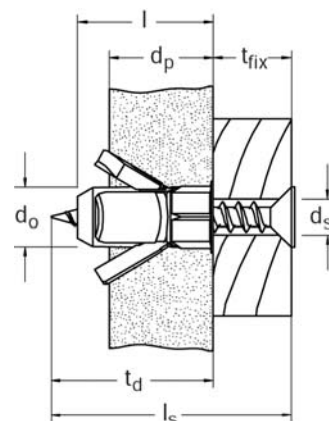
## TECHNICAL DATA



Board fixing **PD**



Board fixing **PD S** - with chipboard screw



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. panel thickness $d_p$ [mm]	Anchor length $l$ [mm]	Chipboard screw $d_s / d_s \times l_s$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Sales unit [pcs]
<b>PD 8</b>	<b>024771</b>	8	31	6	29	4	—	100
<b>PD 10</b>	<b>015935</b>	10	30	7	28	5	—	100
<b>PD 12</b>	<b>015937</b>	12	29	9	27	6	—	50
<b>PD 8 S</b>	<b>024772</b> <sup>1)</sup>	8	31	6	29	4 x 40	11	50
<b>PD 10 S</b>	<b>015936</b> <sup>1)</sup>	10	30	7	28	5 x 40	12	50
<b>PD 12 S</b>	<b>015938</b> <sup>1)</sup>	12	29	9	27	6 x 50	22	25

<sup>1)</sup> PD-S with chipboard screw.

## LOADS

### Board fixing PD

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for chipboard screws with the specified diameter.

Type			PD 8	PD 10	PD 12
Chipboard screw	$\emptyset$	[mm]	4	5	6
<b>Recommended loads in the respective base material <math>F_{rec}</math> <sup>2)</sup></b>					
Gypsum plasterboard	9,5 mm	[kN]	0,10	0,10	0,10
Gypsum plasterboard	12,5 mm	[kN]	0,10	0,10	0,15
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,15	0,15	0,15
Gypsum fibreboard	12,5 mm	[kN]	0,20	0,25	0,30
Plywood		[kN]	0,15	0,40	0,80
Chipboard	16 mm	[kN]	0,25	0,25	0,25

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The self-drilling plasterboard plug for fast and easy installation



Smoke detectors



Mirrors

### BUILDING MATERIALS

- Gypsum plasterboard, single and double-planked
- Gypsum fibreboard
- Lightweight cement boards

### CERTIFICATES



### ADVANTAGES

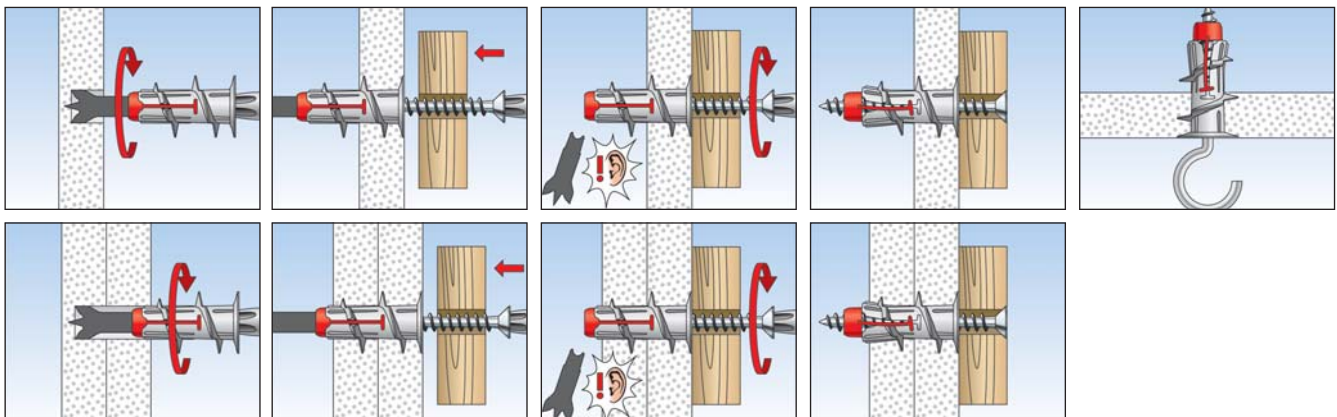
- An innovative product of the fischer DUO-Line with intelligent combinations for more power and more intelligence.
- The self-drilling fischer DUOBLADE allows fast and easy installation in gypsum plasterboard and gypsum fibreboard.
- The black metal tip guarantees simple and safe installation.
- High torque when anchor is installed for the feelgood-factor and an optimum feeling when setting.
- PZ 2 drive - same drive for plug and screw.

### APPLICATIONS

- Smoke detectors
- Mirrors
- Curtain rods
- Blinds
- Lamps
- Pictures

### FUNCTIONING

- The fischer DUOBLADE is suitable for pre-positioned installation.
- The metal tip for better heat-resistant and cutting characteristics. Especially in double-layered plasterboard.
- The fischer DUOBLADE can be used with wood, metal and chipboard screws of Ø4.0 to Ø5.0 mm.

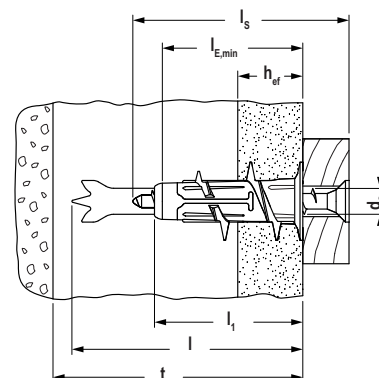




## TECHNICAL DATA



DUOBLADE



Item	Art.-No.	Min. thickness to first support- ing layer t [mm]	Anchor length l [mm]	Anchor length without drill tip l <sub>1</sub> [mm]	Anchorage depth h <sub>ef</sub> [mm]	Min. bolt penetration l <sub>E,min</sub> [mm]	Wood and chip- board screws d <sub>s</sub> / d <sub>s</sub> x l <sub>s</sub> [mm]	Drive	Sales unit [pcs]
<b>DUOBLADE</b>	<b>545675</b>	50	44	29	9,5 - 25	28	4 - 5	—	50
<b>DUOBLADE S</b>	<b>545676</b> <sup>1)</sup>	50	44	29	9,5 - 25	28	4,5 x 40	PZ2	25
<b>DUOBLADE K NV</b>	<b>545683</b>	50	44	29	9,5 - 25	28	4 - 5	—	10
<b>DUOBLADE S K NV</b>	<b>545684</b> <sup>1)</sup>	50	44	29	9,5 - 25	28	4,0 x 46	PZ2	6
<b>DUOBLADE WH K NV</b>	<b>545685</b> <sup>2)</sup>	50	44	29	9,5 - 25	28	4,2 x 40	—	6
<b>DUOBLADE RH K NV</b>	<b>545686</b> <sup>3)</sup>	50	44	29	9,5 - 25	28	4,5 x 40	—	6

1) With chipboard screw countersunk head.

2) With screw with angle hook.

3) With screw with round hook.

## LOADS

### Plasterboard fixing DUOBLADE

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for chipboard screws with the specified diameters.

Type	DUOBLADE	
Chipboard screw	Ø [mm]	4,0 - 5,0
<b>Recommended loads in the respective base material F<sub>rec</sub></b> <sup>2)</sup>		
Gypsum plasterboard	9,5 mm [kN]	0,08
Gypsum plasterboard	12,5 mm [kN]	0,10
Gypsum plasterboard (e.g. Knauf Diamant board or Rigips Die Harte)	12,5 mm [kN]	0,18
Gypsum plasterboard	2 x 12,5 mm [kN]	0,20
Lightweight Cement Board	12,5 mm [kN]	0,08
Gypsum fibreboard	12,5 mm [kN]	0,34

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The fastest installation in gypsum plasterboard



### BUILDING MATERIALS

- Gypsum plasterboard, single and double-planked

### CERTIFICATES



### ADVANTAGES

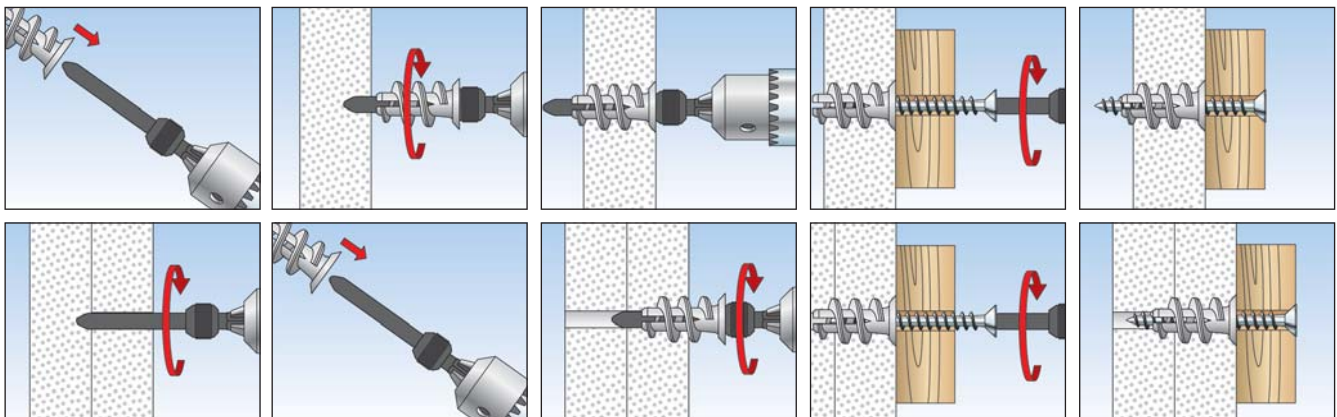
- The included setting tool combines the drilling and fixing setting functions. It thus allows for a fast and simple installation.
- The sharp, self-tapping thread of the GK enables a secure, positive fit fixing. This achieves a high load-bearing capacity.
- The short fixing length means that only a small amount of space is required behind the board. As a result, the GK can also be used in the case of unknown board thickness and cavity depth.
- The cross-drive recess in the head of the fixing means that the GK can also be screwed out like a screw without a setting tool.
- The GK can be used with the most wide-ranging screws, hooks and eye screws. This allows for a broad range of applications.

### APPLICATIONS

- Pictures
- Lighting
- Electrical installations
- Fitting accessories
- Series installations

### FUNCTIONING

- The gypsum plasterboard fixing GK is suitable for pre-positioned installation.
- The GK is screwed flush into the gypsum plasterboard using the setting tool provided. Overtightening the fixing should be avoided. Therefore, the installation torque should be limited when using a battery operated screwdriver.
- Adapted for wood, self-tapping and chipboard screws of 4.0 to 5.0 mm diameter.
- For board thicknesses greater than 15 mm, drill a hole first by using the setting tool.
- Not suitable for gypsum fibreboard and tiled plasterboard.



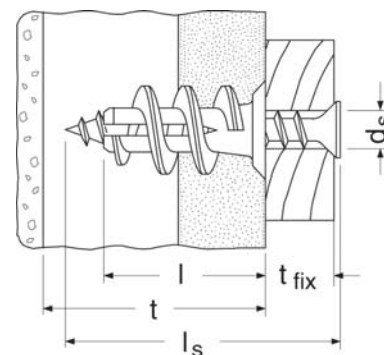
## TECHNICAL DATA



Plasterboard fixing **GK**



Plasterboard fixing **GKS**



Item	Art.-No.	Anchor length l [mm]	Min. thickness to first supporting layer t [mm]	Max. fixture thick- ness t <sub>fix</sub> [mm]	Screw d <sub>s</sub> x l <sub>s</sub> [mm]	Drive	Sales unit [pcs]
<b>GK</b>	<b>052389</b> 1)2)	22	25	—	4,0 - 5,0 x L <sub>s</sub>	—	100
<b>GK S</b>	<b>052390</b> 1)3)	22	25	13	4,5 x 35	PZ2	50

1) Including installation tool GKW.

2) Min. screw length = length of plug 22 mm + thickness of building component.

3) Supplied with plasterboard screw.

## ACCESSORIES



Installation tool **GKW**



**PROFI-BOX GK**

Item	Art.-No.	Contents	Sales unit [pcs]
<b>GKW</b>	<b>052393</b>	-	10
<b>PROFI-BOX GK</b>	<b>518528</b>	50 Plasterboard fixings GK, 1 Installation tool, 38 Chipboard screws 4,5 x 35, 6 Angle hooks 4,2 x 40, 6 Round hooks 4 x 46	1

## LOADS

### Plasterboard fixing GK

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for chipboard screws with the specified diameter.

Type	GK	
Chipboard screw Ø [mm]	4,0 - 5,0	
Recommended loads in the respective base material F <sub>rec</sub> <sup>2)</sup>		
Gypsum plasterboard 9,5 mm [kN]	0,07	
Gypsum plasterboard 12,5 mm [kN]	0,08	
Gypsum plasterboard 2 x 12,5 mm [kN]	0,11	

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The fastest installation in gypsum plasterboard



### BUILDING MATERIALS

- Gypsum plasterboard, single and double-planked

### CERTIFICATES



### ADVANTAGES

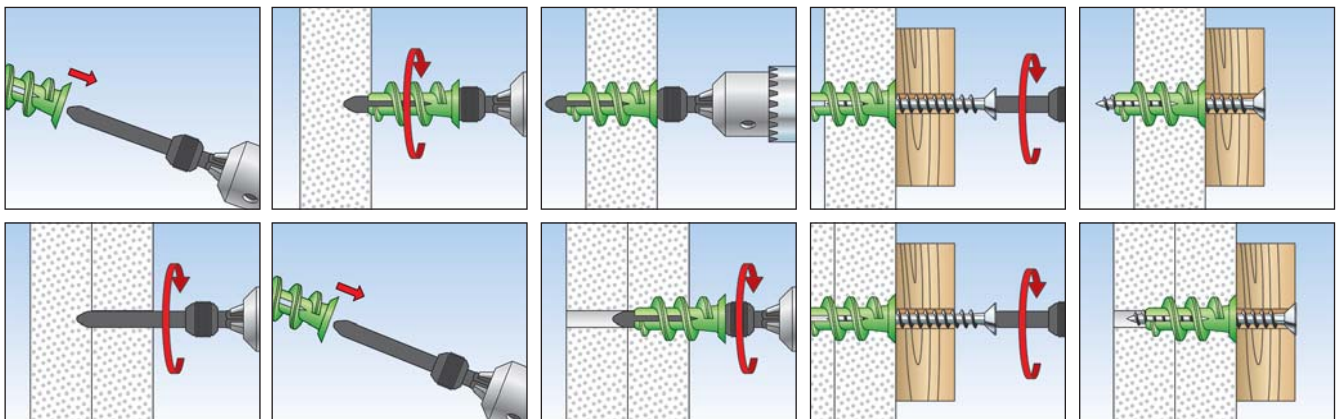
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular GK plugs.
- The included setting tool combine the functions of drilling and setting fixings for direct and easy installation.
- Sharp, self-tapping thread for a positive-fit connection with a high load-bearing capacity.
- The cross-drive recess in the head of the fixing means that the GK GREEN can also easily be screwed out like a screw.
- The GK GREEN can be used with various screws, hooks and eye screws, making it very versatile in its applications.

### APPLICATIONS

- Pictures
- Lighting
- Electrical installations
- Fitting accessories
- Series installations

### FUNCTIONING

- The gypsum plasterboard fixing GK GREEN is suitable for pre-positioned installation.
- The GK GREEN is screwed flush into the gypsum plasterboard using the setting tool provided. Avoid manual and machine-aided overtightening.
- For board thicknesses greater than 15 mm, drill a hole first by using the setting tool.
- Adapted for wood, sheet metal and chipboard screws with a diameter of 4.0 to 5.0 mm.
- Not suitable for gypsum fibreboard and tiled plasterboard.



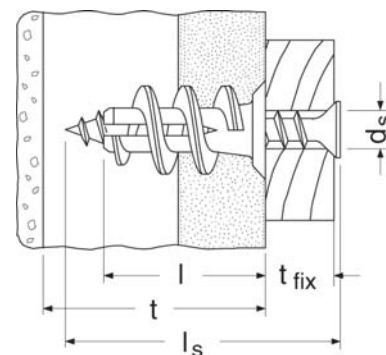
## TECHNICAL DATA



Plasterboard fixing **GK GREEN**



Plasterboard fixing **GK GREEN S**



Item	Art.-No.	Anchor length l [mm]	Min. thickness to first supporting layer t [mm]	Max. fixture thick- ness t <sub>fix</sub> [mm]	Screw d <sub>s</sub> x l <sub>s</sub> [mm]	Drive	Sales unit [pcs]
<b>GK GREEN</b>	<b>524868</b> <sup>1) 2)</sup>	22	25	—	4,0 - 5,0 x L <sub>s</sub>	—	90
<b>GK GREEN S</b>	<b>524869</b> <sup>1) 3)</sup>	22	25	13	4,5 x 35	PZ2	45

1) Including installation tool GKW.

2) Min. screw length = length of plug 22 mm + thickness of building component.

3) Supplied with plasterboard screw.

## ACCESSORIES



Installation tool **GKW**

Item	Art.-No.	Sales unit [pcs]
<b>GKW</b>	<b>052393</b>	10

## LOADS

### Plasterboard fixing GK GREEN

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for chipboard screws with the specified diameter.

Type		GK GREEN	
Chipboard screw	Ø [mm]	4,0 - 5,0	
Recommended loads in the respective base material F <sub>rec</sub> <sup>2)</sup>			
Gypsum plasterboard	9,5 mm	[kN]	0,07
Gypsum plasterboard	12,5 mm	[kN]	0,08
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,11

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

## The self-tapping metal fixing for gypsum plasterboard and gypsum fibreboard



Wall lamps



Speaker cabinets

### BUILDING MATERIALS

- Gypsum fibreboard
- Gypsum plasterboard

### ADVANTAGES

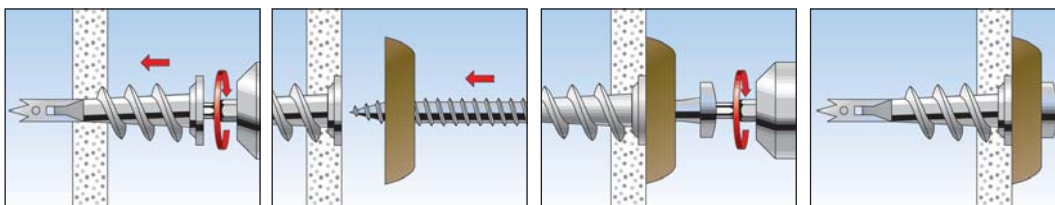
- Due to its material properties, the GKM can be used in gypsum plasterboard and gypsum fibreboard, and can be used with the most wide-ranging screws, hooks and eye screws. This allows for a broad range of applications.
- The sharp, self-tapping thread enables a secure, positive fit fixing. This achieves a high load-bearing capacity.
- The cross-drive recess means that a standard screwdriver or bit can be used. No special setting tool is required.
- The short fixing length means that only a small amount of space is required behind the board. As a result, the GKM can also be used in the case of unknown board thickness and cavity depth.

### APPLICATIONS

- Pictures
- Lighting
- Electrical installations
- Fitting accessories

### FUNCTIONING

- The GKM is suitable for pre-positioned installation.
- The self-tapping metal fixing GKM taps itself into the plasterboard with a positive fit.
- Flush installation in the board building material. Overtightening the fixing should be avoided. Therefore, the installation torque should be limited when using a battery operated screwdriver.
- Adapted for wood, self-tapping and chipboard screws of 4.0 to 5.0 mm diameter.
- Pre-drill with a Ø 8 mm drill bit when using gypsum fibreboard and double-planked gypsum plasterboard.
- Not suitable for tiled plasterboard.

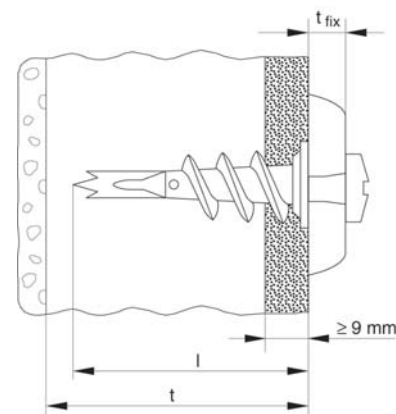




## TECHNICAL DATA



Plasterboard fixing metal **GKM**



Item	Art.-No.	Anchor length l [mm]	Min. thickness to first supporting layer t [mm]	Max. fixture thick- ness t <sub>fix</sub> [mm]	Screw d <sub>s</sub> x l <sub>s</sub> [mm]	Drive	Sales unit [pcs]
<b>GKM</b>	<b>024556</b>	31	35	—	4,0 - 5,0 x Ls	—	100
<b>GKM 12</b>	<b>040432</b> <sup>1)</sup>	31	35	12	4,5 x 35	PZ2	100
<b>GKM 27</b>	<b>040434</b> <sup>2)</sup>	31	35	27	4,5 x 50	PZ2	100

<sup>1)</sup> Supplied with plasterboard screws panhead.

<sup>2)</sup> Supplied with plasterboard screws countersunk head.

## LOADS

### Plasterboard fixing metal GKM

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for chipboard screws with the specified diameter.

Type		GKM	
Chipboard screw	Ø [mm]	4,0 - 5,0	
Recommended loads in the respective base material F <sub>rec</sub> <sup>2)</sup>			
Gypsum plasterboard	9,5 mm	[kN]	0,07
Gypsum plasterboard	12,5 mm	[kN]	0,08
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,11






















<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.





# 8 Electrical fixings

		Page
Locking clip SCN		416
Pipe clip RC		418
Pipe clip FC		420
Saddle clip SCH		422
Fastening tie FF		424
ClipFix plus LS/ES/ZS		426
ClipFix plus SD		428
Cable clasp KB		430
Cable harness SHA		432
Multi cable support metal SHA M		434
Wall slot clip FWSC		436
Nail disc NSB		437
Nail clip NS/MNS		439
Spacer pipe clamp AM		441
Conduit clip BSM		443
Textile web strapping GWB		445
Perforated steel banding LBV / LBK		446
Impact nail ED		447
Cable tie BN/UBN		449
Cable tie plug FCTP		451
Wireclip		452

## The easy-to-install and secure locking clip for fixing of pipes



Plastic pipes



Plastic pipes

### BUILDING MATERIALS

When using 2-component DUOPO-WER plug:

- Concrete
- Solid brick
- Solid sand-lime brick
- Aerated concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Plasterboard
- Gypsum plasterboard and gypsum fibreboards
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete or similar
- Natural stone
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

### CHARACTERISTICS



### ADVANTAGES

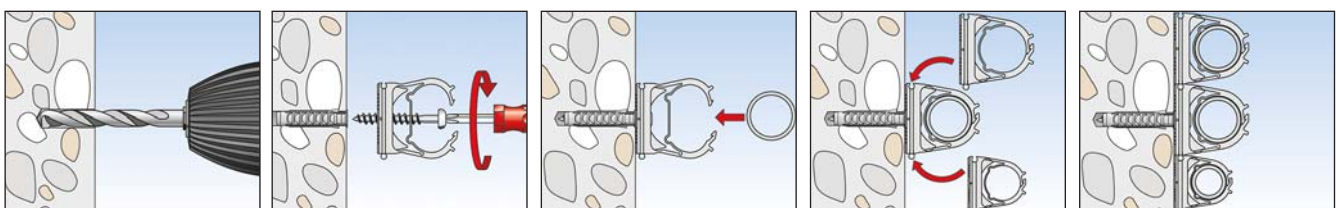
- When pressing, the locking clip SCN automatically embraces and locks the pipe, thus enabling convenient installation.
- The mechanical lock provides a secure and reopenable fixing.
- The integrated slotted hole allows for an easy and adjustable installation.
- The double-sided couplings allow several clips to be coupled together. This saves installation time and money.
- Flexible mounting with plugs and screws or with 11 mm C-profile rails.
- The durable nylon material is halogen- and silicone-free, allows year-round use even under frost and thus ensures a high level of safety.

### APPLICATIONS

- Plastic, empty pipes
- Flexible and rigid electric tubes
- Aluminium-, copper- and steel pipes

### FUNCTIONING

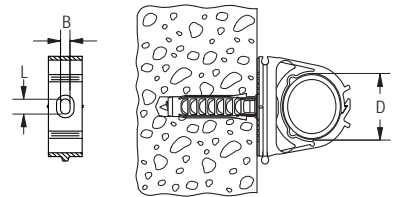
- The locking clip SCN is fixed in pre-positioned installation with a suitable plug and screw or in 11 mm C-profile rails.
- Due to the mechanical locking, the pipes are securely fixed with the clip.
- Installation temperature -20 °C + 60 °C
- Temperature resistance when installed -40 °C to +80 °C.



TECHNICAL DATA

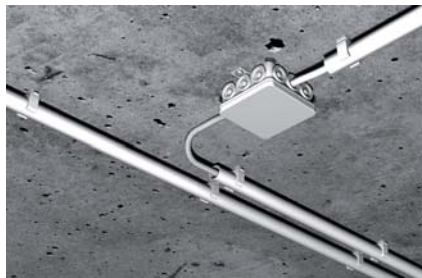


Locking clip SCN



		Pipe to wall distance	Clamping range	Dimension of slot	Sales unit			
Item	Art.-No.	[mm]	D [mm]	B x L [mm]	[pcs]			
SCN 16	501261	11	16	4,5 x 4,5	100			
SCN 20	501262	11	20	4,5 x 6,5	100			
SCN 25	501263	11	25	4,5 x 6,5	50			
SCN 32	501264	13	32	4,5 x 7,5	50			
SCN 40	501265	13	40	4,5 x 7,5	25			
SCN 50	501266	14	50	4,5 x 7,5	25			

## The convenient pipe fixing



Fixing plastic insulating conduits



Fixing plastic insulating conduits

### BUILDING MATERIALS

#### When using ClipFix SD:

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

### CHARACTERISTICS



### ADVANTAGES

- The pipe clip RC can be used with pre-installed clip fixing SD, with Hammerfix N 6 or in 11 mm C-shaped profile-rails, and thus allows for a flexible and cost-effective installation.
- The 6 mm-long hole allows for the optimal alignment of the pipe fixing and ensures a more user-friendly installation.
- Two additional pipe clips can be added to the sides of a pre-fixed pipe clip. This saves assembly time and materials.
- The long-lasting nylon material is halogen- and silicone-free. It can be used all year round, including during a frost. This ensures a high level of safety.

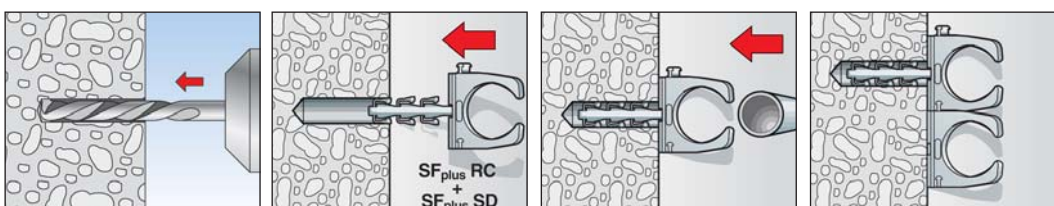
### APPLICATIONS

#### For fixing of:

- Flexible and rigid plastic insulating pipes

### FUNCTIONING

- Plastic insulation pipes are laid into the pipe clip. The pre-tensioning of the pipe clip holds the pipes securely.
- The pipe clip RC is adapted to be fixed with either clip fixing SD or Hammerfix N 6.
- Manually place the ClipFix plus SD directly into the drill hole. No additional screws are needed.
- The Hammerfix N is expanded when the nail is driven in, and holds by friction in the drill hole.
- Temperature resistance once installed from -20 °C to +80 °C.





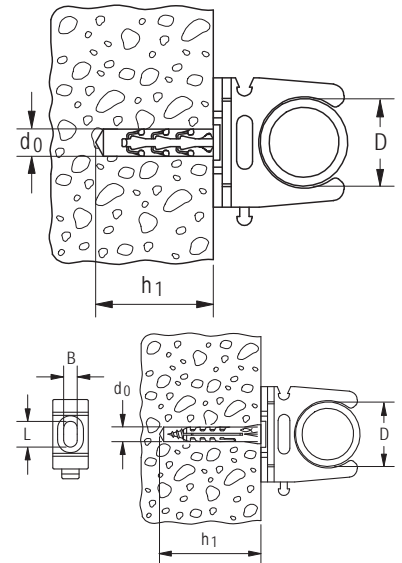
## TECHNICAL DATA



Clipfix plus pipe clip **RC**



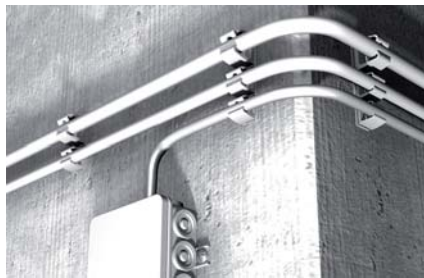
Pipe clip **RC PG**



Item	Art.-No.	Drill hole $d_0$ [Ø mm]	Min. drill hole depth $h_1$ [mm]	Suitable for IEC	Clamping range  D [mm]	Dimension of slot  B x L [mm]	Sales unit  [pcs]
<b>SF plus RC IEC 12</b>	<b>048190</b>	6	35	12	12 - 13	6 x 7	100
<b>SF plus RC IEC 16</b>	<b>048191</b>	6	35	16	15 - 16	6 x 8	100
<b>SF plus RC IEC 20</b>	<b>048193</b>	6	35	20	20 - 21	6 x 10	100
<b>SF plus RC IEC 25</b>	<b>048197</b>	6	35	25	24 - 25	6 x 10	50
<b>SF plus RC IEC 32</b>	<b>048198</b>	6	35	32	31 - 32	6 x 10	25
<b>SF plus RC IEC 40</b>	<b>048199</b>	6	35	40	38 - 40	6 x 10	25
<b>RC IEC 12</b>	<b>058194</b>	—	—	12	12 - 13	6 x 7	100
<b>RC IEC 16</b>	<b>058120</b>	—	—	16	15 - 16	6 x 8	100
<b>RC IEC 20</b>	<b>058122</b>	—	—	20	20 - 21	6 x 10	100
<b>RC IEC 25</b>	<b>058198</b>	—	—	25	24 - 25	6 x 10	50
<b>RC IEC 32</b>	<b>058199</b>	—	—	32	31 - 32	6 x 10	40
<b>RC IEC 40</b>	<b>058200</b>	—	—	40	39 - 40	6 x 10	40
<b>RC IEC 50</b>	<b>079194</b> <sup>1</sup>	—	—	50	50 - 51	6 x 10	20
<b>RC IEC 63</b>	<b>079196</b> <sup>1</sup>	—	—	63	62 - 64	6 x 10	15

1) Does not include latching catches, therefore cannot be mounted side by side.

## The flexible pipe clip for various diameters



Cable fixing



Fixing plastic insulating conduits

### BUILDING MATERIALS

#### When using Hammerfix N:

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Building brick
- Natural stone
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

### CHARACTERISTICS



### ADVANTAGES

- The flexible pipe clip socket ensures a secure hold for various cable and pipe diameters, and reduces the number of products required.
- The pipe clip FC can be installed with both N 5 Hammerfixes and 11 mm-C-shaped profile-rails, and thus offers great flexibility.
- Two additional pipe clips can be added to the sides of a pre-fixed clip clamp. This saves assembly time and materials.
- The long-lasting nylon material is halogen-free. It can be used all year round, including during a frost. This ensures a high level of safety.

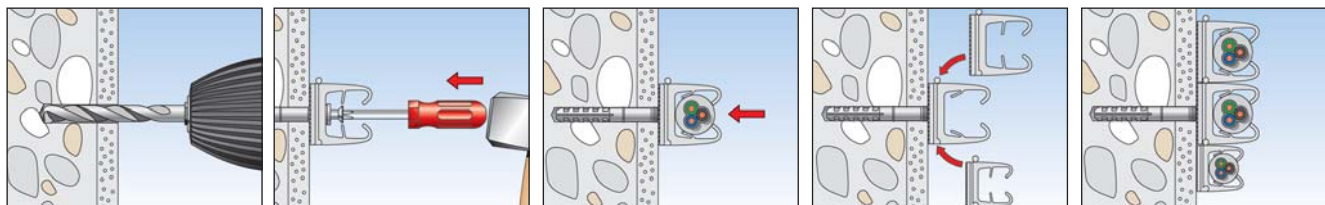
### APPLICATIONS

#### For fixing of:

- Electric cables
- Flexible and rigid plastic insulating pipes

### FUNCTIONALITY

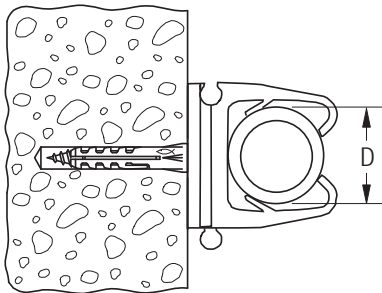
- The clip clamp FC is adapted to suit the fixture using N5 Hammerfixes.
- The Hammerfix N is expanded when the nail is driven in, and holds by friction in the drill hole.
- The cables or pipes are then laid in the clip clamp FC. The pre-tensioning of the clip clamp holds the cables or pipes securely.
- Temperature resistance once installed from -40 °C to +80 °C.



TECHNICAL DATA

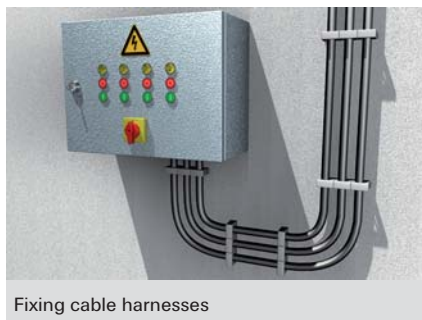


Pipe clip **FC**

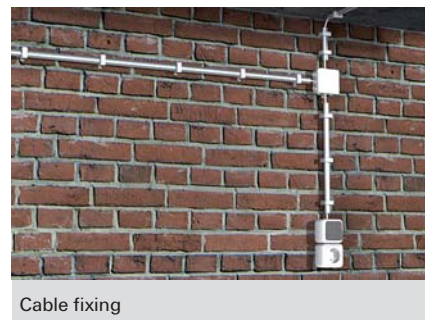


Item	Art.-No.	Clamping range D [mm]	Sales unit [pcs]					
FC 6 - 9 GR	068060	6 - 9	100					
FC 9 - 12 GR	068062	9 - 12	100					
FC 12 - 16 GR	068064	12 - 16	50					
FC 16 - 20 GR	068066	16 - 20	25					

## The flexible cable clamp for various diameters



Fixing cable harnesses



Cable fixing

### BUILDING MATERIALS

#### When using Hammerfix N:

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Building brick
- Natural stone
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

### CHARACTERISTICS



### ADVANTAGES

- With its elastic spring tabs, the saddle clip SCH can bear different cable diameters. This increases flexibility and reduces the number of products required.
- Additional clips can be added to the sides of a pre-fixed clip. This saves installation time and materials.
- The long-lasting nylon material is halogen- and silicone-free. It can be used all year round, including during a frost. This ensures a high level of safety.

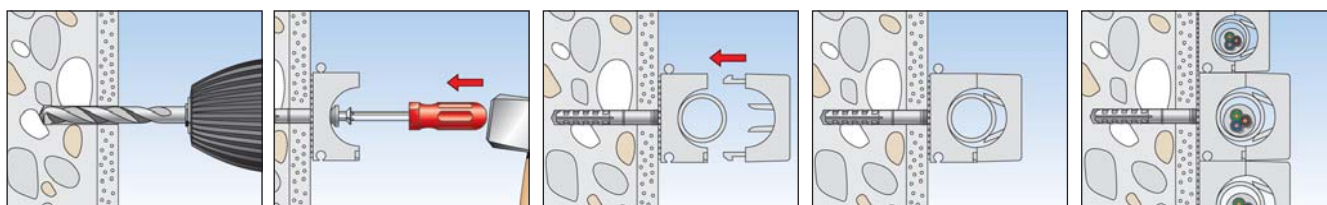
### APPLICATIONS

#### For fixing of:

- Electric cables
- Flexible and rigid plastic insulating pipes

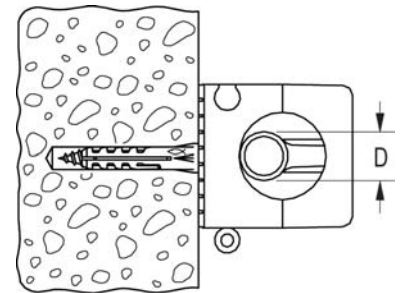
### FUNCTIONALITY

- The clamp SCH is adapted to suit the fixture using N 5 Hammerfixes.
- The Hammerfix N is expanded when the nail is driven in, and holds by friction in the drill hole.
- The cables or pipes are then laid in the clamp SCH and fixed by inserting the locking latch.
- The internal tabs adapt to fit various cable or pipe diameters.
- Temperature resistance once installed from -40 °C to +80 °C.





Saddle **SCH**, colour: Nylon transparent



Saddle **SCH**, colour: grey RAL 7035

	Art.-No.		Clamping range D [mm]	Dimension of insulated pipes	Sales unit [pcs]			
	Grey RAL 7035	Nylon trans- parent						
<b>SCH 812</b>	<b>068012</b>	<b>060012</b>	8 - 12	6 x 1 - 8 x 1	100			
<b>SCH 1216</b>	<b>068016</b>	<b>060016</b>	12 - 16	10 x 1 - 12 x 1	50			
<b>SCH 1619</b>	<b>068019</b>	<b>060019</b>	16 - 19	—	50			
<b>SCH 1623</b>	<b>068023</b>	<b>060023</b>	16 - 23	15 x 1 - 18 x 1	50			
<b>SCH 2332</b>	<b>068032</b>	<b>060032</b>	23 - 32	22 x 1 - 22 x 1,5	25			
<b>SCH 3242</b>	—	<b>060042</b>	32 - 42	22 x 1 - 22 x 1,5	25			

## Fixing tie for bundling and fixing of cables and pipes to the substrate



Electric cables



Plastic pipes

### BUILDING MATERIALS

When using 2-component DUOPO-WER plug:

- Concrete
- Solid brick
- Solid sand-lime brick
- Aerated concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Plasterboard
- Gypsum plasterboard and gypsum fibreboards
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete or similar
- Natural stone
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

### CHARACTERISTICS



### ADVANTAGES

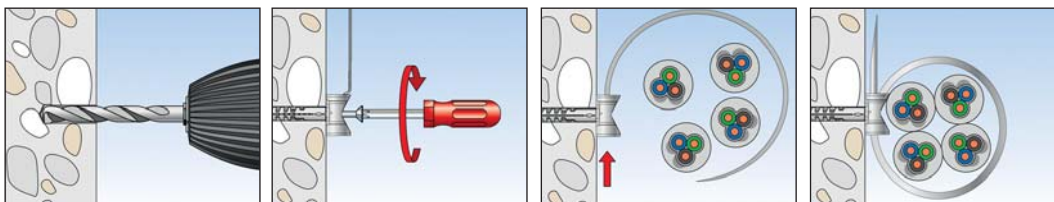
- The socket of the FF fixing tie is fixed to the substrate with a screw or screw and plug.
- The fixing tie can be used to bundle and fix several cables or pipes.
- Adjustable diameter of the tie loop.
- The socket of the fixing tie can be adjusted through its slotted hole.

### APPLICATIONS

- For bundling and fixing of:
- Electric cables
  - Flexible and rigid electric tubes
  - Steel conduits

### FUNCTIONING

- The Socket of the fixing tie is fixed with the plug and screw suitable for the substrate.
- Recommended application temperature -20 °C to +60 °C.
- Temperature resistant when installed -40 °C to +80 °C.

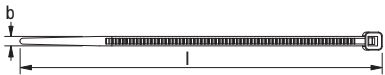




TECHNICAL DATA



Fastening tie FF



Item	Art.-No.	Length l [mm]	Dimension fixing base [mm]	For cables and pipes from / to d <sub>min</sub> - d <sub>max</sub> [Ø mm]	max. screw diameter [mm]	Sales unit [pcs]		
FF 8 - 32	519808	172	25 x 15 x 20	8 - 32	4.5	80		
FF 16 - 63	519809	270	25 x 15 x 20	16 - 63	4.5	40		

## The user-friendly clip fixing for pipes and conduits



### BUILDING MATERIALS

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

### CHARACTERISTICS



### ADVANTAGES

- The complete element combines anchor, screw and clamp. This saves materials, allows for one-handed installation, and reduces assembly time.
- The slimline geometry of the fixing element only protrudes slightly, thus saving space.
- The three different sizes of each of the cable strap LS, twin clamp ZS and single clamp ES cover a range of cable diameters, thus reducing storage.
- The long-lasting nylon material is flame resistant, halogen- and silicone-free, can be used all year round, including during a frost. This ensures a high level of safety.

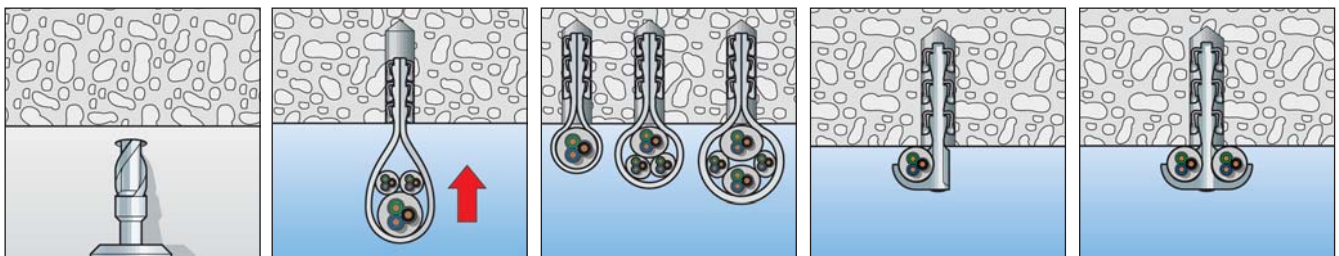
### APPLICATIONS

#### For fixing of:

- Individual electric cables
- Cable bundles
- Flexible pipes
- Rigid plastic pipes

### FUNCTIONING

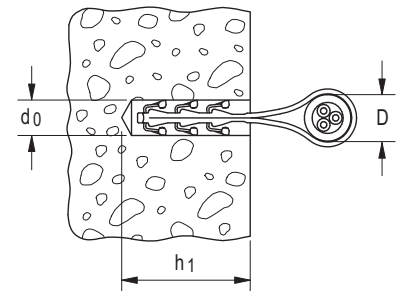
- The clip fixing is set into the drill hole without the need for any additional screws and fixes the pipe directly to the base material.
- The clamping force of the locking catch allows the ClipFix to hold itself in the drill hole.
- Place the clasp of the cable strap LS into the drill hole so that it is level and the teeth grip.
- Recommended loads (required safety factor considered): cable strap LS up to 6 kg, twin clamp ZS and single clamp ES up to 11 kg.
- Temperature resistance once installed from -20 °C to +80 °C.



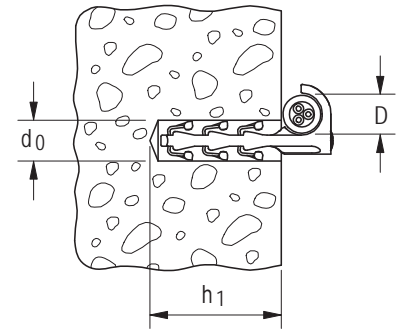
## TECHNICAL DATA



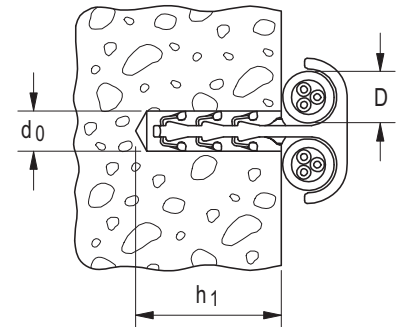
Clip fix plus cable strap **SF plus LS**



Clip fix plus single clamp **SF plus ES**



ClipFix plus twin clamp **SF plus ZS**

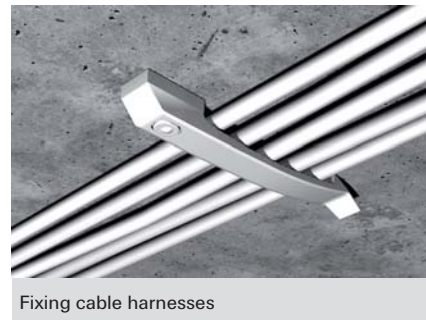


Item	Art.-No.	Drill hole $d_0$ [Ø mm]	Min. drill hole depth $h_1$ [mm]	Clamping range $D$ [mm]	Sales unit [pcs]			
<b>SF plus LS 3/13</b>	<b>058155</b>	6	35	3 - 13	100			
<b>SF plus LS 8/28</b>	<b>058156</b>	6	50	8 - 28	100			
<b>SF plus LS 20/40</b>	<b>058157</b>	6	50	20 - 40	100			
<b>SF plus ES 10</b>	<b>048151</b>	6	40	3 - 12	100			
<b>SF plus ES 18</b>	<b>048152</b>	6	40	10 - 25	100			
<b>SF plus ES 28</b>	<b>058183</b>	6	40	15 - 31	100			
<b>SF plus ZS 10</b>	<b>058184</b>	6	35	3 - 12	100			
<b>SF plus ZS 18</b>	<b>048161</b>	6	40	10 - 25	100			
<b>SF plus ZS 28</b>	<b>048162</b>	6	40	15 - 31	75			

## The user-friendly clip fixing for cable ducts and cable clasps



Fixing cable ducts



Fixing cable harnesses

### BUILDING MATERIALS

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

### CHARACTERISTICS



### ADVANTAGES

- The ClipFix plus SD combines anchor and screw. This saves on materials and makes it easier to affix cable ducts that are difficult to access without the need for additional tools.
- The simple clip fixing reduces installation time.
- The extended shank of the FS plus SD 40 allows bridging of non-bearing plaster layers, as well as the fixing of thicker attachments.
- The long-lasting nylon material is flame resistant, halogen- and silicone-free. It can be used all year round, including during a frost. This ensures a high level of safety.

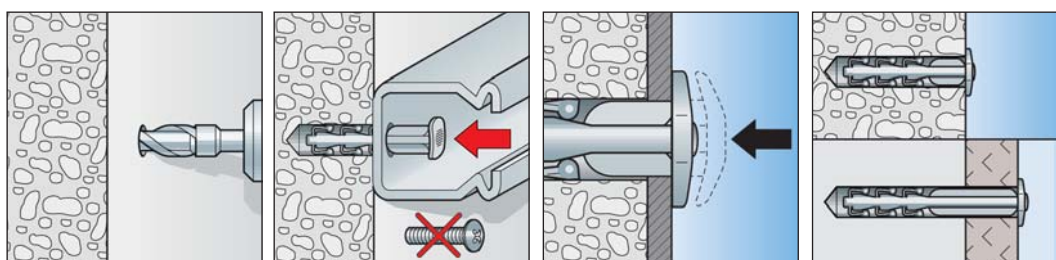
### APPLICATIONS

#### For fixing of:

- Cable channels
- Cable clasps
- Installation base cable harness
- Flat building components

### FUNCTIONING

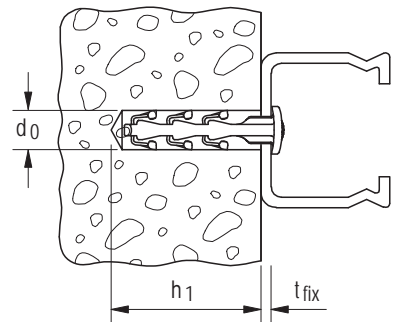
- To fix, manually place the ClipFix plus SD directly into the drill hole. No additional screws are needed.
- The clamping force of the locking catch allows the ClipFix to hold itself in the drill hole.
- Recommended loads (required safety factor considered): clip fixing SD up to 11 kg.
- Temperature resistance once installed from -20 °C to +80 °C.



TECHNICAL DATA

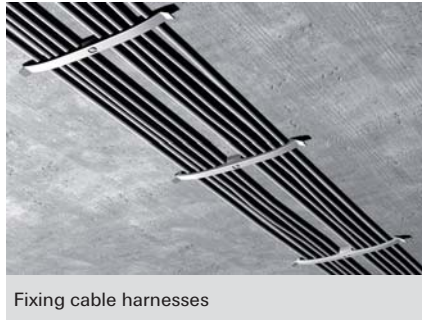


fischer ClipFix plus clip fixing **SF plus SD**

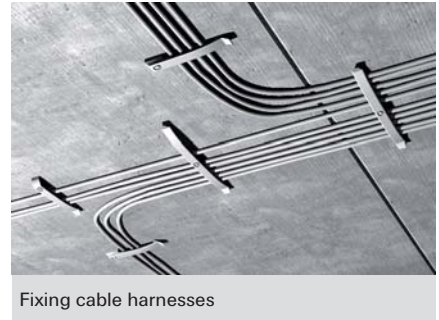


Item	Art.-No.	Drill hole $d_0$ [Ø mm]	Min. drill hole depth $h_1$ [mm]	Max. usable length $t_{fix}$ [mm]	Sales unit [pcs]			
SF plus SD 30	058178	6	35	4	200			
SF plus SD 40	058179	6	35	15	100			

## The flat cable clasp for space-saving cable fixing



Fixing cable harnesses



Fixing cable harnesses

### BUILDING MATERIALS

#### When using ClipFix SD:

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

### CHARACTERISTICS



### ADVANTAGES

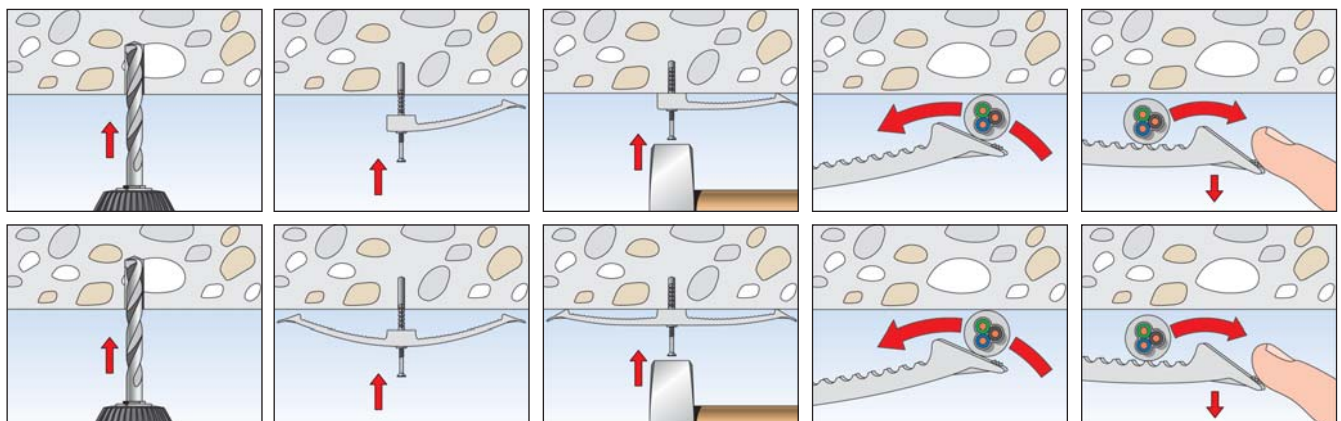
- The flat design of the KB cable clasp allows for a space-saving cable fixing, and simplifies subsequent cable-laying.
- The combination of cable clasp KB and ClipFix SD allows for one-handed installation, thus enabling a flexible and economic installation.
- The long-lasting nylon material is halogen- and silicone-free. It can be used all year round, including during a frost. This ensures a high level of safety.

### APPLICATIONS

- For the fixing of several individual cables

### FUNCTIONALITY

- The cable clasp KB is adapted to suit the fixture with clip fixing SD or Hammerfix N6.
- Place the ClipFix plus SD directly into the drill hole by hand. No additional screws are needed.
- The Hammerfix N is expanded when the nail is driven in, and holds by friction in the drill hole.
- After installation, the cables are pulled under the clasp. Additional cables can be easily laid after installation too.
- Temperature resistance once installed from -20 °C to +80 °C.





## TECHNICAL DATA



Cable clasp with nailplug **KB N 8**



Cable clasp with nailplug **KB N 16**



ClipFix plus cable clasp **SF plus KB 8**



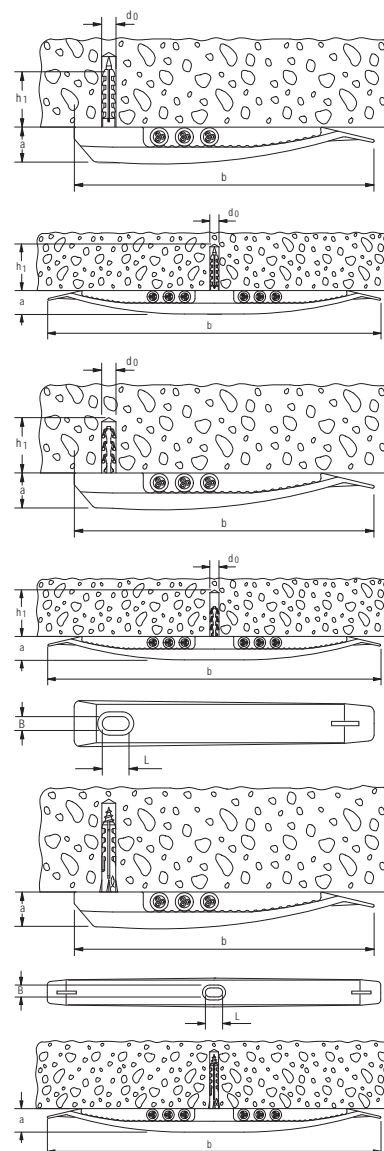
ClipFix plus cable clasp **SF plus KB 16**



Cable clasp **KB 8**

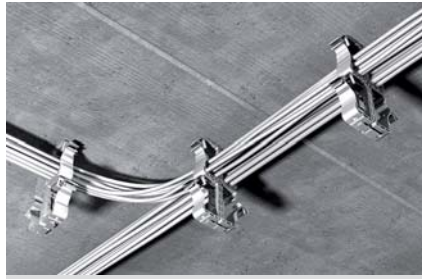


Cable clasp **KB 16**

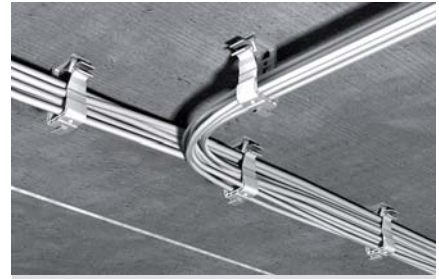


Item	Art.-No.	Drill hole $d_0$ [Ø mm]	Min. drill hole depth $h_1$ [mm]	Dimensions $a \times b$ [mm]	Dimension of slot $B \times L$ [mm]	Max. number of ducts	Sales unit [pcs]
<b>KB N 8</b>	<b>545522</b>	6	35	15 x 133	6 x 10	8 ducts NYM 3 x 1,5	50
<b>KB N 16</b>	<b>545523</b>	6	35	15 x 133	6 x 10	16 ducts NYM 3 x 1,5	25
<b>SF plus KB 8</b>	<b>048171</b>	6	35	15 x 133	6 x 10	8 ducts NYM 3 x 1,5	50
<b>SF plus KB 16</b>	<b>048172</b>	6	35	15 x 230	6 x 10	16 ducts NYM 3 x 1,5	25
<b>KB 8</b>	<b>058135</b>	—	—	15 x 133	6 x 10	8 ducts NYM 3 x 1,5	50
<b>KB 16</b>	<b>058136</b>	—	—	15 x 230	6 x 10	16 ducts NYM 3 x 1,5	50

## The adaptable cable harness for fixing cable bundles



Fixing cable bundles



Fixing cable bundles

### BUILDING MATERIALS

#### When using ClipFix SD:

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

### CHARACTERISTICS



### ADVANTAGES

- Simple bundling and economical laying of multiple electric cables.
- The seal of the cable harness SHA makes it easy to lay cables at a later date, thus ensuring high user-friendliness.
- Combining several SHA cable harnesses allows for a cost-effective fixing of cables to just one MS installation base.
- The MS installation base allows for various fixing options, and offers great flexibility for the installation.
- The long-lasting nylon material is halogen- and silicone-free, can be used all year round, including during a frost, and thus ensures a high level of safety.

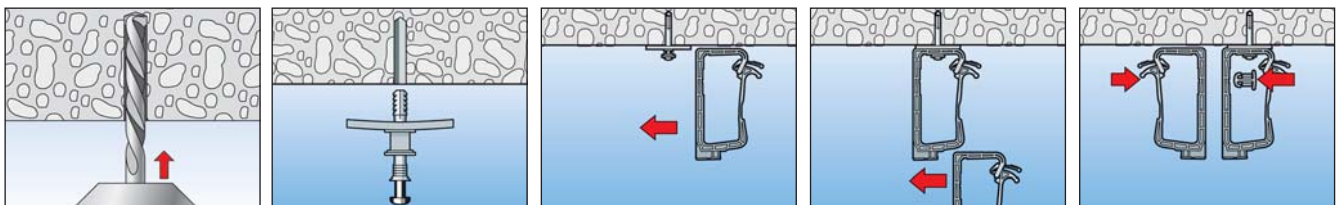
### APPLICATIONS

#### For fixing of:

- Electric cables, loose and bundled

### FUNCTIONING

- Cable bundles can be laid in the cable harness SHA. The seal makes it easy to lay cables at a later date.
- The cable harness SHA can either be affixed with ClipFix plus, installation base MS or with plugs and screws.
- Several SHA cable harnesses can be combined below one another.
- The SHA cable harnesses can also be lined up adjacent to one another with the connection piece SHA KP.
- The maximum installation distance of 80 cm must not be exceeded.
- Temperature resistance once installed from -20 °C to +80 °C.



## TECHNICAL DATA



Cable harness **SHA**



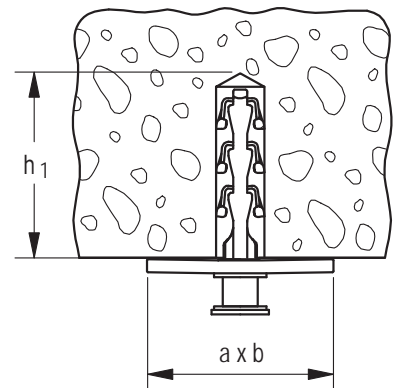
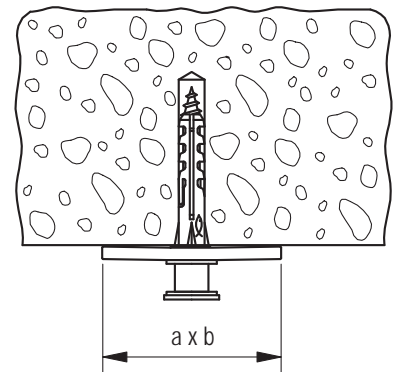
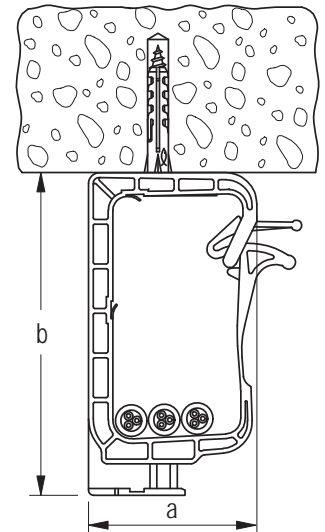
Installation base **SHA MS**



Steckfix plus installation base **SF plus MS**



Connection piece **SHA KP**



Item	Art.-No.	Drill hole $d_0$ [Ø mm]	Min. drill hole depth $h_1$ [mm]	Dimensions $a \times b$ [mm]	Max. number of ducts	Sales unit [pcs]	
<b>SHA 15</b>	<b>058139</b>	—	—	93 x 49	15 ducts NYM 3 x 1,5	50	
<b>SHA 30</b>	<b>058140</b>	—	—	128 x 59	30 ducts NYM 3 x 1,5	25	
<b>SHA MS</b>	<b>058141</b>	—	—	41 x 27	connection piece	50	
<b>SF plus MS</b>	<b>048181</b>	6	35	41 x 27	installation base with clip-plug	50	
<b>SHA KP</b>	<b>058142</b>	—	—	—	installation base	50	

## Metal multi-cable support with high mechanical resistance and approval



Cable fixing to the ceiling



Cable fixing to the wall

### ADVANTAGES

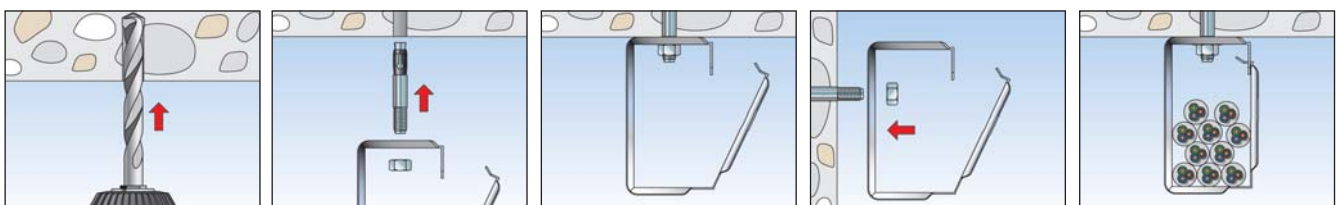
- The fischer metal multi cable support SHA M has a high mechanical strength and thus offers a long service life and safety in the event of fire.
- It is approved as a cable-specific variant for circuit integrity maintenance of electric cable systems in accordance with DIN 4102 Part 12.
- This makes it suitable for safe installation above fire protection ceilings.
- Depending on the version, 15, 30 or 70 cables can be fixed.
- The lock, which can be operated without tools, allows easy subsequent cable-laying and thus ensures a high degree of ease of installation.
- The multi cable support is variably suitable for wall and ceiling installation.
- Halogen-free and without fire load.

### APPLICATIONS

- Fixing of cables with circuit integrity maintenance.
- Installation of electrical cables above fire protection ceilings.

### FUNCTIONING

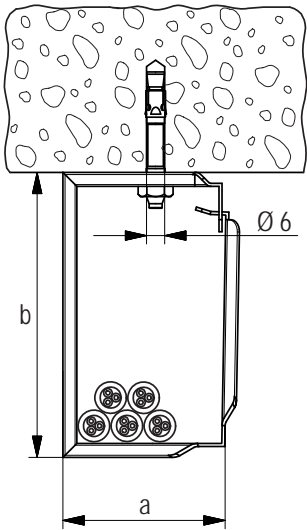
- The multi cable support is fixed to walls or ceilings with plugs and screws or metal anchors suitable for the substrate and application.



TECHNICAL DATA



Multi cable support metal **SHA M**



Item	Art.-No.	Mounting pipe Ø [mm]	Dimension in [mm]	Max. number of ducts	Sales unit [pcs]
SHA M 15	544933	6	66,7 x 41,9 x 30,6	15 ducts NYM 3 x 1,5	50
SHA M 30	544934	6	92,8 x 58,1 x 33,6	30 ducts NYM 3 x 1,5	25
SHA M 70	544935	6	126,0 x 104,0 x 80,0	70 ducts NYM 3 x 1,5	10

## The quick tool-free cable fixing in wall slots



Cable fixing in wall slots > 30 mm



Cable fixing in wall slots < 55 mm

### BUILDING MATERIALS

- Concrete
- Masonry

### ADVANTAGES

- With the fischer FWSC wall slot clip, cables can be fixed quickly and without tools in wall slots 20 to 60 mm wide.
- This reduces installation time by up to 50%.
- The high expansion power of the wall slot clip guarantees a reliable fixing of the cables.
- Damage to the cables can be excluded due to the expansion principle.
- Thanks to its neutral colour, the wall slot clip does not shine through the plaster.
- The wall slot clip is made of halogen-free material.

### APPLICATIONS

- Fixing of cables in wall slots of 20 - 60 mm width.

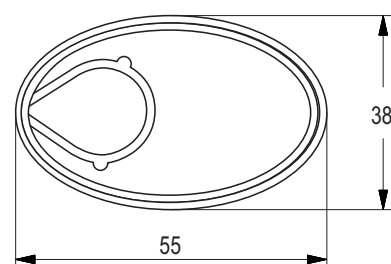
### FUNCTIONING

- The cables to be fastened are inserted into the wall slot.
- By pressing together the wall slot clip is compressed and tensed to be ready for installation in the wall slot.
- The wall slot clip can be compressed in length or width as required and thus used for wall slots with a width of 20 to 60 mm.

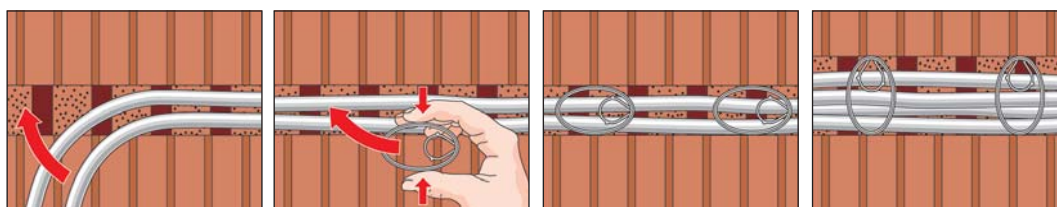
### TECHNICAL DATA



Wall slot clip **FWSC**



Item	Art.-No.	Max. slot width [mm]	Dimension in [mm]	Sales unit [pcs]			
<b>FWSC 20 - 60</b>	<b>545792</b>	60	38 x 60 x 4	50			





## The secure cable fixing in wall slots



### BUILDING MATERIALS

- Vertically perforated brick
- Pumice
- Lightweight aggregate concrete
- Aerated concrete
- Hardboard
- Wood
- Chipboard
- Plywood
- Solid panel made from gypsum

### ADVANTAGES

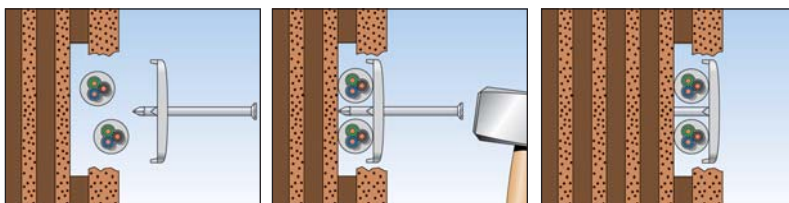
- The nail disc NSB allows for use in two slot widths.
- The vaulted structure of the nail disc ensures an optimal contact pressure and, as such, for a secure hold.
- The flat nail disc only protrudes slightly, and can thus be easily plastered over.
- The nail disc NSB is made from high-strength polypropylene. The nail is made from hardened, galvanised steel. The tried and tested material combination for in-wall installation.

### APPLICATIONS

- For fixing cables in wall slots

### FUNCTIONALITY

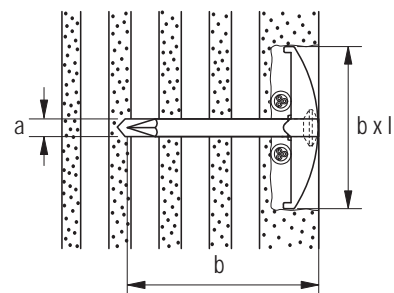
- Remove cable.
- Align the nail disc with either dimensions 27 mm or 34 mm, depending on the slot width, and hit the nail in with a hammer.
- The cables are fixed in the wall slots by the curved washer.



## TECHNICAL DATA



Nail disc **NSB**



Item	Art.-No.	Dimension of nail	Dimension of disc	Sales unit				
		a x b [mm]	b x l [mm]	[pcs]				
<b>NSB 2/40</b>	<b>048308</b>	2 x 40	27 x 34	200				
<b>NSB 2/50</b>	<b>048309</b>	2 x 50	27 x 34	150				
<b>NSB 2/60</b>	<b>048310</b>	2 x 60	27 x 34	100				
<b>NSB 3/40</b>	<b>048311</b>	3 x 40	27 x 34	150				
<b>NSB 3/50</b>	<b>048312</b>	3 x 50	27 x 34	150				
<b>NSB 3/60</b>	<b>048313</b>	3 x 60	27 x 34	100				

## The fast fixing for electric cables



### BUILDING MATERIALS

- Hardboard
- Wood
- Aerated concrete
- Chipboard
- Plywood
- Solid gypsum panels and other plastered substrates

### ADVANTAGES

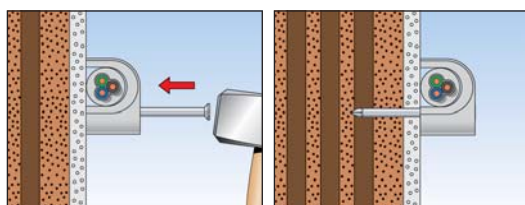
- The nail clip features a pre-assembled zinc-plated nail, allowing for a fast fixing, thus reducing assembly time.
- The small space required for fixing simplifies installation in narrow spaces.
- The nail clip MNS covers cable diameters from 4 mm to 14 mm with just 3 sizes.

### APPLICATIONS

- To fix single electric cables with varying diameters

### FUNCTIONING

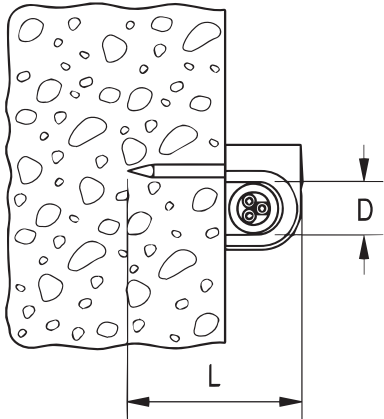
- Position the nail clip with the laid cable. Hammer in the pre-assembled nail with a hammer.



TECHNICAL DATA



Nail clip **NS**



Nail clip **MNS**

Item	Art.-No.	For cable [Ø mm]	Clamping range D [mm]	Length of nail L [mm]	Sales unit [pcs]			
NS 7	058173	7	7	25	100			
NS 8	058174	8	8	25	100			
NS 9	058175	9	9	25	100			
NS 10	058176	10	10	30	100			
NS 12	058177	12	12	35	100			
MNS 4-7	094673	–	4 - 7	25	100			
MNS 7-11	094674	–	7 - 11	25	100			
MNS 10-14	094675	–	10 - 14	30	100			

## The installation-friendly metal spacing disc for cables and pipes



Fixing steel armoured conduits



Fixing conduits

### BUILDING MATERIALS

#### When using nail anchor FNA II:

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Pre-stressed concrete hollow slabs

#### When using Hammerfix N:

- Concrete
- Solid sand-lime brick
- Building brick
- Natural stone
- Solid brick made from lightweight concrete

### ADVANTAGES

- The fast-locking latch ensures easy opening and closing without completely removing the screw, and allows for a simple and fast installation.
- The pre-fitted combination screw with conventional slotted or recessed screw head allows for the use of different screwdrivers, thus allowing for a simple installation.

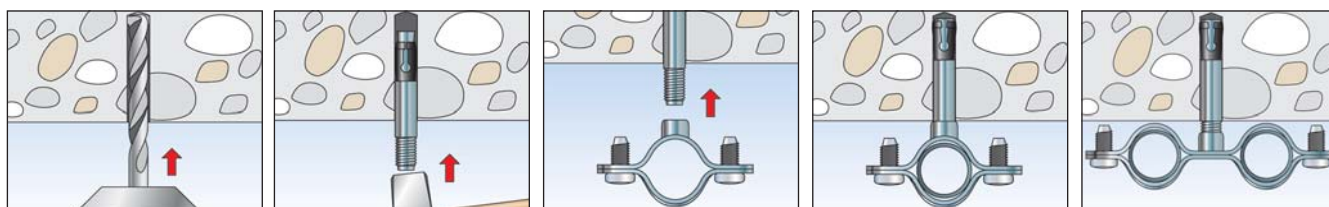
### APPLICATIONS

#### For fixing of:

- Steel conduits
- Electric cables
- Copper and metal pipes

### FUNCTIONING

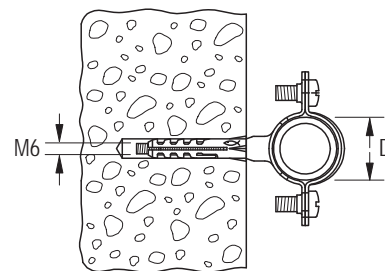
- The spacer clamp AM with M6 thread can either be affixed with fischer nail anchor FNA II 6x30 M6x43, stud screw STST 6x60 and STST 6x80 or with Hammerfix N 6x40/10 M6.



## TECHNICAL DATA



Metal two-piece pipe clamp **AM**

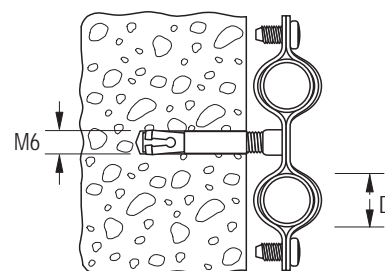


Item	Art.-No.	Dimension IEC	Clamping range D [mm]	Sales unit [pcs]				
<b>AM 8</b>	<b>060185</b>	—	8 - 10	50				
<b>AM 10</b>	<b>060186</b>	—	10 - 11	50				
<b>AM 12</b>	<b>060187</b>	12	12 - 13	50				
<b>AM 14</b>	<b>060188</b>	—	14 - 15	50				
<b>AM 16</b>	<b>060189</b>	16	15 - 17	50				
<b>AM 18</b>	<b>060190</b>	—	18 - 19	50				
<b>AM 20</b>	<b>060191</b>	20	20 - 21	50				
<b>AM 22</b>	<b>060192</b>	—	22 - 23	50				
<b>AM 24</b>	<b>060193</b>	—	24 - 25	50				
<b>AM 26</b>	<b>060194</b>	25	26 - 27	50				
<b>AM 28</b>	<b>060195</b>	—	28 - 29	50				
<b>AM 30</b>	<b>060196</b>	—	30 - 31	50				
<b>AM 32</b>	<b>060209</b>	32	32 - 33	25				
<b>AM 34</b>	<b>060210</b>	—	34 - 35	25				
<b>AM 37</b>	<b>060211</b>	37	37 - 39	20				
<b>AM 40</b>	<b>090849</b>	40	40 - 42	15				
<b>AM 50</b>	<b>090850</b>	50	50 - 52	10				
<b>AM 63</b>	<b>090851</b>	63	63 - 65	10				

## TECHNICAL DATA



Metal two-piece pipe clamp **AMD**



Item	Art.-No.	Clamping range D [mm]	Sales unit [pcs]					
<b>AMD 10 - 12</b>	<b>545772</b>	10 - 12	25					
<b>AMD 14 - 16</b>	<b>545773</b>	14 - 16	25					
<b>AMD 17 - 19</b>	<b>545774</b>	17 - 19	25					
<b>AMD 20 - 23</b>	<b>545775</b>	20 - 23	25					
<b>AMD 24 - 27</b>	<b>545776</b>	24 - 27	25					



## The flat metal clip for cables and pipes



Fixing armoured conduits



Fixing armoured conduits

### BUILDING MATERIALS

**When using impact nail ED:**

- Concrete

### ADVANTAGES

- The open conduit clip BSM is ideal for the post-installation fixing of conduits.
- The conduit clip allows for a direct fixing with impact nails and is, therefore, quick and easy to install.
- Two conduits or pipes can be fixed with just one fixing point with the twin clamp BSMZ.

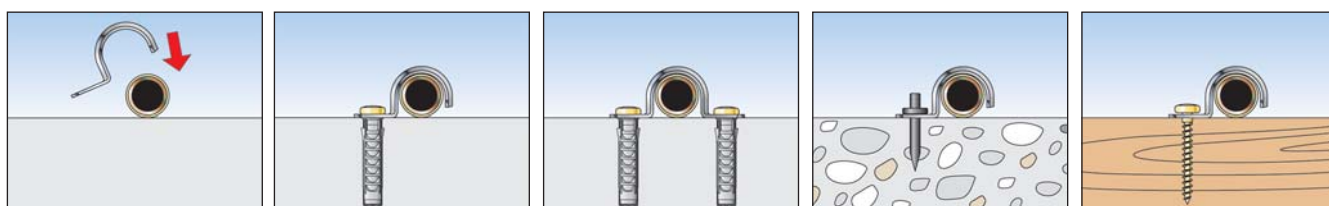
### APPLICATIONS

**For fixing of:**

- Electrical conduits
- Flexible and rigid plastic insulating pipes
- Steel conduits

### FUNCTIONING

- Depending on your requirements, use a conduit clip with 1 or 2 fixing points, or a twin clamp.
- The conduits or pipes are laid in the conduit clip. Assembling the clip fixes the conduits / pipes.
- Our recommendation for fixtures on concrete (not older than 6 months): Impact nail.



## TECHNICAL DATA



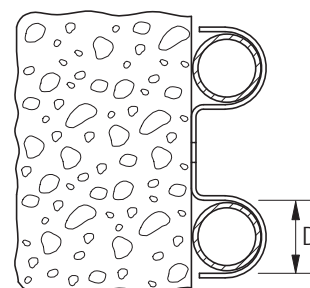
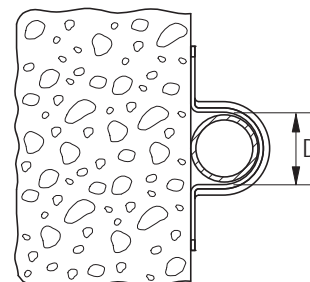
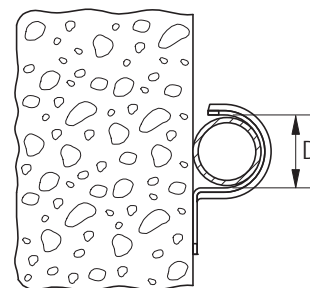
Conduit clip **BSM**



Conduit clip **BSMD**

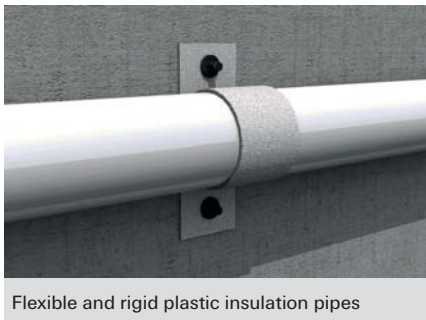


Conduit clip **BSMZ**



Item	Art.-No.			Dimension IEC	Clamping range D [mm]	Sales unit [pcs]	
	BSM	BSMD	BSMZ				
6	015014	—	—	—	6	100	
8	015015	—	—	—	8	100	
10	015016	—	—	—	10	100	
10	—	015068	—	—	10	50	
12	015017	015069	—	—	12	50	
14	015018	015070	—	—	14	50	
15	015093	—	—	15	15	50	
16	060149	060169	—	16	16	50	
18	060150	060170	—	—	18	50	
20	060151	060171	079535	20	20	50	
22	060152	060172	—	—	22	50	
24	060153	—	079536	—	24	50	
25	090839	090844	—	25	25	50	
26	096958	015076	—	—	26	50	
28	—	060175	—	—	28	25	
28	060155	—	079537	—	28	50	
30	015019	—	—	—	30	50	
32	090840	—	—	32	32	50	
32	—	090845	—	32	32	25	
37	060158	060178	—	—	37	25	
40	090841	090846	—	40	40	25	
42	—	015081	—	—	42	20	
42	015021	—	—	—	42	25	
47	—	015082	—	—	47	20	
50	090842	—	—	50	50	20	
50	—	090847	—	50	50	15	
63	—	090848	—	63	63	10	
63	090843	—	—	63	63	15	

## Textile web strapping GWB for cost-effective, easy pipe fixings



Flexible and rigid plastic insulation pipes

### ADVANTAGES/BENEFITS

- Pipe fastening using textile tape allows cheap and simple installation.
- The textile tape roll allows the correct tape length to be chosen to suit the diameter in question.
- Hangings with textile tape are a fast solution for temporary fixings.

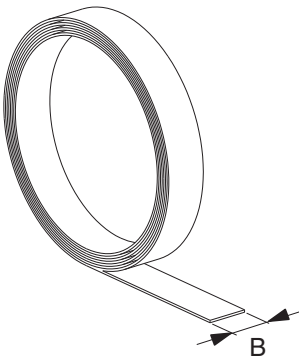
### APPLICATIONS

- Tear-proof textile tape for simple and load-bearing installation
- Fixing to concrete using the fischer impact nail ED

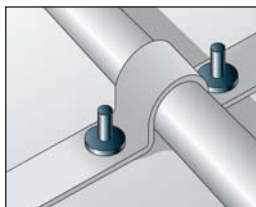
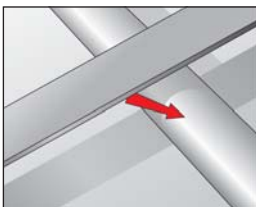
### PROPERTIES

- **Material:** polypropylene

### TECHNICAL DATA



Item	Art.-No.	Total length [mm]	Width [mm]	Thickness S [mm]	Sales unit [pcs]
GWB	020959	10000	15	1.1	10



## Perforated steel banding LBV / LBK for the fast fixing of pipelines



Plastic pipes

### ADVANTAGES/BENEFITS

- The perforated tape's material thicknesses and plastic covering allows the tapes to be easily cut to size using metal shears.
- The perforated tape's hole geometry enables concrete fixing using the fischer impact nail ED.

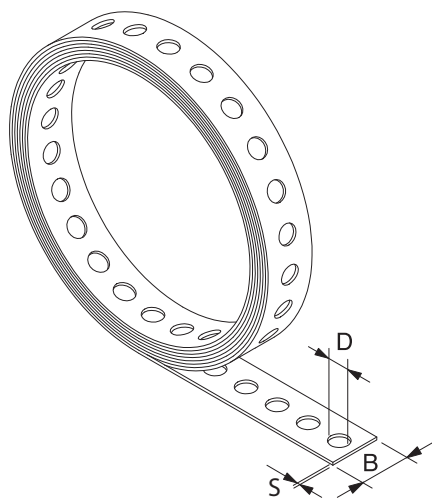
### APPLICATIONS

- Steel tape with stamped holes for simple installation; available zinc-plated LBV or plastic-covered LKB
- The fischer nail anchor FNA II is suitable for ceiling fixing in concrete
- Use fischer thread hanger RAH for fastening to threaded rods

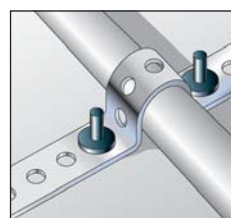
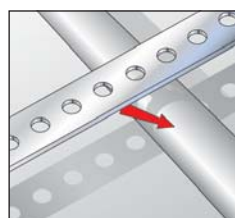
### PROPERTIES

- **Material:** steel DX5 1D+Z (material no. 1.0226) acc. to DIN EN 10327
- **Zinc plating:** electro zinc-plated, min. 7 µm
- **Protective coating LBK:** PE

### TECHNICAL DATA



Item	Art.-No.	Total length I [mm]	Width B B [mm]	Thickness S [mm]	Eye-Ø D [mm]	Sales unit [pcs]
<b>LBV 12</b>	<b>079549</b>	10000	12	0.75	5	10
<b>LBV 17</b>	<b>079550</b>	10000	17	0.75	6.5	10
<b>LBV 25</b>	<b>079551</b>	10000	25	0.88	8.5	8
<b>LBK 14</b>	<b>079553</b>	10000	14	2.6	5	10
<b>LBK 19</b>	<b>079554</b>	10000	19	2.4	6.5	8
<b>LBK 27</b>	<b>079555</b>	10000	27	2.4	8.5	5



## Fixing in concrete without pre-drilling



### BUILDING MATERIALS

- Fresh concrete (not older than 6 months)

### ADVANTAGES

- The stable impact nail ED can be set in concrete with the impact nail setting tool SZE without pre-drilling. This allows for a fast installation.
- The setting tool SZE impact protection provides the best protection for your hand, thus ensuring a safe installation.

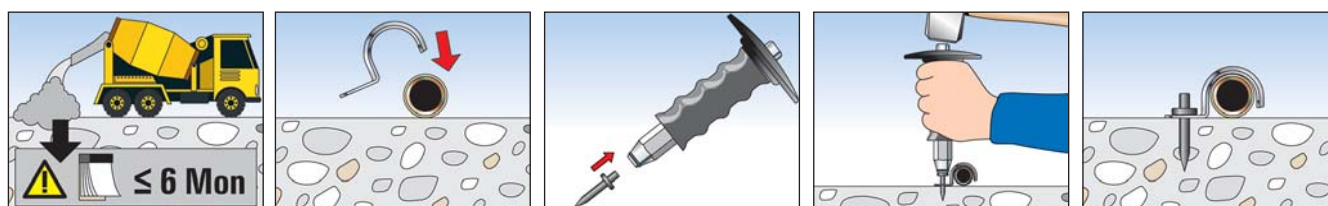
### APPLICATIONS

#### For fixing of:

- Conduit clips such as BSM, BSMD, BSMZ
- Perforated band such as LBK, LBV

### FUNCTIONALITY

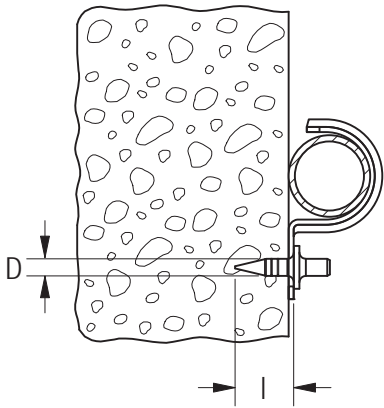
- The impact nail ED is set in the setting tool SZE.
- The bracket in the setting tool holds the nail securely in place during the installation procedure.
- Pre-positioning of the element to be fixed.
- The nail can be hammered through the fixing element directly into the concrete (not older than 6 months).



TECHNICAL DATA



Impact nail **ED**



Item	Art.-No.	Length l [mm]	Diameter d [mm]	Sales unit [pcs]				
<b>ED 15</b>	<b>048212</b>	15	4.0	200				
<b>ED 18</b>	<b>079815</b>	18	4.0	200				
<b>ED 22</b>	<b>014570</b>	22	4.0	200				

TECHNICAL DATA



Impact nail setting tool **SZE**

Toolset for **SZE**

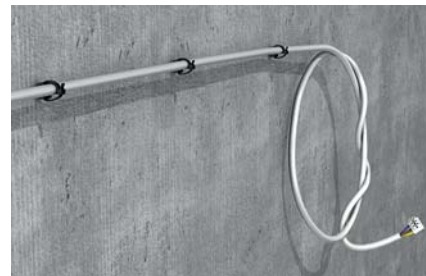
Item	Art.-No.	Sales unit [pcs]						
<b>SZE</b>	<b>079820</b>	1						
<b>Toolset for SZE</b>	<b>043365</b>	4						



## For the simple bundling of cables and pipes



Bundling electric cables



Pipe fixing with cable tie plug

### CHARACTERISTICS



8

Electrical fixings

### ADVANTAGES

- The long-lasting nylon material is halogen- and silicone-free.
- The cable tie UBN (black) is made from UV-stabilised material.

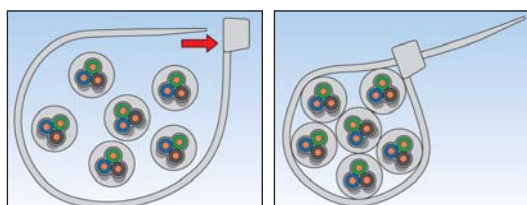
### APPLICATIONS

#### For bundling of:

- Electric cables
- Flexible and rigid plastic insulating pipes
- Steel conduits

### FUNCTIONING

- Lie the cable tie around the object to be fixed, and pull the band through the head of the cable tie. The cable tie can no longer be opened due to the latching of the tab in the teeth.
- Temperature resistance once installed from -10 °C to +85 °C.
- Recommended installation temperature from -10 °C to +85 °C.

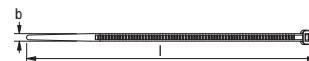


## TECHNICAL DATA

 Cable tie **BN**, colour: transparent

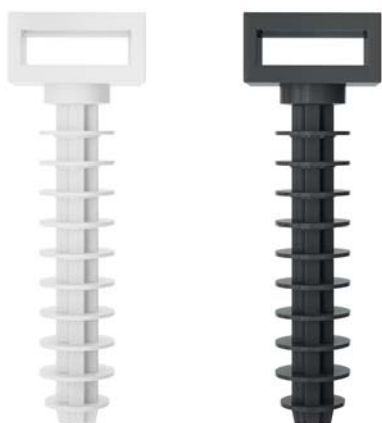
 Cable tie **UBN**, colour: black

 Cable tie **GBN**, colour: green

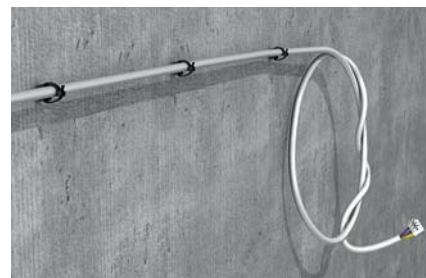


Item	Art.-No.			Dimensions [mm]	Sales unit [pcs]	Outer carton [pcs]	
	Colour: black	Colour: transparent	Colour: green				
<b>BN/UBN/GBN 2,5 x 100</b>	<b>087488</b>	<b>087478</b>	<b>543924</b>	2,5 x 100	100	20000	
<b>BN/UBN 2,5 x 120</b>	<b>087489</b>	<b>087479</b>	—	2,5 x 120	100	15000	
<b>GBN 2,5 x 150</b>	—	—	<b>543925</b>	2,5 x 150	100	20000	
<b>BN/UBN/GBN 2,5 x 200</b>	<b>087490</b>	<b>087480</b>	<b>543926</b>	2,5 x 200	100	10000	
<b>BN/UBN 2,5 x 160</b>	<b>069363</b>	<b>037489</b>	—	2,5 x 160	100	20000	
<b>BN/UBN/GBN 3,6 x 150</b>	<b>087491</b>	<b>087481</b>	<b>543927</b>	3,6 x 150	100	10000	
<b>BN/UBN 3,6 x 200</b>	<b>037573</b>	<b>019802</b>	—	3,6 x 200	100	10000	
<b>BN/UBN 3,6 x 300</b>	<b>069364</b>	<b>037490</b>	—	3,6 x 300	100	7500	
<b>BN/UBN 4,6 x 160</b>	<b>069365</b>	<b>037501</b>	—	4,6 x 160	100	10000	
<b>BN/UBN 4,6 x 190</b>	<b>069366</b>	<b>037581</b>	—	4,6 x 190	100	10000	
<b>BN/UBN/GBN 4,6 x 200</b>	<b>087494</b>	<b>087484</b>	<b>543928</b>	4,6 x 200	100	7500	
<b>BN/UBN 4,8 x 250</b>	<b>069367</b>	—	—	4,8 x 250	100	5000	
<b>BN/UBN 4,8 x 250</b>	—	<b>037582</b>	—	4,8 x 250	100	5000	
<b>BN/UBN/GBN 4,8 x 280</b>	<b>087495</b>	<b>087485</b>	<b>543929</b>	4,8 x 280	100	5000	
<b>BN/UBN 4,8 x 350</b>	<b>069368</b>	<b>037653</b>	—	4,8 x 350	100	5000	
<b>BN/UBN 4,8 x 370</b>	<b>069369</b>	<b>037583</b>	—	4,8 x 370	100	5000	
<b>BN/UBN 4,8 x 430</b>	<b>069370</b>	<b>037708</b>	—	4,8 x 430	100	5000	
<b>BN/UBN 7,6 x 200</b>	<b>069372</b>	<b>037945</b>	—	7,6 x 200	100	4500	
<b>BN/UBN 7,8 x 300</b>	<b>069373</b>	<b>037949</b>	—	7,6 x 300	100	2500	
<b>BN/UBN 7,6 x 350</b>	<b>087497</b>	<b>087487</b>	—	7,6 x 350	100	2500	
<b>BN/UBN 7,6 x 450</b>	<b>069374</b>	<b>037996</b>	—	7,6 x 450	100	2500	
<b>BN/UBN 7,6 x 550</b>	<b>069375</b>	<b>037997</b>	—	7,6 x 550	100	2000	
<b>BN/UBN 8,8 x 760</b>	<b>069376</b>	<b>037998</b>	—	8,8 x 760	100	1000	
<b>BN/UBN 8,8 x 810</b>	<b>069377</b>	<b>038000</b>	—	8,8 x 810	100	1000	
<b>BN/UBN 8,8 x 1168</b>	<b>069379</b>	<b>038002</b>	—	8,8 x 1168	100	500	

## The universal fixing point for cable ties



Flexible and rigid plastic pipes



Electric cables

### BUILDING MATERIALS

- Concrete
- Solid brick
- Solid sand-lime brick

### ADVANTAGES

- The FCTP cable tie plug combines the function of a plug and an eyelet to which cable ties up to 9.5 mm width can be attached (e.g. fischer BN or UBN).
- It offers a universal fixing point to which various cables and pipes can be attached.
- Installation is simple and time-saving by driving the plug into the drill hole.
- The lamellas of the plug ensure a secure hold in the building material and thus fix the cable tie in the intended position.

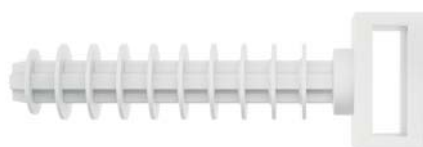
### APPLICATIONS

- Universal fixing point for fixing of cables and pipes using cable ties

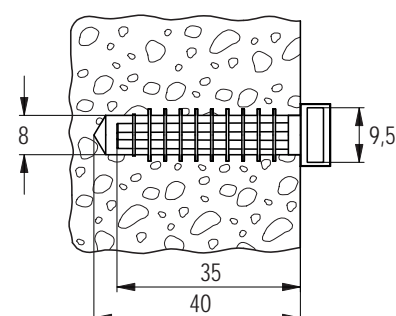
### FUNCTIONING

- The cable tie plug can be hammer set.
- A cable tie is inserted through the eyelet and the object to be fastened is fixed in the intended position.
- The eyelet with a width of 9.5 mm and a height of 3 mm is suitable for all fischer cable ties.

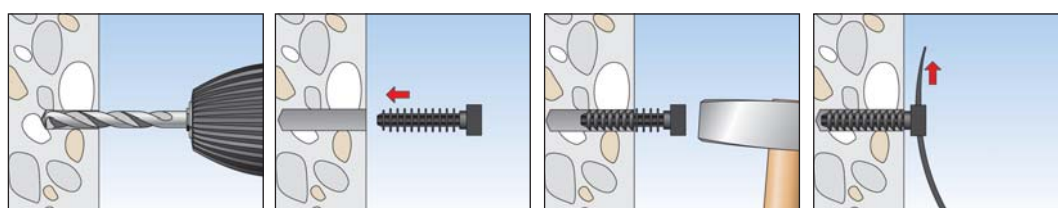
### TECHNICAL DATA



Cable tie plug FCTP



Item	Art.-No.	Drill diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Anchorage depth $h_{ef}$ [mm]	Total length $l$ [mm]	Sales unit [pcs]		
FCTP-W	545786	8	40	35	45	100		
FCTP-B	545787	8	40	35	45	100		



## Infinitely variable fixing of wire suspensions



Suspension of signs



Suspensions for trade show exhibits

### ADVANTAGES

- The simple system guarantees ease of use.
- The Wireclip's simple closing mechanism means that no tools are needed. This allows for a cost-effective installation.
- The reclosable Wireclips make it possible to adjust the length at any time. This guarantees the greatest flexibility.

### APPLICATIONS

#### For suspension of:

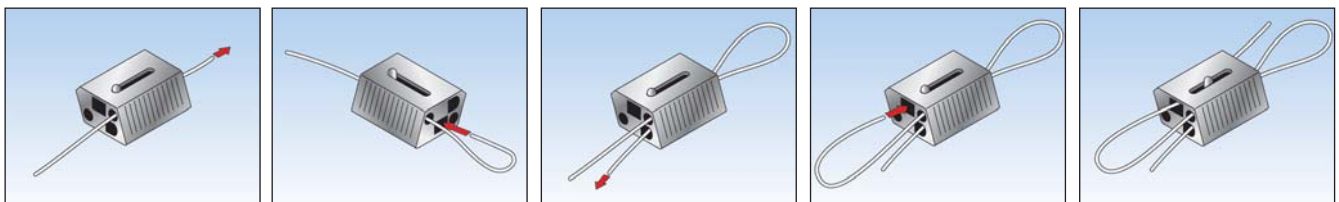
- Lighting strips
- Cable trays
- Ventilation ducts
- Pipes
- Signs
- Chilled ceilings

### FUNCTIONALITY

- Loops are formed from the wire, which can be threaded through the wireclip. This allows objects to be hung. The wireclips can be adjusted at any time.
- The FNA II 6x25 OE is suitable for fixing the wire.

#### Note:

- Do not apply paint or any other coating.
- Do not apply lubricant.
- Do not use for lifting loads.
- Remove damaged wire ends using the wire cutter WIZ prior to introducing wires into the wire clip.



## TECHNICAL DATA



WIC 2

WIC 3

WIC 4

Item	Art.-No.	Wire-Ø [mm]	Sales unit [pcs]					
WIC 2 VE20	044559	2 - 2,5	20					
WIC 3 VE20	044561	2,5 - 3,5	20					
WIC 2 VE100	044560	2 - 2,5	100					
WIC 4 VE50	044564	3 - 4	50					

## TECHNICAL DATA



WIS cable set with eyelet



Wire cutter WIZ

Item	Art.-No.	Cable length [m]	Wire-Ø [mm]	Sales unit [pcs]				
WIS 2/1	045956	1	2	10				
WIS 2/2	045957	2	2	10				
WIS 2/3	045958	3	2	10				
WIS 2/5	045959	5	2	10				
WIS 2/10	045960	10	2	10				
WI Ø 2 mm	044565 <sup>1)</sup>	200	2	1				
WIZ	044721	—	—	1				

<sup>1)</sup> on a roll

## LOADS

### Wireclip

Highest recommended loads<sup>1)</sup> per Wireclip

Type	Diameter of wire cable [mm]	Recommended tensile load [kN]
WIS complete system	2,0	0,5
WIC 2 <sup>2)</sup>	2,0	0,6
WIC 2 <sup>2)</sup>	2,5	1,0
WIC 3 <sup>2)</sup>	3,0	1,2
WIC 4 <sup>2)</sup>	4,0	2,3

<sup>1)</sup> Required safety factors are considered.




<sup>2)</sup> Only in combination with fischer wire cable.







## 9 Sanitary fixings

		Page
Sanitary fixings for board materials		456
Ceramic fixings		458
Wash basin and urinal fixings		460

## Complete fixing sets for wash basins and urinals in board building materials and plumbing walls



Urinals



Wash basins

### BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Chipboard

### ADVANTAGES

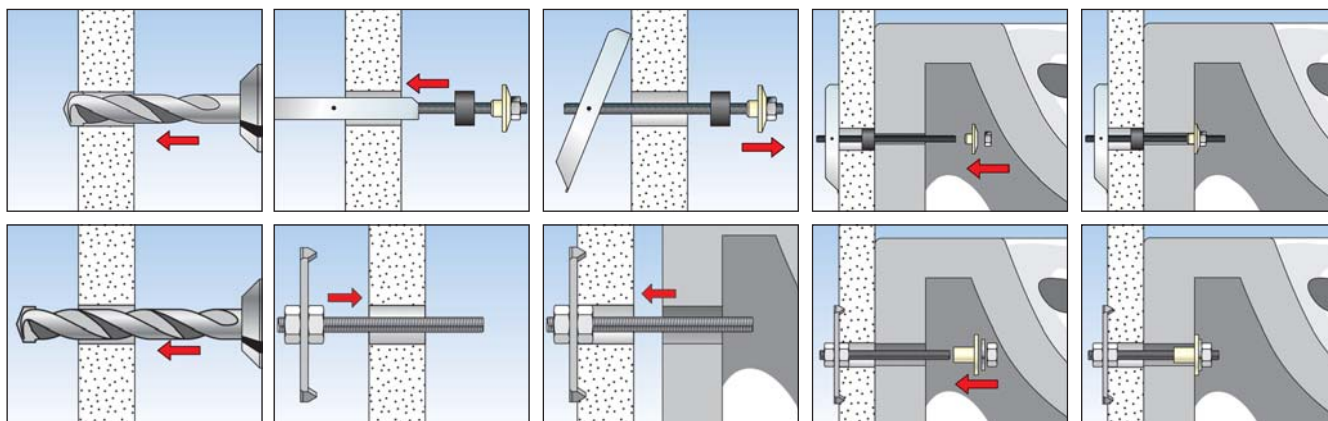
- With their special geometries, KM and WDP are the specialists for fixings in plumbing and hollow walls.
- The wide transition beams of the KM and the large base plate of the WDP ensure a good load distribution, thus allowing for a high load-bearing capacity.

### APPLICATIONS

- Wash basins
- Urinals

### FUNCTIONING

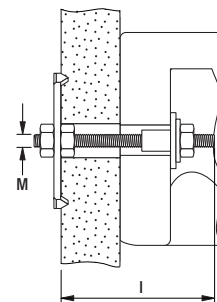
- KM is suitable for push-through installation.
- When placed in the drill hole, the wide transition beam of the KM independently swings open behind the board.
- WDP is set into the plumbing walls during wall installation.



## TECHNICAL DATA

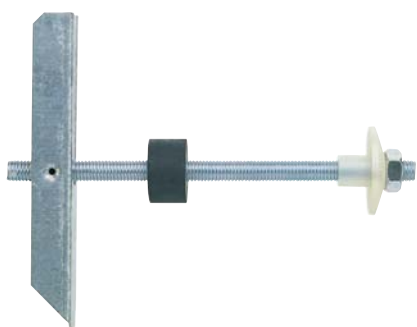


Wash basin and urinal fixing **WDP**

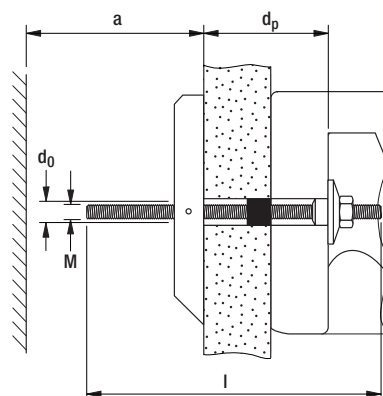


Item	Art.-No.	Contents per plastic bag	Sales unit
		[pcs]	[pcs]
<b>WDP 10 x 170</b>	<b>014320</b>	2 Threaded rods M10 x 170 with base plate 60x60x3, 2 flanged bushes BDH M10, 2 hexagon nuts M10 zinc-plated	10

## TECHNICAL DATA



Gravity toggle **KM 10**



Item	Art.-No.	Drill hole diameter	Anchor length	Min. cavity depth	Max. panel thickness	Screw	Sales unit
		$d_0$ [mm]	$l$ [mm]	$a$ [mm]	$d_p$ [mm]	$d_s \times l_s$ [mm]	[pcs]
<b>KM 10</b>	<b>050326</b>	30	180	140	90	M 10 x 180	25

## Complete fixing sets for free-standing toilets and bidets



Free-standing toilets



Bidets

### BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick made from lightweight concrete
- Solid brick

### CHARACTERISTICS



### ADVANTAGES

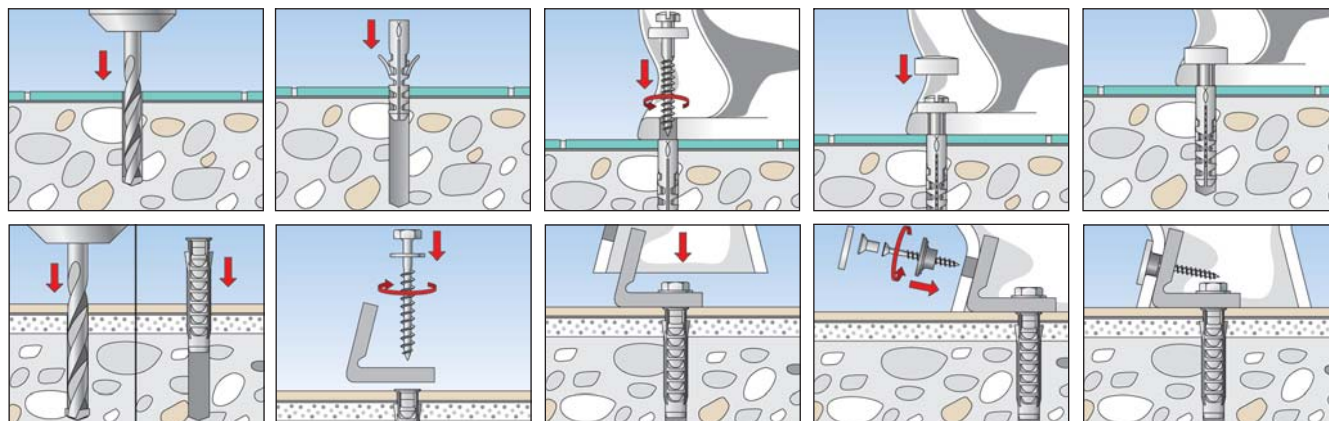
- Complete fixing sets including brass screws allow for quick and easy installation.
- A pronounced rim prevents contact between the screw and ceramics, thus ensuring nothing gets damaged during fixing.
- The WB5N's assembly bracket with pre-drilled rows of holes allows for a flexible fixing with two directions.
- The WCN is also suitable for fixing ceramic shelves and mirrors, and can thus be used for a wide range of applications.

### APPLICATIONS

- Free-standing toilets
- Bidets
- Ceramic shelves
- Mirrors

### FUNCTIONING

- S 8 RD is suitable for push-through installation.
- WCN and S 8 D are suitable for both pre-positioned and push-through installation.
- The WB5N's assembly bracket is flexibly positioned on the base using the long hole. The ceramics are then fixed to the bracket via the rows of holes. These counterbalance any height differences in the ceramic assembly holes.



## TECHNICAL DATA



Item	Art.-No.	Contents per plastic bag	Sales unit
		[pcs]	[pcs]
<b>WCN 1</b>	<b>060561</b>	2 wall plugs S 8, 2 brass screws 6 x 70 hex., 2 cover caps white, 2 snap-fit sleeves	50
<b>WCN 2</b>	<b>060562</b>	2 wall plugs S 8, 2 brass screws 6 x 70 hex., 2 cover caps chrome, 2 snap-fit sleeves	50

## TECHNICAL DATA



Item	Art.-No.	Contents per plastic bag	Sales unit
		[pcs]	[pcs]
<b>S 8 D 70 WCR</b>	<b>060564</b>	2 wall plugs S 8, 2 brass screws 6 x 70 hex., 2 cover caps chrome and white, 2 snap-fit sleeves	50

## TECHNICAL DATA



Item	Art.-No.	Contents per plastic bag	Sales unit
		[pcs]	[pcs]
<b>S 8 RD 60 WCR</b>	<b>060570</b>	2 wall plugs S 8 RD 60, 2 brass screws 6 x 65 hex., 2 cover caps chrome and white	50
<b>S 8 RD 80 WCR</b>	<b>060568</b>	2 wall plugs S 8 RD 80, 2 brass screws 6 x 85 hex., 2 cover caps chrome and white	50

## TECHNICAL DATA



Item	Art.-No.	Contents	Sales unit
		[pcs]	[pcs]
<b>WB 5N</b>	<b>018652</b>	2 S plugs SX 10, 2 Screws 7x65 zinc-plated, 2 Nylon angles, 2 washers 8mm, 2 screws A2 stainless steel, 2 flanged sleeves, 2 cover caps chrom	50



## Complete fixing sets for wash basins, urinals and sanitary installations



Urinals



Wash basins

### BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

### CHARACTERISTICS



### ADVANTAGES

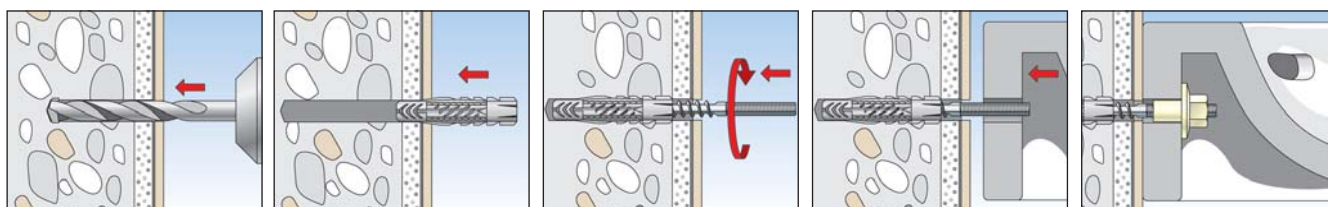
- Complete fixing sets allow for quick and easy installation.
- The universal plug UX can be used in solid and hollow materials, thus offering a high level of flexibility.
- Flanged nuts and collar sleeves made of high-strength nylon are resistant to ageing and chemicals, and guarantee a long-lasting fixing that will not damage the ceramics.
- Cover caps with a high-quality chrome finish ensure the fixture remains visually attractive for a long period of time.

### APPLICATIONS

- Wash basins
- Urinals
- Built-in toilets
- Boilers
- Gas heaters
- Cisterns
- Consoles

### FUNCTIONING

- The rimless UX is suitable for pre-positioned and push-through installation.
- Screwing in the screw causes the UX to expand in solid and hollow building material.
- Maximum load-bearing capacity is only achieved when the minimum screw-in depth is reached.
- Tiles and plaster are not classed as load-bearing base materials.





## TECHNICAL DATA



Wash basin and urinal fixing **WD**

Item	Art.-No.	Contents per plastic bag	Sales unit
		[pcs]	[pcs]
<b>WD 8 x 90</b>	<b>080659</b>	2 wall plugs UX 10 x 60, 2 stud screws M8 x 90 zinc-plated, 2 flanged nuts BU M8	50
<b>WD 8 x 110</b>	<b>080658</b>	2 wall plugs UX 10 x 60, 2 stud screws M8 x 110 zinc-plated, 2 flanged nuts BU M8	50
<b>WD 10 x 120</b>	<b>080655</b>	2 wall plugs UX 14 x 75, 2 stud screws M10 x 120 zinc-plated, 2 flanged nuts BU M10 MH	50
<b>WD 10 x 140</b>	<b>080656</b>	2 wall plugs UX 14 x 75, 2 stud screws M10 x 140 zinc-plated, 2 flanged nuts BU M10 MH	50

## TECHNICAL DATA



Boiler fixing **BO**

Item	Art.-No.	Contents per plastic bag	Sales unit
		[pcs]	[pcs]
<b>BO 120</b>	<b>080654</b>	4 wall plugs UX 14 x 75, 4 stud screws M10 x 120 zinc-plated, 4 flanged nuts BU M10	25

## TECHNICAL DATA



Washbasin fixing **WST**

Item	Art.-No.	Contents per plastic bag	Sales unit
		[pcs]	[pcs]
<b>WST 10 x 140</b>	<b>080660</b>	2 wall plugs UX 14 x 75, 2 stud screws M10 x 140 zinc-plated, 2 hexagon nuts M10 zinc-plated, 2 flanged bushes BDH M10	50
<b>WST 12 x 150</b>	<b>080661</b>	2 wall plugs UX 14 x 75, 2 stud screws M12 x 150 zinc-plated, 2 hexagon nuts M12 zinc-plated, 2 flanged bushes BDH M12	50
<b>WST 12 x 180</b>	<b>080662</b>	2 wall plugs UX 14 x 75, 2 stud screws M12 x 180 zinc-plated, 2 hexagon nuts M12 zinc-plated, 2 flanged bushes BDH M12	50

## TECHNICAL DATA



Urinal fixing **UST 8 x 110**



Urinal fixing **UST 10 x 120**

Item	Art.-No.	Contents per plastic bag	Sales unit
		[pcs]	[pcs]
<b>UST 8 x 110</b>	<b>083578</b>	2 wall plugs UX 10 x 60, 2 stud screws M8 x 110, 2 washers B 8.4 DIN 125, 2 plastic washer 8,4 x 16 x 1,6, 2 cap nuts FA 8, 2 cover caps chrome plated	50
<b>UST 10 x 120</b>	<b>080668</b>	2 wall plugs UX 14 x 75, 2 stud screws M10 x 120, 2 flanged nuts BU M10, 2 cover caps AKM 10 CR	10

## TECHNICAL DATA



Sanitary fixing **WL**

Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
<b>WL 7 x 60</b>	<b>080651</b>	2 plugs S 10, 2 screws 7 x 65 hex. head zinc-plated, 2 washers zinc-plated	100
<b>WL 8 x 70</b>	<b>080652</b>	2 plugs S 10, 2 screws 8 x 70 hex. DIN 571 zinc-plated, 2 washers zinc-plated	100
<b>WL 10 x 80</b>	<b>080650</b>	2 plugs S 12, 2 screws 10 x 80 hex. DIN 571 zinc-plated, 2 washers zinc-plated	50

## ACCESSORIES



Flanged nut **BUM**

Item	Art.-No.	Thread M	Width across nut ○ SW [mm]	Washer [mm]	Match	Sales unit [pcs]
<b>BU M8 MH</b>	<b>060200</b>	M 8	17	40	STS M8	25
<b>BU M10 MH</b>	<b>060201</b>	M 10	17	40	STS M10	25
<b>BU M12 MH</b>	<b>060204</b>	M 12	19	40	STS M12	25

## ACCESSORIES



Cover cap **AKM**

Item	Art.-No.	Colour	Match	Sales unit [pcs]
<b>AKM 10 W</b>	<b>080972</b>	white	BU M10 MH	20
<b>AKM 10 CR</b>	<b>080951</b>	chrome	BU M10 MH	100
<b>AKM 12 CR</b>	<b>080952</b>	chrome	BU M12 MH	100

## ACCESSORIES



Installation tool **HED**

Item	Art.-No.	Match	Sales unit [pcs]
<b>HED</b>	<b>079831</b>	M6, M8, M10, M12	1

## INSTALLATION DATA

Item	Art.-No.	Drill diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Usable length (with assembled flanged nut) $t_{fix}$ [mm]	Min. bolt penetration $l_{E,min}$ [mm]
WD 8 x 90	080659	10	75	5	68
WD 8 x 110	080658	10	75	25	68
WD 10 x 120	080655	14	95	18	85
WD 10 x 140	080656	14	95	38	85
BO 120	080654	14	95	18	85
WST 10 x 140	080660	14	95	38	85
WST 12 x 150	080661	14	95	48	85
WST 12 x 180	080662	14	95	78	85
UST 8 x 110	083578	10	75	32	68
UST 10 x 120	080668	14	95	18	85
WL 7 x 60	080651	10	70	10	57
WL 8 x 70	080652	10	70	12	58
WL 10 x 80	080650	12	80	10	70

## LOADS

### Washbasin and urinal fixings

Highest recommended loads<sup>1)</sup> for a single anchor.

The given loads are valid for stud screws with the specified diameter.

Type		WD 8x90 WD 8x110	WD 10x120 WD 10x140	WST 10x140 BO 120	WST 12x150 WST 12x180	UST 8x110	UST 10x120	WL 7x60	WL 8x70	WL 10x80
Screw diameter	$\emptyset$ [mm]	8	10	10	12	8	10	7	8	10
<b>Recommended loads in the respective base material <math>F_{rec}</math><sup>2)</sup></b>										
Concrete	$\geq C20/25$ [kN]	0,90	0,90	0,90	1,80	0,90	0,90	1,10	1,10	1,50
Solid brick	$\geq Mz 12$ [kN]	0,50	0,50	0,50	0,80	0,50	0,50	- <sup>3)</sup>	- <sup>3)</sup>	- <sup>3)</sup>
Perforated sand-lime brick	$\geq KSL 12$ [kN]	0,40	0,40	0,40	0,80	0,40	0,40	-	-	-
Vertically perforated brick	$\geq Hlz 12$ [kN]	0,20	0,30	0,30	0,40	0,20	0,30	-	-	-
Aerated concrete	$\geq PB 4, PP 4 (G4)$ [kN]	0,30	0,30	0,30	0,70	0,30	0,30	0,16	0,16	0,28

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.





<sup>3)</sup> Due to that the failure of the substrate varies too much no reproducible values can be given.







# 10 Scaffold and eye screw fixings

		Page
Scaffold anchoring GS 12 + plug		466
Scaffold anchoring FI G		468
Eye screw GS		470
Ring nut RI		472



## The standard scaffold anchoring



Scaffold anchoring



Façade scaffolds

### BUILDING MATERIALS

#### GS 12 + S 14 ROE suitable for:

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick
- Solid brick made from lightweight concrete

#### GS 12 + S 16 H R suitable for:

- Vertically perforated brick
- Perforated sand-lime brick
- Aerated concrete

### CERTIFICATES



### ADVANTAGES

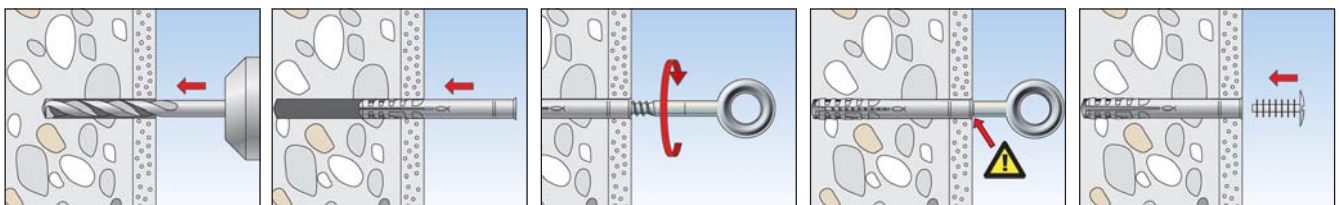
- The ideal interaction of the scaffold eyebolt and plug allows for a high load-bearing capacity, thus providing increased safety.
- The high-quality weld stops the eye from opening.
- The large diameter of the cover caps (available separately) covers drill holes completely and discreetly, even those with slightly broken edges.

### APPLICATIONS

- Façade scaffolds
- Ropes
- Chains
- Trellises
- Lighting
- Clothes lines
- Hanging baskets

### FUNCTIONING

- In order to achieve the maximum load-bearing capacity, nylon plugs should only be used once.
- The combination with plug S 16 H R is recommended for perforated brick and aerated concrete.
- The screw-in markings provide a visual control during assembly, and thus allow for a simple and problem-free installation.
- Pre-drill into wood when not using plugs. The drill bit diameter should equal the core diameter of the screw.
- Suitable cover caps AD 12x40 (see page 469) for closing off remaining drill holes for S 14 ROE.
- Not suitable for swings, hammocks etc.

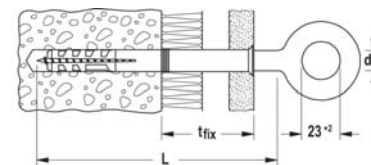




## TECHNICAL DATA



Scaffold eyebolt **GS 12**



Item	Art.-No.	Shaft diameter $d_s$ [mm]	Shaft length $L$ [mm]	Max. thickness of non-bearing layer $t_{fix}$ [mm]	Eye-Ø [mm]	Match	Sales unit [pcs]
<b>GS 12 x 90</b>	<b>080925</b>	12	90	15	23	S 14 ROE 70	25
<b>GS 12 x 120</b>	<b>080926</b>	12	120	30 / 10	23	S 14 ROE 100 / S 16 H 100 R	25
<b>GS 12 x 160</b>	<b>080927</b>	12	160	65 / 45	23	S 14 ROE 135 / S 16 H 135 R	25
<b>GS 12 x 190</b>	<b>080960</b>	12	190	110 / 70	23	S 14 ROE 185 / S 16 H 160 R	25
<b>GS 12 x 230</b>	<b>080961</b>	12	230	110 / 70	23	S 14 ROE 185 / S 16 H 160 R	25
<b>GS 12 x 300</b>	<b>081269</b>	12	300	110 / 70	23	S 14 ROE 185 / S 16 H 160 R	25
<b>GS 12 x 350</b>	<b>080962</b>	12	350	110 / 70	23	S 14 ROE 185 / S 16 H 160 R	25

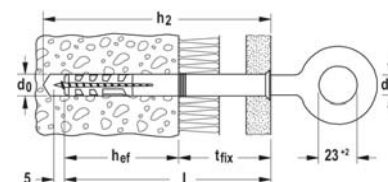
## TECHNICAL DATA



Plug **S 14 ROE**



Plug **S 16 H R**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Max. thickness of non-bearing layer $t_{fix}$ [mm]	Min. bolt pene- tration $l + 5$ [mm]	Sales unit [pcs]
<b>S 14 ROE 70</b>	<b>052160</b>	14	80	70	70	—	75	25
<b>S 14 ROE 100</b>	<b>052161</b>	14	110	70	100	30	105	25
<b>S 14 ROE 135</b>	<b>052162</b>	14	145	70	135	65	140	25
<b>S 14 ROE 185</b>	<b>052164</b>	14	195	70	185	110	190	25
<b>S 16 H 100 R</b>	<b>059187</b> <sup>1)</sup>	16	120	90	100	10	105	50
<b>S 16 H 135 R</b>	<b>059188</b> <sup>1)</sup>	16	155	90	135	45	140	50
<b>S 16 H 160 R</b>	<b>059189</b> <sup>1)</sup>	16	180	90	160	70	165	50

<sup>1)</sup> Also suitable for screws with metric thread M12.

## LOADS

### Scaffold anchoring S 14 ROE / S 16 H R + GS 12

Mean ultimate loads<sup>1)</sup> for tension of a single anchor.

Type			S 14 ROE + GS 12	S 16 H R + GS 12
<b>Mean ultimate loads for tension in the respective base material <math>N_u</math></b>				
Concrete	$\geq C20/25$	[kN]	14,5	-
Solid brick	$\geq Mz 12$	[kN]	13,0	-
Solid sand-lime brick	$\geq KS 12$	[kN]	14,5	-
Solid brick of lightweight aggregate concrete	$\geq V 2$	[kN]	3,0	-
Perforated sand-lime brick	$\geq KSL 12$	[kN]	-	5,0
Vertically perforated brick	$\geq Hlz 12$	[kN]	-	3,5
Aerated concrete	$\geq AAC 4$	[kN]	3,0	3,0

<sup>1)</sup> On these values an appropriate safety factor has to be considered.

10

Scaffold and eye screw fixings

## The scaffold anchoring with metric thread M 12



Scaffold anchoring



Façade scaffolds

### BUILDING MATERIALS

**When combined with internal threaded anchor:**

- Concrete C20/25 - C50/60:  
Injection mortar FIS EM / FIS V  
Internal threaded anchor  
RG 18x125 M12 I,  
Art.-No. 50562 /  
ZYKON undercut anchor FZA-I  
FZA 22x100 M12 I, Art.-No. 060763
- Masonry:  
Injection mortar FIS V 360 S  
Perforated sleeve FIS H 20x85 K,  
Art.-No. 41904 /  
Internal threaded anchor  
FIS E 15x85 M12,  
Art.-No. 43634

### ADVANTAGES

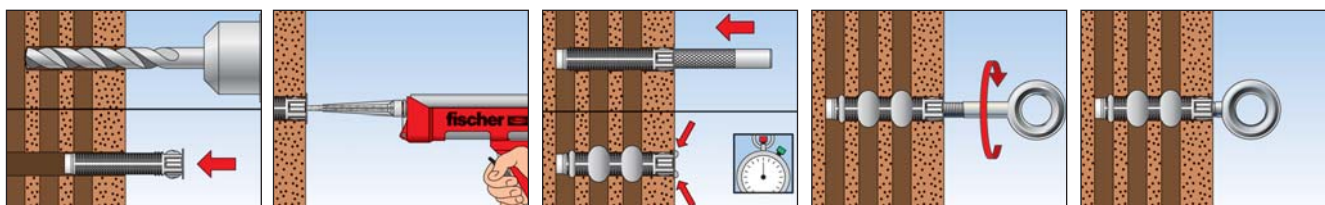
- When used together with an internal threaded anchor or a steel fixture with internal thread M 12, the scaffold screw FI G allows for repeated installation and removal using the same fixing point.
- The high-quality weld stops the eye from opening, thus providing increased safety.

### APPLICATIONS

- Façade scaffolds
- Trellises
- Tensioning ropes
- Chains
- Lighting
- Clothes lines
- Hanging baskets

### FUNCTIONING

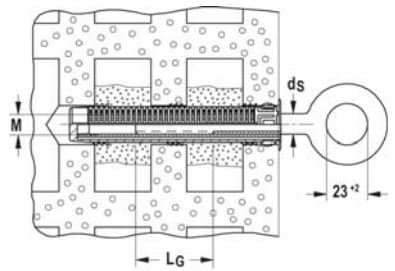
- The scaffold anchoring FI G should be used with an internal threaded anchor. Detailed information about its functioning can be found in the „Chemical fixings“ chapter.
- Not suitable for swings, hammocks etc.



## TECHNICAL DATA

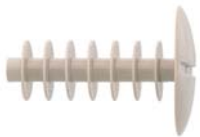


Scaffold eyebolt **FI G 12**



Item	Art.-No.	Thread M	Thread length L <sub>G</sub> [mm]	Shaft diameter d <sub>s</sub> [mm]	Max. thickness of non-bearing layer t <sub>fix</sub> [mm]	Eye-Ø [mm]	Sales unit [pcs]
<b>FI G 12 x 40</b>	<b>080933</b>	M 12	30	12	40	23	20
<b>FI G 12 x 80</b>	<b>080934</b>	M 12	30	12	80	23	20

## ACCESSORIES



Cover cap **AD 12 x 40**

Item	Art.-No.	Colour	Length l [mm]	Head height [mm]	Match	Sales unit [pcs]
<b>AD 12 x 40 W</b>	<b>060259</b>	white	40	3	Plug-Ø 14 mm	100
<b>AD 12 x 40 G</b>	<b>060260</b>	grey	40	3	Plug-Ø 14 mm	100

## The universal eye screw for use with fischer plugs or for direct use in wood



Hanging baskets



Trellis

### BUILDING MATERIALS

#### GS 8 + SX 10 suitable for:

- Concrete
- Solid brick
- Perforated brick
- Aerated concrete

#### GS 10 + S 12 R suitable for:

- Concrete
- Solid brick

#### GS 10 + S 14 H R suitable for:

- Perforated brick

#### GS 8 or GS 10 without plug suitable for:

- Wood

### CERTIFICATES



### ADVANTAGES

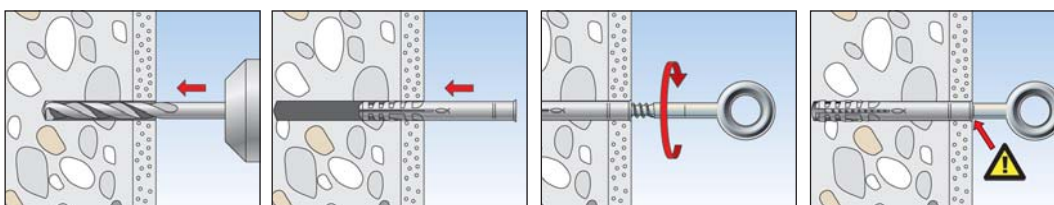
- The ideal interaction of the eye screw and plug allows for a high load-bearing capacity, thus providing increased safety.
- The high-quality weld stops the eye from opening.

### APPLICATIONS

- Ropes
- Chains
- Trellises
- Lighting
- Clothes lines
- Hanging baskets

### FUNCTIONING

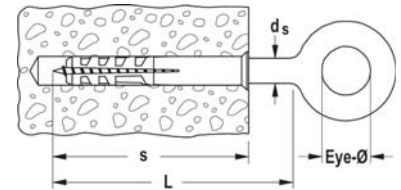
- Pre-drill when using with wood. The drill bit diameter should equal the core diameter of the screw.
- The maximum load-bearing capacity is achieved when combined with the plugs recommended by fischer (see table "Technical Data"). The nylon plug must only be used once.
- Not suitable for swings, hammocks etc.



## TECHNICAL DATA



Eye screw **GS**



Item	Art.-No.	Shaft diameter $d_s$ [mm]	Shaft length $L$ [mm]	Bolt penetration $s$ [mm]	Match	Eye-Ø [mm]	Sales unit [pcs]
<b>GS 8 x 50 Ø15</b>	<b>502620</b>	8	50	50	SX 10	15	20
<b>GS 8 x 80 Ø15</b>	<b>540677</b>	8	80	58	SX 10	15	20
<b>GS 8 x 120 Ø15</b>	<b>540678</b>	8	120	58	SX 10	15	20
<b>GS 8 x 80 Ø22</b>	<b>080918</b>	8	80	58	SX 10	22	20
<b>GS 8 x 100 Ø22</b>	<b>080919</b>	8	100	58	SX 10	22	20
<b>GS 8 x 120 Ø22</b>	<b>080920</b>	8	120	58	SX 10	22	20
<b>GS 10 x 160 Ø30</b>	<b>080929</b>	10	160	—	S 12 R, S 14 H R, SX12	30	20

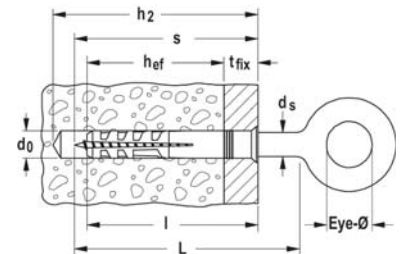
## TECHNICAL DATA



Plug **S 12 R**



Plug **S 14 H R**



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth for through fixings $h_2$ [mm]	Bolt penetration $s$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Sales unit [pcs]
<b>S 12 R 100</b>	<b>050177</b>	12	120	110	60	100	40	100
<b>S 12 R 135</b>	<b>050178</b>	12	155	145	60	135	75	100
<b>S 14 H 100 R</b>	<b>059179</b>	14	120	110	90	100	10	50
<b>S 14 H 135 R</b>	<b>059180</b>	14	155	145	90	135	45	50

## LOADS

### Eye screw GS

Highest recommended tensile loads<sup>1)</sup> for a single anchor.

The given loads are valid for the eye screw GS with the specified fischer plugs.

Type			SX 10x50 + GS 8	SX 12 + GS 10	S 12 R + GS 10	S 14 H-R + GS 10
Recommended tensile loads in the respective base material $N_{rec}$						
Concrete	≥ C12/15	[kN]	1,20	1,70	1,03	-
Solid brick	≥ Mz 12	[kN]	0,65	0,70	1,00	-
Solid sand-lime brick	≥ KS 12	[kN]	1,20	1,70	0,84	-
Solid brick of lightweight aggregate concrete	≥ V 4	[kN]	-	-	0,29	0,43
Perforated sand-lime brick	≥ KSL 12	[kN]	0,35	0,35	0,30	0,34
Vertically perforated brick	≥ Hlz 12 ( $\rho \geq 1 \text{ kg/dm}^3$ )	[kN]	-	-	0,36	0,50
Aerated concrete	≥ AAC 2	[kN]	0,09	0,20	-	-
Aerated concrete	≥ AAC 4	[kN]	0,30	0,60	-	-

<sup>1)</sup> Required safety factors are considered.

## The ring nut for all fixings with threaded studs



### BUILDING MATERIALS

#### In line with the anchor used:

- Concrete, cracked and non-cracked
- Solid and perforated brick

### ADVANTAGES

- The metric internal thread gives the ring nut RI flexibility and means it can be used with a range of steel anchors or threaded rods; e.g. FH II, FHB II-A, RG M, FZA, FAZ II, FIS A.

### APPLICATIONS

- Ropes
- Chains
- Trellises
- Lighting
- Clothes lines
- Hanging baskets

### FUNCTIONING

- The ring nut is to be used with an anchor with threaded studs. Detailed information about its functioning can be found in the „High performance steel anchors“ and „Chemical fixings“ chapters. The following anchors, for example, can be used: FHB II, RG M, FZA, FAZ II, FIS A.
- Not suitable for swings, hammocks etc.

### TECHNICAL DATA



Ring nut **RI**

Item	Art.-No.	Match	Eye-Ø [mm]	Total height [mm]	Sales unit [pcs]
<b>RI M 8</b>	<b>080840</b>	M 8	20	36	20
<b>RI M 10</b>	<b>080842</b>	M 10	25	45	10
<b>RI M 12</b>	<b>080844</b>	M 12	30	53	10



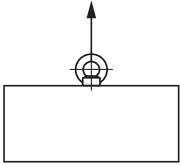
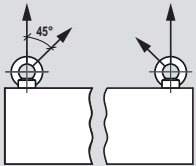
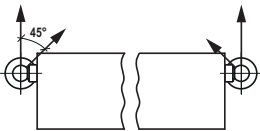


## LOADS

### Ring nut RI

Highest recommended loads<sup>1)</sup> for ring nuts.

The given loads apply for the use of ring nuts as permanent anchorage. For varying use at different components to be lifted ring nuts with next larger thread diameter has to be use (see DIN 582).













Type			RIM 8	RIM 10	RIM 12
Thread size		[M]	M 8	M 10	M 12
<b>Recommended load per ring nut for respective set-up <math>F_{rec}</math></b>					
Axial tension on single ring nut		[kN]	1,40	2,30	3,40
Axial tension or oblique tension up to 45° on a group of two ring nuts		[kN]	1,00	1,70	2,40
Shear or oblique tension up to 45° on a group of two ring nuts for lateral set-up		[kN]	0,70	1,15	1,70

<sup>1)</sup> Required safety factors are considered.



# 11 Insulation fixings / Façade fixings

Page

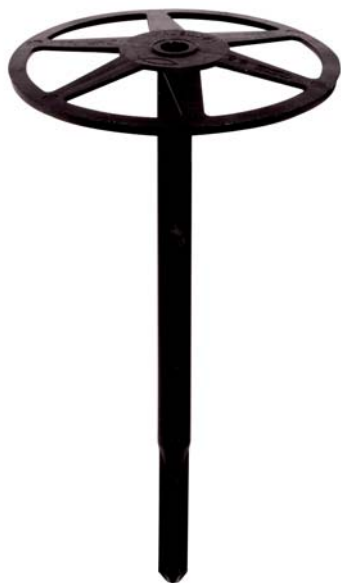
Insulation support DHK		476
Insulation support DHM		478
Render fixing DIPK		480
Render fixing FIF-PN 8		482
Render fixing FIF-CN II 8		485
Render fixing FIF-CS 8		488
Insulation discs		490
Retaining disc with screw DHT S		492
Insulation fixing FID		494
Insulation fixing FID GREEN		496
Holding clamp DVN		498
Fibre cement panel screw FAFZ H		499

11

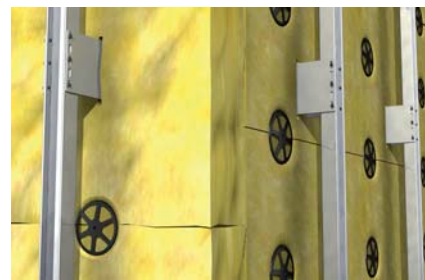
Insulation fixings / Façade fixings



## The cost-effective plastic insulation support for all conventional insulating boards



Insulating materials in rear-ventilated façades



Insulating materials in rear-ventilated façades

### BUILDING MATERIALS

- Concrete
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

### ADVANTAGES

- The optimised geometry of the expansion section ensures a low anchorage depth and reduces the amount of drilling required.
- Flexible pins in the plate area adapt to the insulating material, and ensure a sustained contact pressure.
- The simple hammer-set installation allows for a quick installation process and thus reduces workload.
- The colouring of the DHK means that it does not stand out on black clad insulating material in rear-ventilated façades.
- The DHK 45 is suitable for use in pressure-resistant insulating boards and reveals.

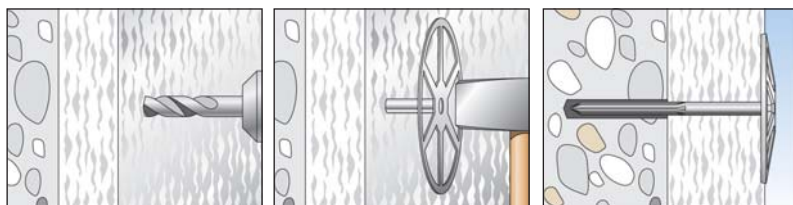
### APPLICATIONS

**To fix soft and pressure-resistant insulating materials in rear-ventilated façades, such as:**

- Mineral / glass wool
- PU panels
- Light building boards made of wood wool
- Cork boards / coir matting
- Polystyrene
- Foam glass tiles

### FUNCTIONING

- The DHK is set in push-through installation using a hammer.
- The plate size of the insulation support is to be selected in line with the compressive strength of the insulating material: DHK 45 for pressure-resistant; DHK 90 for soft insulating materials.
- The expansion of the ribs in the drill hole gives the DHK an ideal contact pressure.
- Temperature range when installed: -40 °C to +80 °C.



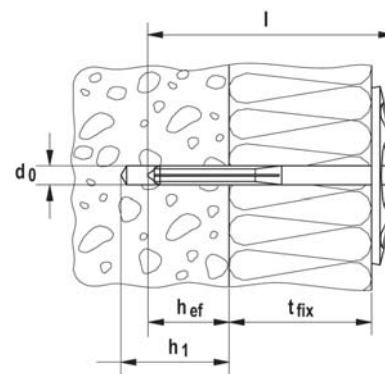
## TECHNICAL DATA



Insulation support **DHK 45**,  
plate-ø 45 mm



Insulation support **DHK**,  
plate-ø 90 mm



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Anchor length $l$ [mm]	Max. fixture thick- ness $t_{fix}$ [mm]	Sales unit [pcs]
<b>DHK 40</b>	<b>080937</b>	8	30	20	65	40	250
<b>DHK 60</b>	<b>080938</b>	8	30	20	85	60	250
<b>DHK 80</b>	<b>080939</b>	8	30	20	105	80	250
<b>DHK 100</b>	<b>080940</b>	8	30	20	125	100	250
<b>DHK 120</b>	<b>080941</b>	8	30	20	145	120	200
<b>DHK 140</b>	<b>080949</b>	8	30	20	165	140	200
<b>DHK 160</b>	<b>512150</b>	8	30	20	185	160	100
<b>DHK 180</b>	<b>512151</b>	8	30	20	205	180	100
<b>DHK 200</b>	<b>512153</b>	8	30	20	225	200	100
<b>DHK 220</b>	<b>512154</b>	8	30	20	245	220	100
<b>DHK 45/40</b>	<b>080892</b>	8	30	20	65	40	250
<b>DHK 45/60</b>	<b>080893</b>	8	30	20	85	60	250
<b>DHK 45/80</b>	<b>080894</b>	8	30	20	105	80	250
<b>DHK 45/100</b>	<b>080895</b>	8	30	20	125	100	250

## LOADS

### Insulation support DHK

Highest recommended loads<sup>1)</sup> for a single anchor.

Type	DHK		
Recommended loads in the respective base material $F_{rec}^{2)}$			
Concrete	≥ C12/15	[kN]	0,03
Solid brick	Mz 12	[kN]	0,03
Solid sand-lime brick	KS 12	[kN]	0,03
Perforated sand-lime brick	KSL 6	[kN]	0,03
Vertically perforated brick	Hlz 12	[kN]	0,02
Aerated concrete	≥ PB 2, PP 2 (G2)	[kN]	0,02

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load.

## The fire-protection-tested metal insulation support for fire-resistant insulating boards



### BUILDING MATERIALS

- Concrete
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

### CERTIFICATES



### ADVANTAGES

- The metal insulation support achieves fire resistance F 120. This means that it can be used where there are fire resistance requirements.
- The DTM 80 plate for soft insulating materials (available separately) simplifies storage and minimises costs.
- The simple hammer-set installation allows for a quick installation process and thus reduces workload.
- The shaft geometry allows setting in aerated concrete without pre-drilling, thus saving a stage of installation.
- Stainless steel version DHM A2 (1.4301) for wet and exterior applications.

### APPLICATIONS

**To fix fire-resistant soft or pressure-resistant insulating materials, such as:**

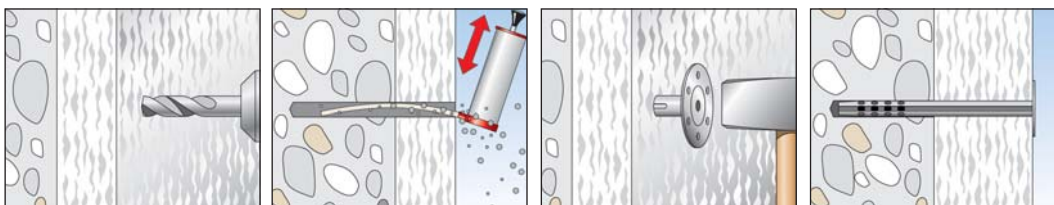
- Mineral / glass wool
- Light building boards made of wood wool
- Foam glass tiles

**Also suitable for:**

- Polystyrene boards
- Coir matting

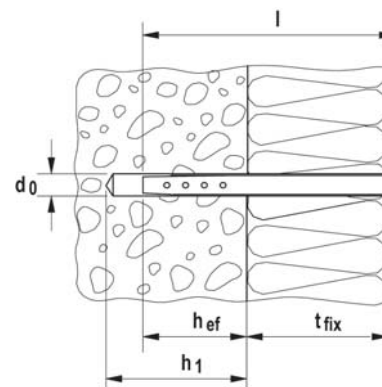
### FUNCTIONING

- The insulation support is set in push-through installation using a hammer.
- The spring steel expands when hammered into the base material.
- Use the DTM 80 plate (available separately) to fix soft insulating materials.





## TECHNICAL DATA



Insulation support metal **DHM**,  
washer-ø 35 mm

Insulation retaining metal washer **DTM 80**,  
washer-ø 80 mm, inside-ø 11 mm

	Hot-dip galva- nised steel	Stainless steel A2	Approval	Drill hole dia- meter	Min. drill hole depth	Effect. anchorage depth	Anchor length	Usable length	Sales unit
	Art.-No.	Art.-No.	DIBt	d <sub>0</sub> [mm]	h <sub>1</sub> [mm]	h <sub>ef</sub> [mm]	l [mm]	t <sub>fix</sub> [mm]	[pcs]
Item	hdg	A2							
<b>DHM 40</b>	<b>536253</b>	<b>536262</b>	•	8	50	40	80	10 - 40	250
<b>DHM 70</b>	<b>536254</b>	<b>536264</b>	•	8	50	40	110	40 - 70	250
<b>DHM 100</b>	<b>536256</b>	<b>536265</b>	•	8	50	40	140	70 - 100	250
<b>DHM 130</b>	<b>536257</b>	<b>536266</b>	•	8	50	40	170	100 - 130	250
<b>DHM 160</b>	<b>536258</b>	<b>536267</b>	•	8	50	40	200	130 - 160	250
<b>DHM 210</b>	<b>536259</b>	<b>536268</b>	•	8	50	40	250	170 - 210	125
<b>DHM 260</b>	<b>536260</b>	<b>536269</b>	•	8	50	40	300	220 - 260	125
<b>DTM 80</b>	<b>536261</b>	<b>536271</b>	•	—	—	—	—	—	250

## ACCESSORIES



Cover cap **DHM ADK-W**



Cover cap **DHM ADK-GR**



Cover cap **DHM ADK-BG**

Item	Art.-No.	Diameter d [mm]	Colour	Outer carton [pcs]	Sales unit [pcs]
<b>DHM ADK-W</b>	<b>013330</b>	37	white	5000	250
<b>DHM ADK-GR</b>	<b>046843</b>	37	grey	10000	250
<b>DHM ADK-BG</b>	<b>046844</b>	37	beige	2500	250

## LOADS

### Insulation support DHM

Highest recommended loads<sup>1)</sup> for a single anchor.

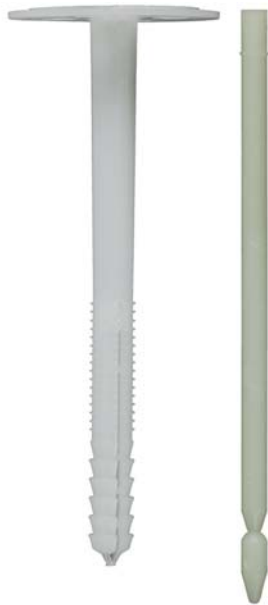
Type	DHM		
Recommended loads in the respective base material $F_{rec}^{2)}$			
Concrete <sup>3)</sup>	≥ C12/15	[kN]	0,25
Solid brick	Mz 12	[kN]	0,25
Solid sand-lime brick	KS 12	[kN]	0,25
Aerated concrete (without pre-drilling)	≥ PB 2, PP 2 (G2)	[kN]	0,10

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load.

<sup>3)</sup> Acc. to German approval in cracked concrete 0,07 kN. The complete approval has to be considered.

## The cost-effective drive anchor with plastic nail



### BUILDING MATERIALS

- Concrete
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

### ADVANTAGES

- The glass-fibre-reinforced plastic nail (GRP nail) reduces the heat transmission and prevents marks on the plaster surface.
- The simple hammer-set installation allows for a quick installation process and thus reduces workload.
- The well-proven design with low anchorage depth reduces the amount of drilling required, thus achieving a high level of efficiency.
- The DIPK can be used universally in rear-ventilated curtain façades, as well as in plaster façades.
- The surface of the anchor plate is suitable to use as a plaster base

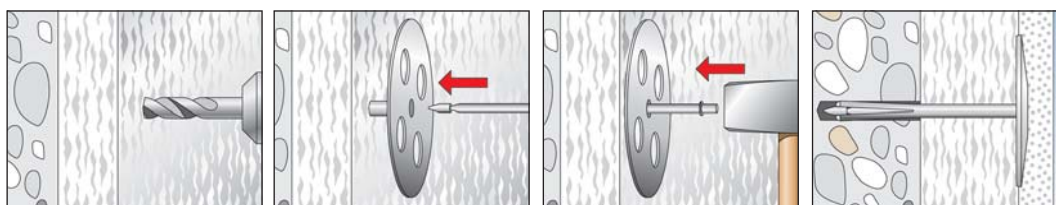
### APPLICATIONS

#### To fix pressure-resistant insulating materials in façades, such as:

- Polystyrene boards
- Light building boards made of wood wool
- Cork boards / coir matting
- PU panels

### FUNCTIONING

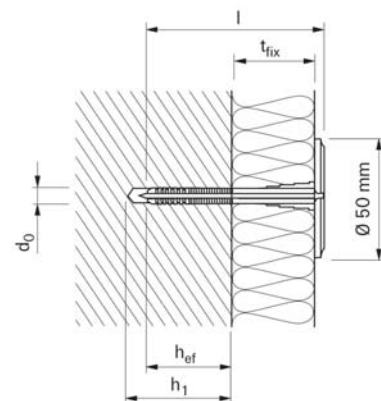
- Non-bearing layers, such as adhesive and/or old render, are to be included in the anchor's useful length.
- The DIPK is set in push-through installation using a hammer.
- In solid materials the GRP nail needs to be shortened at the predetermined breaking point.
- Driving the nail into the anchor shaft causes the DIPK to expand in the base material.



## TECHNICAL DATA



Render fixing DIPK



Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Usable length $t_{fix}$ [mm]	Min. drill hole depth $h_1$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Nail length [mm]	Fixing length $l$ [mm]	Sales unit [pcs]
<b>DIPK 8/20-40</b>	<b>041865</b>	8	20 - 40	40	30	77	70	200
<b>DIPK 8/40-60</b>	<b>041866</b>	8	40 - 60	40	30	97	90	200
<b>DIPK 8/60-80</b>	<b>041867</b>	8	60 - 80	40	30	117	110	200
<b>DIPK 8/80-100</b>	<b>041868</b>	8	80 - 100	40	30	137	130	200
<b>DIPK 8/100-120</b>	<b>041869</b>	8	110 - 120	40	30	157	150	200
<b>DIPK 10/10-30</b>	<b>043966</b>	10	10 - 30	40	30	67	60	200
<b>DIPK 10/40-60</b>	<b>043967</b>	10	40 - 60	40	30	97	90	200
<b>DIPK 10/60-80</b>	<b>043968</b>	10	60 - 80	40	30	117	110	200
<b>DIPK 10/80-100</b>	<b>043969</b>	10	80 - 100	40	30	137	130	200
<b>DIPK 10/100-120</b>	<b>043970</b>	10	110 - 120	40	30	157	150	200
<b>DIPK 10/120-140</b>	<b>043971</b> <sup>1)</sup>	10	120 - 140	40	30	117	170	200
<b>DIPK 10/140-160</b>	<b>043972</b> <sup>1)</sup>	10	140 - 160	40	30	137	190	200

1) Installation with setting tool, included in each package.

## The pre-assembled drive anchor with reinforced plastic nail



### BUILDING MATERIALS

- Building material classes A, B, C, D, E
- Concrete
- Building brick
- Solid sand-lime brick
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Lightweight aggregate concrete
- Aerated concrete

### APPROVALS



### ADVANTAGES

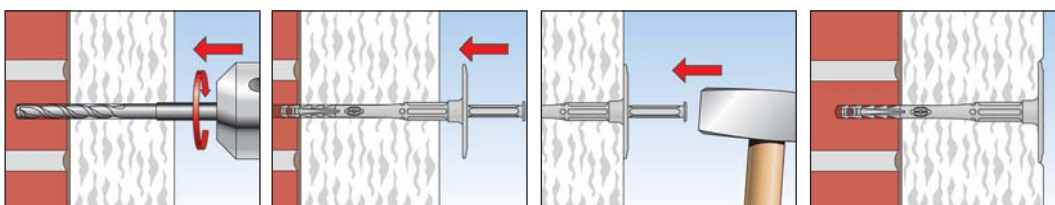
- To set with few hammer blows.
- The disc fits tight into the insulation thanks to its thickness of only 2.5 mm. Thus allows the application of low-cost, thin reinforcement layers.
- Optimised retention forces thanks to the glass fibre reinforced plastic nail (GRP).
- Small anchoring depth of 35 mm saves on drilling times.
- Thanks to the GRP nail, the fixing is free of thermal bridging with the Chi value 0.000 [W/K].
- The compression zone in the shank allows the disc to be drawn precisely into the insulation.
- For insulating material thicknesses up to 180 mm.

### APPLICATIONS

- Attachment of ETICS insulating boards on concrete and masonry
- Flush-to-surface installation in ETICS insulating materials e.g. polystyrene

### FUNCTIONING

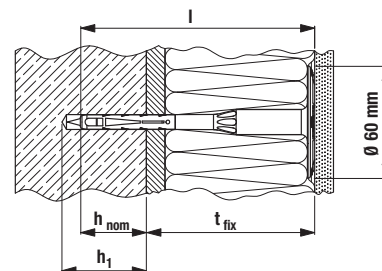
- The fixing is set in push-through installation.
- Simple, fast setting by driving the GRP nail in using a standard hammer.
- Non load bearing layers such as adhesive and old plaster are included in the maximum useful length.



## TECHNICAL DATA



Render fixing **FIF-PN 8**



$t_{fix}$  = thickness of insulation + glue + old render

For building material categorie A, B, C

Item	Art.-No.	Approval ETA	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. anchorage depth $h_{nom}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Disc Ø [mm]	Sales unit [pcs]
<b>FIF-PN 8/60</b>	<b>546803</b>	■	8	45	35	108	70	60	100
<b>FIF-PN 8/80</b>	<b>546804</b>	■	8	45	35	128	90	60	100
<b>FIF-PN 8/100</b>	<b>546805</b>	■	8	45	35	148	110	60	100
<b>FIF-PN 8/120</b>	<b>546806</b>	■	8	45	35	168	130	60	100
<b>FIF-PN 8/140</b>	<b>546807</b>	■	8	45	35	188	150	60	100
<b>FIF-PN 8/160</b>	<b>546808</b>	■	8	45	35	208	170	60	100
<b>FIF-PN 8/180</b>	<b>546809</b>	■	8	45	35	228	190	60	100

For building material categorie D, E

Item	Art.-No.	Approval ETA	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. anchorage depth $h_{nom}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Disc Ø [mm]	Sales unit [pcs]
<b>FIF-PN 8/60</b>	<b>546803</b>	■	8	65	55	108	50	60	100
<b>FIF-PN 8/80</b>	<b>546804</b>	■	8	65	55	128	70	60	100
<b>FIF-PN 8/100</b>	<b>546805</b>	■	8	65	55	148	90	60	100
<b>FIF-PN 8/120</b>	<b>546806</b>	■	8	65	55	168	110	60	100
<b>FIF-PN 8/140</b>	<b>546807</b>	■	8	65	55	188	130	60	100
<b>FIF-PN 8/160</b>	<b>546808</b>	■	8	65	55	208	150	60	100
<b>FIF-PN 8/180</b>	<b>546809</b>	■	8	65	55	228	170	60	100

11

Insulation fixings / Façade fixings

## LOADS

### Render fixing FIF-PN 8

Highest permissible loads for a single anchor<sup>1) 4)</sup> for fixing of external thermal insulation composite systems with rendering.

For the design the complete assessment ETA-18/0253 has to be considered.

					Beton und Mauerwerk <sup>5)</sup>		
Base material	Brick raw density	Minimum compressive brick strength	Min. embedment depth	Min. member thickness	Permissible tensile load <sup>3)</sup>	Minimum spacing <sup>2)</sup>	Minimum edge distance <sup>2)</sup>
	$\rho$ [kg/dm <sup>3</sup> ]	$f_b$ [N/mm <sup>2</sup> ]	$h_{nom}$ [mm]	$h_{min}$ [mm]	$N_{perm}$ [kN]	$s_{min}$ [mm]	$c_{min}$ [mm]
<b>Concrete according to EN 206-1:2013</b>							
FIF-PN 8	C12/15 - C50/60		35 <sup>6)</sup>	100	0,17	100	100
<b>Solid clay bricks Mz according to EN 771-1:2011</b>							
FIF-PN 8	$\geq 2,0$	12	35 <sup>6)</sup>	100	0,17	100	100
<b>Vertically perforated clay bricks HLz according to EN 771-1:2011</b>							
FIF-PN 8	$\geq 1,0$	12	35 <sup>7)</sup>	100	0,13	100	100
<b>Lightweight aggregate concrete LAC according to EN 1520:2011</b>							
FIF-PN 8	$\geq 0,8$	6	55 <sup>6)</sup>	100	0,10	100	100
<b>Autoclaved aerated concrete blocks AAC according to EN 771-4:2011</b>							
FIF-PN 8	$\geq 0,5$	6	55 <sup>7)</sup>	100	0,10	100	100

<sup>1)</sup> The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of  $\gamma_F = 1,5$  are considered.

<sup>2)</sup> Possible minimum spacing resp. edge distance according to assessment.

<sup>3)</sup> Plastic anchor for fixing of external thermal insulation composite systems with rendering according to ETAG014. Only tensile wind loads are permitted.

<sup>4)</sup> The given loads are valid for installation and use of fixations in dry base material for temperatures in the substrate up to +24 °C (resp. short term up to +40 °C).

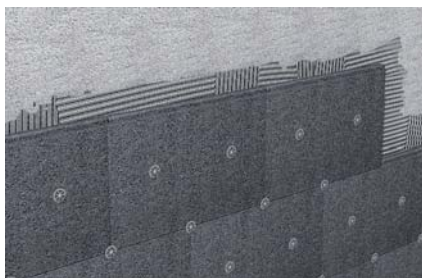
<sup>5)</sup> Restrictions concerning the manufacturer and the permissible hole patterns as well as the web thickness see assessment.

<sup>6)</sup> Drill method hammer drilling.

<sup>7)</sup> Hammer drilling.



## The pre-assembled drive anchor with innovative steel-plastic nail



Additional reinforcement of ETICS



Detail: innovative steel-plastic combination

### BUILDING MATERIALS

- Building material classes A, B, C, D, E
- Concrete
- Full blocks made from concrete
- Building brick
- Solid sand-lime brick
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Lightweight aggregate concrete
- Aerated concrete

### APPROVALS



### ADVANTAGES

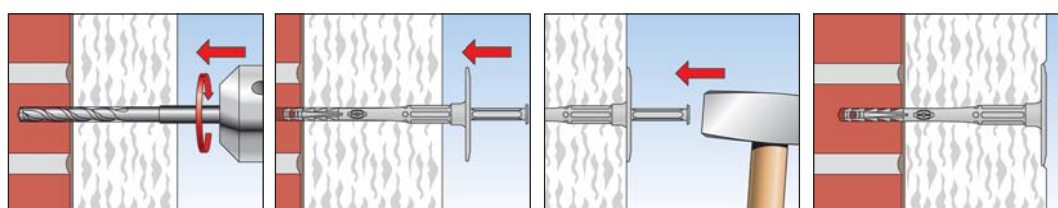
- To set with few hammer blows.
- The disc fits tight into the insulation thanks to its thickness of only 2.5 mm. Thus allows the application of low-cost, thin reinforcement layers.
- High retention forces thanks to the steel tip of the compound nail.
- Small anchoring depth of 35 mm saves on drilling times.
- The FIF-CN II 8 is virtually free of thermal bridging due to the compound nail.
- The compression zone in the shank allows the disc to be drawn in precisely.
- For insulating material thicknesses up to 340 mm.

### APPLICATIONS

- Attachment of ETICS insulating boards on concrete and masonry
- Flush-to-surface installation in ETICS insulating materials and mineral wool e.g. polystyrene

### FUNCTIONING

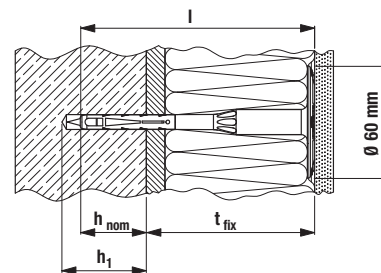
- The fixing is set in push-through installation.
- Simple, fast setting by driving the compound nail in using a standard hammer.
- Non load bearing layers such as adhesive and old plaster are included in the maximum useful length.



## TECHNICAL DATA



Render fixing **FIF-CN II 8**



$t_{fix}$  = thickness of insulation + glue + old render

For building material categorie A, B, C

Item	Art.-No.	Approval ETA	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. anchorage depth $h_{nom}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Disc Ø [mm]	Sales unit [pcs]
FIF-CN II 8/60	546443	■	8	45	35	108	70	60	100
FIF-CN II 8/80	546444	■	8	45	35	128	90	60	100
FIF-CN II 8/100	546445	■	8	45	35	148	110	60	100
FIF-CN II 8/120	546446	■	8	45	35	168	130	60	100
FIF-CN II 8/140	546447	■	8	45	35	188	150	60	100
FIF-CN II 8/160	546448	■	8	45	35	208	170	60	100
FIF-CN II 8/180	546449	■	8	45	35	228	190	60	100
FIF-CN II 8/200	546450	■	8	45	35	248	210	60	100
FIF-CN II 8/220	546451	■	8	45	35	268	230	60	100
FIF-CN II 8/240	546452	■	8	45	35	288	250	60	100
FIF-CN II 8/260	546453	■	8	45	35	308	270	60	100
FIF-CN II 8/280	546454	■	8	45	35	328	290	60	100
FIF-CN II 8/300	546455	■	8	45	35	348	310	60	100
FIF-CN II 8/320	546456	■	8	45	35	368	330	60	100
FIF-CN II 8/340	546457	■	8	45	35	388	350	60	100

For building material categorie D, E

Item	Art.-No.	Approval ETA	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Min. anchorage depth $h_{nom}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Disc Ø [mm]	Sales unit [pcs]
FIF-CN II 8/60	546443	■	8	65	55	108	50	60	100
FIF-CN II 8/80	546444	■	8	65	55	128	70	60	100
FIF-CN II 8/100	546445	■	8	65	55	148	90	60	100
FIF-CN II 8/120	546446	■	8	65	55	168	110	60	100
FIF-CN II 8/140	546447	■	8	65	55	188	130	60	100
FIF-CN II 8/160	546448	■	8	65	55	208	150	60	100
FIF-CN II 8/180	546449	■	8	65	55	228	170	60	100
FIF-CN II 8/200	546450	■	8	65	55	248	190	60	100
FIF-CN II 8/220	546451	■	8	65	55	268	210	60	100
FIF-CN II 8/240	546452	■	8	65	55	288	230	60	100
FIF-CN II 8/260	546453	■	8	65	55	308	250	60	100
FIF-CN II 8/280	546454	■	8	65	55	328	270	60	100
FIF-CN II 8/300	546455	■	8	65	55	348	290	60	100
FIF-CN II 8/320	546456	■	8	65	55	368	310	60	100
FIF-CN II 8/340	546457	■	8	65	55	388	330	60	100

## LOADS

### Render fixing FIF-CN II 8 3)

Highest permissible loads for a single anchor<sup>1) 4)</sup> for fixing of external thermal insulation composite systems with rendering.

For the design the complete assessment ETA-18/0393 has to be considered.

					Beton und Mauerwerk <sup>5)</sup>		
Base material	Brick raw density	Minimum compressive brick strength	Min. embedment depth	Min. member thickness	Permissible tensile load <sup>3)</sup>	Minimum spacing <sup>2)</sup>	Minimum edge distance <sup>2)</sup>
	$\rho$ [kg/dm <sup>3</sup> ]	$f_b$ [N/mm <sup>2</sup> ]	$h_{nom}$ [mm]	$h_{min}$ [mm]	$N_{perm}$ [kN]	$s_{min}$ [mm]	$c_{min}$ [mm]
<b>Concrete according to EN 206-1:2000</b>							
FIF-CN II 8	C12/15 – C50/60		35 <sup>6)</sup>	100	0,25	100	100
<b>Solid clay bricks Mz according to EN 771-1:2011</b>							
FIF-CN II 8	≥ 2,0	12	35 <sup>6)</sup>	100	0,25	100	100
<b>Vertically perforated clay bricks HLz according to EN 771-1:2011</b>							
FIF-CN II 8	≥ 1,0	12	35 <sup>7)</sup>	100	0,17	100	100
<b>Lightweight aggregate concrete LAC according to EN 1520:2011</b>							
FIF-CN II 8	≥ 0,8	6	55 <sup>6)</sup>	100	0,17	100	100
<b>Autoclaved aerated concrete blocks AAC according to EN 771-4:2011</b>							
FIF-CN II 8	≥ 0,5	4	55 <sup>7)</sup>	100	0,10	100	100

<sup>1)</sup> The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of  $\gamma_L = 1,5$  berücksichtigt.

<sup>2)</sup> Possible minimum spacing resp. edge distance according to assessment.

<sup>3)</sup> Plastic anchor for fixing of external thermal insulation composite systems with rendering according to ETAG014. Only tensile wind loads are permitted.

<sup>4)</sup> The given loads are valid for installation and use of fixations in dry base material for temperatures in the substrate up to +24 °C (resp. short term up to +40 °C).

<sup>5)</sup> Restrictions concerning the manufacturer and the permissible hole patterns as well as the web thickness see assessment.

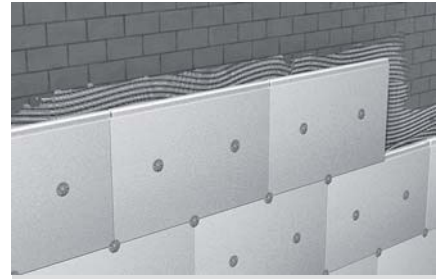
<sup>6)</sup> Drill method hammer drilling.

<sup>7)</sup> Hammer drilling.

## The economic screw fixing for all ETICS insulation materials



Screwed fixing of insulation boards



Polystyrene rigid foam boards O35 on perforated sand-lime brick

### BUILDING MATERIALS

- Building material classes A, B, C, D, E
- Concrete
- Concrete (weather shell)
- Building brick
- Solid sand-lime brick
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Lightweight aggregate concrete
- Aerated concrete

### APPROVALS



### ADVANTAGES

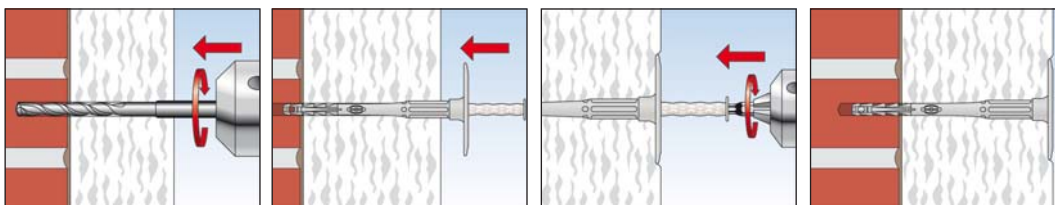
- Compound screw minimises the thermal bridge, thus there are no fixing marks on the façade.
- Less drill wear and drill time due to minimum installation depth of 35 mm in the substrate.
- With flush installation, the disc tapers to a very thin edge, thus providing for optimal retaining of the insulation panel and for application of thin render.
- For insulation material thicknesses up to 340 mm.
- Standard embedment depth for all building materials.

### APPLICATIONS

- Attachment of ETICS insulating boards on concrete and masonry
- Flush installation in all conventional insulation materials

### FUNCTIONING

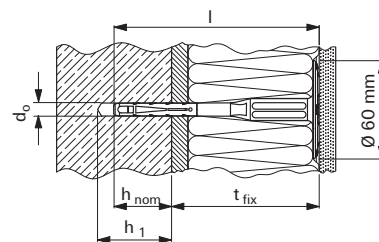
- The fixing is pushed through the insulation into the drilled hole and is screwed tight.
- For lengths from 250 mm, at least 180 mm long T25 bits are required. These are not included in the delivery assortment.



## TECHNICAL DATA



Render fixing **FIF-CS 8**



Item	Art.-No.	Approval ETA	Drill hole diameter $d_0$ [mm]	Min. drill hole depth $h_1$ [mm]	Effect. anchorage depth $h_{nom}$ [mm]	Anchor length $l$ [mm]	Max. fixture thickness $t_{fix}$ [mm]	Disc Ø [mm]	Sales unit [pcs]
FIF-CS 8/60	534157	■	8	45	35	108	70	60	100
FIF-CS 8/80	534158	■	8	45	35	128	90	60	100
FIF-CS 8/100	534159	■	8	45	35	148	110	60	100
FIF-CS 8/120	534160	■	8	45	35	168	130	60	100
FIF-CS 8/140	534161	■	8	45	35	188	150	60	100
FIF-CS 8/160	534162	■	8	45	35	208	170	60	100
FIF-CS 8/180	534163	■	8	45	35	228	190	60	100
FIF-CS 8/200	534164	■	8	45	35	248	210	60	100
FIF-CS 8/220	534165	■	8	45	35	268	230	60	100
FIF-CS 8/240	534166	■	8	45	35	288	250	60	100
FIF-CS 8/260	534167	■	8	45	35	308	270	60	100
FIF-CS 8/280	534168	■	8	45	35	328	290	60	100
FIF-CS 8/300	534169	■	8	45	35	348	310	60	100
FIF-CS 8/320	534170	■	8	45	35	368	330	60	100
FIF-CS 8/340	534171	■	8	45	35	388	350	60	100

## LOADS

### Render fixing FIF-CS 8 <sup>3)</sup>

Highest permissible loads for a single anchor<sup>1) 4)</sup> for fixing of external thermal insulation composite systems with rendering.

For the design the complete assessment ETA-15/0006 has to be considered.

					Beton und Mauerwerk <sup>5)</sup>		
Base material	Brick raw density $\rho$ [kg/dm <sup>3</sup> ]	Minimum compres- sive brick strength $f_b$ [N/mm <sup>2</sup> ]	Min. embedment depth $h_{nom}$ [mm]	Min. member thickness $h_{min}$ [mm]	Permissible tensile load <sup>3)</sup> $N_{perm}$ [kN]	Minimum spacing <sup>2)</sup> $s_{min}$ [mm]	Minimum edge distance <sup>2)</sup> $c_{min}$ [mm]
<b>Concrete according to EN 206-1:2000</b>							
FIF-CS 8	C12/15 – C50/60		35 <sup>6)</sup>	100	0,40	100	100
<b>Solid clay bricks Mz according to EN 771-1:2011</b>							
FIF-CS 8	≥ 1,8	20	35 <sup>6)</sup>	100	0,40	100	100
<b>Vertically perforated clay bricks HLz according to EN 771-1:2011</b>							
FIF-CS 8	≥ 1,0	12	25 <sup>7)</sup>	100	0,20	100	100
<b>Lightweight aggregate concrete LAC according to EN 1520:2011</b>							
FIF-CS 8	≥ 0,9	6	35 <sup>6)</sup>	100	0,20	100	100
<b>Autoclaved aerated concrete blocks AAC according to EN 771-4:2011</b>							
FIF-CS 8	≥ 0,5	4	35 <sup>7)</sup>	100	0,10	100	100

<sup>1)</sup> The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of  $\gamma_L = 1,5$  are considered.

<sup>2)</sup> Possible minimum spacing resp. edge distance according to assessment.

<sup>3)</sup> Plastic anchor for fixing of external thermal insulation composite systems with rendering according to ETAG014. Only tensile wind loads are permitted.

<sup>4)</sup> The given loads are valid for installation and use of fixations in dry base material for temperatures in the substrate up to +24 °C (resp. short term up to +40 °C).

<sup>5)</sup> Restrictions concerning the manufacturer and the permissible hole patterns as well as the web thickness see assessment.

<sup>6)</sup> Drill method hammer drilling.

<sup>7)</sup> Hammer drilling.

## Discs for combining nail and frame fixings, as well as screws



Insulating materials in two-leaf external walls

11

Insulation fixings / Façade fixings

### ADVANTAGES

- The various disc diameters allow for individual adaptation to various insulation materials and requirements and offer the greatest flexibility with wide-ranging applications.
- The flexible pins in the DT 90 ensure sustained pressure on the insulation, thus providing a secure hold.
- The DTM 60 made of stainless steel A4 makes it possible to use a frame fixing, and allows for a secure fixing of the insulation material in façade construction in cases of high requirements.

### APPLICATIONS

- To fix soft and pressure-resistant insulation materials.
- DT 90/4 on VB wall tie
- DT 60/10, DTM 60/10 and DTM 70/10 in combination with 10 mm frame fixing
- DT 90/8 and insulation washer 8/60 in combination with 8 mm hammerfix
- HV and HK 36 with 5 mm screws

### FUNCTIONING

- The disc size is to be selected in line with the compressive strength of the insulating material.
- To be combined with anchors, screws or nails corresponding to the available base material.
- DT 90/4 is suitable for pushing on to fischer wall tie VB.



## TECHNICAL DATA



**HV 36 plastic**

**HV 36 zinc**

**ISO-disk 8/60**

**DT 60/10**

**DTM-A4**

**DTM 70/10**

**DT 90**

		Disc Ø	Disc height	Through hole	Steel sheet thickness	Sales unit
Item	Art.-No.	[mm]	[mm]	d <sub>f</sub> [mm]	s [mm]	[pcs]
<b>HK 36 plastic</b>	<b>004283</b>	36	4.5	5	—	100
<b>HV 36 zinc</b>	<b>004286</b>	36	3.5	5	0,7	100
<b>ISO-disk 8/60</b>	<b>001680</b>	60	7	8	—	100
<b>DT 60/10</b>	<b>044317</b>	60	7	10	—	50
<b>DTM 60/10 A4</b>	<b>088805</b>	60	3	10,5	0,5	100
<b>DTM 70/10 zinc</b>	<b>044318</b>	70	3	10,5	—	50
<b>DT 90/4</b>	<b>080957</b> <sup>1)</sup>	90	9.3	4	—	250
<b>DT 90/8</b>	<b>080958</b>	90	9.3	8,2	—	250

1) The central hole is adapted in such a way that the disc clamps well on the 4 mm wire of the VB walltie.

## The installation-friendly polyamide retaining disc for panel building materials



### BUILDING MATERIALS

- Wood and wooden materials
- Sheet thickness up to 0.8 mm

### CERTIFICATES



### ADVANTAGES

- The DHT-S screw allows setting without pre-drilling, thus saving a stage of installation.
- The plug reduces the heat transmission and prevents marks on the plaster surface.
- The extremely thin disc construction allows for use with thin layers of plaster and reinforcements and offers maximum flexibility.

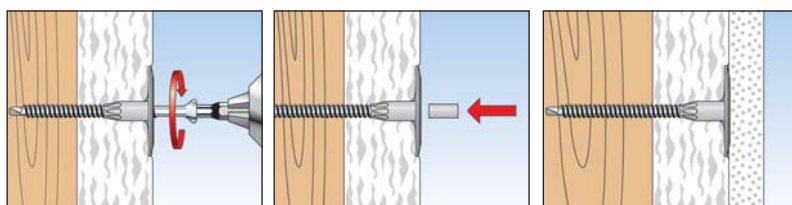
### APPLICATIONS

#### To fix pressure-resistant insulating materials in plaster façades, such as:

- Polystyrene
- PU panels
- Light building boards made of wood wool
- Cork boards / coir matting

### FUNCTIONING

- Non-bearing layers, such as adhesive, are to be included in the useful length.
- The retaining disc with screw is set in push-through installation with a cordless screwdriver.
- A PH2 bit is required for installation.
- After installation, seal the screw hole with the enclosed plug.



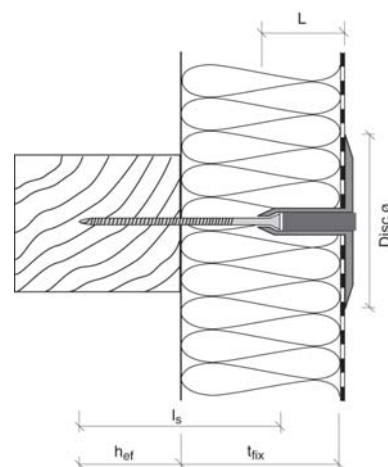
## TECHNICAL DATA



DHT 50/ ... disc

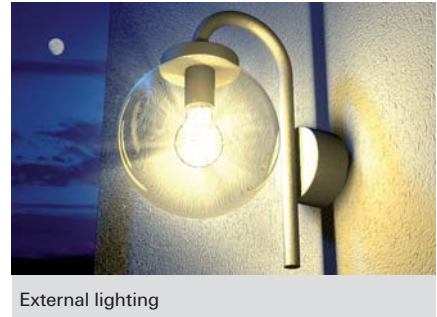


Retaining disc with screw DHT S



Item	Art.-No.	Colour	Usable length $t_{fix}$ [mm]	Shaft length $L$ [mm]	Screw length $l_s$ [mm]	Effect. anchorage depth $h_{ef}$ [mm]	Disc Ø [mm]	Sales unit [pcs]
DHT 50/20 W	044490	white	—	20	—	—	50	500
DHT 50/40 W	044491	white	—	40	—	—	50	500
DHT S 30 W	044390	white	30	20	45	25	50	500
DHT S 50 W	044392	white	40 - 50	20	65	25	50	500
DHT S 70 W	044394	white	60 - 70	40	65	25	50	500
DHT S 80 W	044395	white	70 - 80	40	75	25	50	500
DHT S 100 W	044388	white	90 - 105	40	100	25	50	500
DHT S 120 W	044389	white	110 - 125	40	120	25	50	500
DHT S 150 W	516154	white	140 - 155	40	150	25	50	500

## Thermal bridge-free installation in insulation materials



### BUILDING MATERIALS

- Non-plastered, pressure-resistant insulating boards
- Plastered, pressure-resistant insulating boards
- ETICS insulating boards

### ADVANTAGES

- Since the anchor is set exclusively in the insulation itself, fixtures can be installed without thermal bridges.
- The geometry of the FID allows for a simple installation in thin layers of plaster, without the need for pre-drilling, thus saving a stage of installation.
- The FID 50 is used in thin insulating boards from 50mm. The FID 90 is used in thicker insulating boards, and can bear higher loads.
- The bit mounting allows for setting with standard tools, thus allowing for a fast and economic installation.

### APPLICATIONS

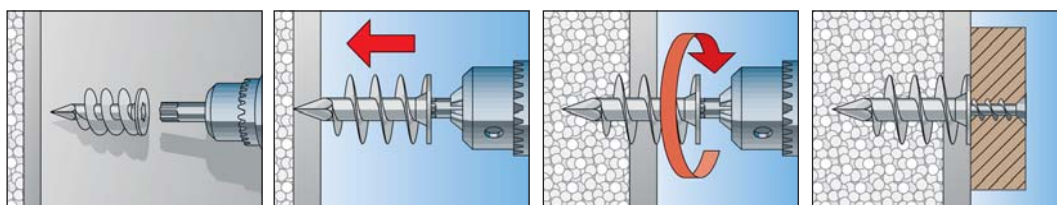
**To fix lightweight fixtures in plastered and non-plastered insulating boards made of polystyrene and polyurethane.**

**The areas of application are:**

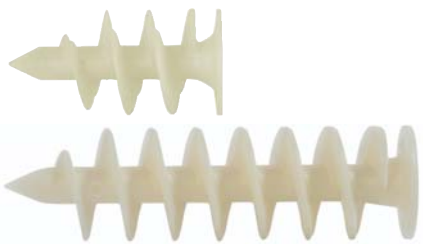
- Façade construction (ETICS)
- Insulating construction
- Electric construction
- Refrigerated and climate construction
- Acoustic construction

### FUNCTIONING

- The FID can be set in the insulating board with a cordless screwdriver or by hand.
- The special spiral thread taps itself in the insulating board.
- Fixtures are fixed with a 4.5 mm screw for the FID 50, and with a 6 mm screw for the FID 90.
- Water ingress in the insulation can be prevented by sealing the plug collar with a suitable sealant after successful pre-positioned installation.
- We recommend to predrill an 6 mm hole in ETICS rendering.

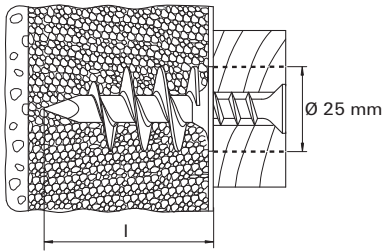


TECHNICAL DATA



Insulation fixing FID 50

Insulation fixing FID 90



		Anchor length	Min. bolt penetration	Wood and chipboard screws	Drive	Sales unit
Item	Art.-No.	l [mm]	[mm]	d <sub>s</sub> [mm]		[pcs]
FID 50	048213	50	50	4,5 - 5	T40	50
FID 90	510971	90	90	6	6 mm / 6-kt	25

LOADS

Insulation fixing FID  
Highest recommended loads<sup>1)</sup> for a single anchor.  
The given loads are valid for chipboard screws with maximum diameter.

Type			FID 50	FID 90
Screw diameter	Ø	[mm]	4,5 - 5,0	6,0
Recommended loads in the respective base material N <sub>rec</sub> <sup>2)</sup>				
Polystyrene	PS 15	[kN]	0,07	0,17
Polystyrene	PS 20	[kN]	0,10	0,20

<sup>1)</sup> Required safety factors are considered.  
<sup>2)</sup> Valid for tensile load.

## Thermal bridge-free installation in insulation materials



External lighting



Letterbox

### BUILDING MATERIALS

- Non-plastered, pressure-resistant insulating boards
- Plastered, pressure-resistant insulating boards
- ETICS insulating boards

### CERTIFICATES



### ADVANTAGES

- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular FID plugs. To fix lightweight fixtures in plastered and non-plastered insulating boards.
- Thermal bridge-free mounting when exclusively set in insulation material.
- Installation without pre-drilling even through thin plaster layers, thus saving a work step.
- Easy to set using a standard bit.

### APPLICATIONS

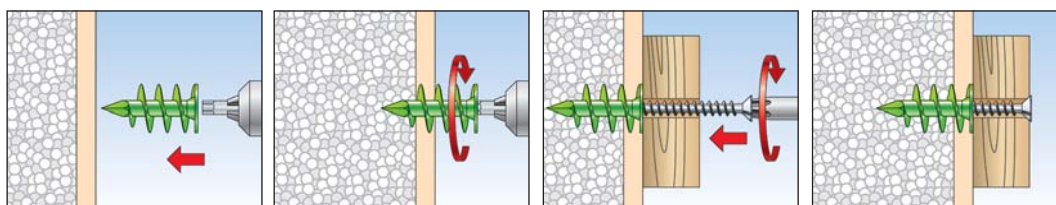
**To fix lightweight fixtures in plastered and non-plastered insulating boards made of polystyrene and polyurethane.**

**The areas of application are:**

- Façade construction (ETICS)
- Insulating construction
- Electric construction
- Refrigerated and climate construction
- Acoustic construction

### FUNCTIONING

- The FID GREEN can be set in pre-positioned installation with a cordless screwdriver or by hand.
- With its strong drill tip, the insulation fixing FID GREEN breaks through thin plaster layers and cuts a positive fit into the insulation panel with its specially shaped spiral thread.
- From a plaster thickness of 5 mm, we recommend to create a 6 mm hole. This serves for better guidance of the fastener in the setting process.
- Water ingress in the insulation material can be prevented by sealing the plug collar after successful installation.
- Attachment parts can be easily attached with screws.
- We recommend to predrill an 6 mm hole in ETICS rendering.





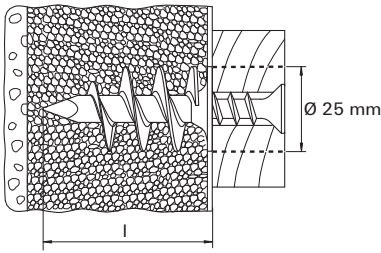
## TECHNICAL DATA



Insulation fixing **FID GREEN 50**



Insulation fixing **FID GREEN 90**



Item	Art.-No.	Anchor length l [mm]	Min. bolt penetration [mm]	Wood and chipboard screws d <sub>s</sub> [mm]	Drive	Sales unit [pcs]
<b>FID GREEN 50</b>	<b>524851</b>	50	50	4,5 - 5	T40	45
<b>FID GREEN 90</b>	<b>524852</b>	90	90	6	Inbus 6 mm	20

## LOADS

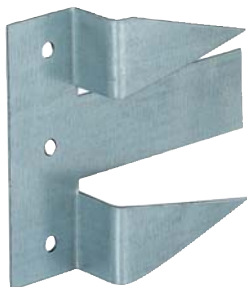
### Insulation fixing FID GREEN

Highest recommended loads<sup>1)</sup> for a single anchor.  
The given loads are valid for chipboard screws with maximum diameter.

Type			FID GREEN 50	FID GREEN 90
Screw diameter	Ø	[mm]	4,5 - 5,0	6,0
<b>Recommended loads in the respective base material N<sub>rec</sub><sup>2)</sup></b>				
Polystyrene	PS 15	[kN]	0,07	0,17
Polystyrene	PS 20	[kN]	0,10	0,20

<sup>1)</sup> Required safety factors are considered.  
<sup>2)</sup> Valid for tensile load.

## The installation-friendly insulation clamp



### BUILDING MATERIALS

- Wooden materials
- Wooden panel materials

### ADVANTAGES

- The holding clamp DVN allows for a hidden installation for a homogeneous surface.
- The complete fixing system, comprising the clamp and zinc-plated nails, allows for an immediate installation in line with building requirements.
- The Sendzimir-galvanised steel claw allows for durable use for the secure anchoring of pressure-resistant insulation materials.

### APPLICATIONS

- To fix pressure-resistant insulation materials (e.g. polystyrene, PU panels, glass foam boards) onto timber sub-structures, predominantly in the ceiling area

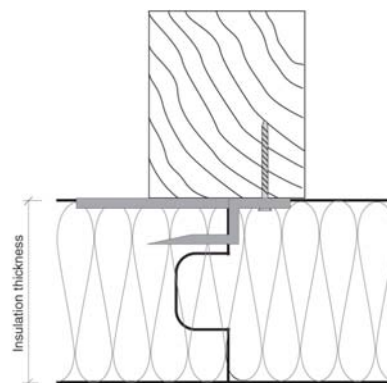
### FUNCTIONING

- The holding clamp is fixed with the supplied nails on the wooden sub-structure with a hammer.
- The points of the holding clamp DVN are pushed into the slot side of the insulating board until it is held securely.

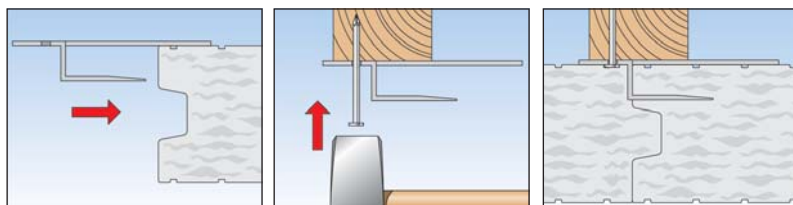
### TECHNICAL DATA



Clamp DVN



Item	Art.-No.	For insulation thickness	Sales unit
		[mm]	[pcs]
DVN 15	047240	up to 60	250
DVN 30	047243	from 80	250



## The pre-assembled fibre cement panel screw



Corrugated root tiles made of fibre cement

### BUILDING MATERIALS

- Wood
- Wooden panel materials

### ADVANTAGES

- The screw is pre-fitted with a seal washer. This provides a complete fixing set for a simple installation.
- The screw is protected against corrosion and thus withstands the stresses of weather when used outside.

### APPLICATIONS

#### For fixing of:

- Fibre cement panels
- Undulating roof tiles

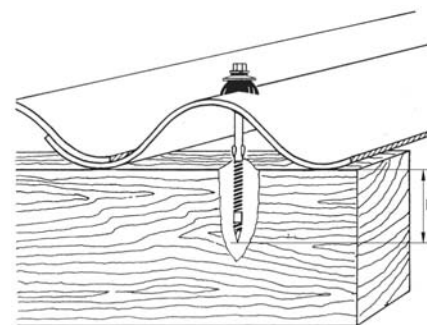
### FUNCTIONING

- The screw is set in push-through installation using a cordless screwdriver. No pre-drilling of the fibre cement panel is required.

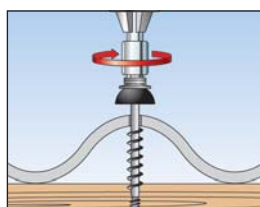
### TECHNICAL DATA



Fibre cement panel screw **FAFZ H**



































Item	Art.-No.	Diameter x length	Min. bolt penetration	Sales unit
		[mm]	l + 5 [mm]	[pcs]
<b>FAFZ-H 6,5 x 130 DS 25</b>	<b>092210</b>	6,5 x 130	50	100







# 12 Foams, sealants

	Page		Page
One-component gun foam PUP S 750	 502	Premium silicone for natural stone DNS	 522
One-component premium gun foam PUP 750	 503	Premium B1 silicone DFS	 523
One-component maxi gun foam PUP S 500	 504	Construction sealant Premium DKM	 524
One-component premium gun foam compact PUP 500	 505	Façade acrylic Premium DFA	 525
One-component premium gun foam PUP 750 B3	 506	Premium painting acrylic DMA	 526
One-component premium gun foam PUP BS 750	 507	Premium structured acrylic DSA	 527
One-component premium B1 gun foam PUP B1 750	 508	Acrylic sealant DA	 528
One-component premium adhesive foam PUP ETICS 750	 509	Repair mortar DEC	 529
One-component premium perimeter adhesive foam PUP P 750	 510	Premium all-weather sealant DDK	 530
One-component rapid installation foam PU S 500/750	 511	Roof sealing compound DD	 531
One-component premium rapid installation foam PU 500/750	 512	Accessories for sealants	 532
2-component premium rapid foam 2K PU 400	 513	Sealant selection matrix	534
Accessories	 514	Zinc spray FTC-ZS	 536
Premium sanitary silicone DSSA	 516	Zinc spray bright grade FTC-ZB	 537
Sanitary silicone DSSI	 517	Zinc-alu spray FTC-ZA	 538
Multi-silicone DMS	 518		
Premium high temperature silicone DHS	 519		
Premium construction silicone DBSA	 520		
Roof and wall silicone DBSI	 521		

## The gun foam with proven joint sound-proofing, thermal insulation and water pressure resistance for professionals



Window connection joints



Filling pipe penetrations

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Fibre cement
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster
- Stone

### CERTIFICATES

- General test certificate from building authorities P-ND504-137 for B2
- Proven joint soundproofing  $R(ST,w)=61 (-1;-3)$  dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss at  $0.0345 \text{ W} / (\text{m} \cdot \text{K})$
- Based on DIN 18542 proven air tightness of  $a < 0,1 \text{ m}^3 / [\text{h} \cdot \text{m}^2 (\text{daPa})^{2/3}]$
- Test for watertightness for the adhesion of manhole rings
- French VOC-emission class A+

### ADVANTAGES

- The proven 61 dB sound insulation fulfills the standards of modern sound insulation and helps to reduce noise.
- The thermal protection and proven airtightness allows compliance with energy saving according to EnEV and substantiated as effective reduction of heat loss.
- External testing of watertightness when used in connection with hinged manhole rings fulfils the requirements for a well foam.
- The low level foam expansion during the curing period avoids reworking, thus guaranteeing a simple and time-saving application.
- The new non-sticking safety valve guarantees long-lasting functionality.

### APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- To insulate and fill wall penetrations, cavities, wall connections and finished elements
- To seal and bind well shafts, manhole shafts, domestic sewage treatment plants and cisterns

### FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment:  $+10 \text{ }^{\circ}\text{C}$  to  $+30 \text{ }^{\circ}\text{C}$  (can temperature:  $+5 \text{ }^{\circ}\text{C}$  to  $+30 \text{ }^{\circ}\text{C}$ )
- Non-tacky after approx. 15 minutes
- Hardened after approx. 24 hours
- Temperature resistant from  $-40 \text{ }^{\circ}\text{C}$  to  $+90 \text{ }^{\circ}\text{C}$
- Layer thicknesses  $> 50 \text{ mm}$  foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PUP S 750 (DE)	539197 <sup>1)</sup>	750	45	beige	12
PUP S 750 B2	040302	750	45	beige	12

<sup>1)</sup> Without protective gloves, for commercial users only.



## The gun foam with proven sound and thermal insulation as well as increased foam yield



Window connection joints



Connection joints around shutter boxes

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- General test certificate from building authorities P-NDS04-137
- Proven joint soundproofing  $R(ST,w)=61 (-1;-3)$  dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss by  $0.0345 \text{ W}/(\text{m}^2\text{K})$
- Based on DIN 18542, proven airtightness of  $a < 0.1 \text{ m}^3/[\text{h} \cdot \text{m}^2 (\text{daPa})^{2/3}]$
- French VOC-emission class A+

### ADVANTAGES

- The thermal protection and proven reduction of air permeability fulfil the high standards for modern thermal protection.
- The proven 6 dB sound insulation fulfils the standards of modern sound insulation and helps to reduce noise.
- The high yield of up to 55 l reduces the number of cans needed, thus ensuring maximum economic efficiency.
- The low level of foam expansion during the curing period avoids reworking, thus guaranteeing a simple and time-saving application.
- The new safety valve prevents adhesion when being stored horizontally or during long interruptions of work, thus guaranteeing long-lasting functionality.

### APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling in roofing work and dry construction
- Insulating and filling finished elements, wall connections, wall penetrations and cavities
- Insulating and filling pipe penetrations and ventilation ducts

### FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment:  $+5^\circ\text{C}$  to  $+35^\circ\text{C}$  (can temperature:  $+5^\circ\text{C}$  to  $+30^\circ\text{C}$ )
- Non-tacky after approx. 25 minutes
- Can be cut after approx. 1 hour
- Hardened after approx. 24 hours
- Temperature resistant from  $-40^\circ\text{C}$  to  $+90^\circ\text{C}$
- Layer thicknesses  $> 50 \text{ mm}$ : foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

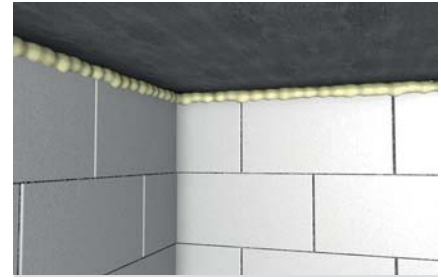
### TECHNICAL DATA

		Content per can	Max. foam yield (free foaming)	Colour	Sales unit
Item	Art.-No.	[ml]	[l]		[pcs]
PUP 750 (DE)	053084	825	55	beige	12

## The proven sound and thermal insulation foam with higher foam yield for professionals in a short can



Window connection joints



Closing joints in structural work

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- General test certificate from building authorities P-NDS04-137 für B2
- Proven joint soundproofing:  $R(ST,w)=61 (-1;-3)$  dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss at  $0.0345 \text{ W}/(\text{m} \cdot \text{K})$
- Based on DIN 18542 proven airtightness of  $a < 0,1 \text{ m}^3/[\text{h} \cdot \text{m}^2(\text{daPa})^{2/3}]$
- French VOC-emission class A+

### ADVANTAGES

- The short, handy can allows the correct positioning in awkward places and leads without premature gas loss to a high emptying of residues.
- The low level of foam expansion during the curing period avoids reworking, thus guaranteeing a simple and time-saving application.
- The thermal protection and proven airtightness allows compliance with energy saving according to EnEV and substantiated as effective reduction of heat loss.
- The high joint soundproofing of 61 dB fulfils the standards of modern sound insulation and helps to reduce noise.

### APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling finished elements, wall connections, wall penetrations and cavities
- Insulating and filling in roofing work and dry construction (e.g. in the ceiling area)
- Insulating and filling pipe penetrations and ventilation ducts

### FUNCTIONING

- 1-component PU foam
- Building material class B2
- Low post-expansion
- Processing temperature environment:  $\pm 0 \text{ }^{\circ}\text{C}$  to  $+35 \text{ }^{\circ}\text{C}$  (can temperature:  $+5 \text{ }^{\circ}\text{C}$  to  $+20 \text{ }^{\circ}\text{C}$ )
- Non-tacky after approx. 8 minutes
- Can be cut after approx. 20 minutes
- Temperature resistant from  $-40 \text{ }^{\circ}\text{C}$  to  $+90 \text{ }^{\circ}\text{C}$
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

Item	Art.-No.	Content per can	Max. foam yield (free foaming)	Colour	Sales unit
		[ml]	[l]		[pcs]
<b>PUP S 500 (DE)</b>	<b>539163</b>	500	43	beige	12

1) Without protective gloves, for commercial users only.

## The grey gun foam in the compact can with high foam yield



Window connection joints



Closing joints in structural work

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- General test certificate from building authorities P-NDS04-137
- Proven joint soundproofing  $R(ST,w)=61$  (-1;-3) dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss by  $0.0345 \text{ W/(m}^2\text{K)}$
- Based on DIN 18542, proven airtightness of  $a < 0.1 \text{ m}^3/[\text{h} \cdot \text{m}^2(\text{daPa})^{2/3}]$

### ADVANTAGES

- The compact, handy can allows for use in difficult to access areas, and achieves a high degree of emptying without premature loss of gas.
- The grey colour of the foam is ideally suited to concrete substrates and allows for an inconspicuous filling of joints.
- The proven thermal protection and reduction of air permeability fulfil the high standards for modern thermal protection.
- The proven 61 dB sound insulation fulfils the standards of modern sound insulation and helps to reduce noise.
- The new safety valve prevents adhesion when being stored horizontally or during long interruptions of work, thus guaranteeing long-lasting functionality.

### APPLICATIONS

- Insulating and filling component joints, wall connections and wall penetrations
- Insulating and filling in roofing work and dry construction (e.g. in the ceiling area)
- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling pipe penetrations and ventilation ducts

### FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment: of  $-5 \text{ }^{\circ}\text{C}$  to  $+35 \text{ }^{\circ}\text{C}$  (can temperature:  $+5 \text{ }^{\circ}\text{C}$  to  $+20 \text{ }^{\circ}\text{C}$ )
- Non-tacky after approx. 8 minutes
- Can be cut after approx. 20 minutes
- Cures within 5 to 8 hours
- Temperature resistant from  $-40 \text{ }^{\circ}\text{C}$  to  $+90 \text{ }^{\circ}\text{C}$
- Layer thicknesses  $> 50 \text{ mm}$ : foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

		Content per can	Max. foam yield (free foaming)	Colour	Sales unit
Item	Art.-No.	[ml]	[l]		[pcs]
PUP 500 (DE)	503259	500	43	concrete grey	12

## The gun foam with the perfect dosage



Window connection joints



Connection joints around shutter boxes

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- Proven joint soundproofing  
R(ST,w)=60 (-1;-4) dB in line with ISO  
EN 717-1

### ADVANTAGES

- The low level of foam expansion during the curing period avoids reworking, thus guaranteeing a simple and time-saving application.
- The easy dosage allows for a controlled filling and sealing, and ensures that the correct amount is used.
- The proven 60dB sound insulation fulfils the standards of modern sound insulation and helps to reduce noise.
- The new non-sticking safety valve guarantees long-lasting functionality.

### APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling in roofing work and dry construction
- Insulating and filling finished elements, wall connections, wall penetrations and cavities
- Insulating and filling pipe penetrations and ventilation ducts

### FUNCTIONING

- 1-component PU foam
- Building material class B3
- Processing temperature environment: +5 °C to +35 °C (can temperature: +10 °C to +30 °C)
- Non-tacky after approx. 15 minutes
- Can be cut after approx. 45 minutes
- Cures within 5 to 8 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

Item	Art.-No.	Content per can	Max. foam yield (free foaming)	Colour	Sales unit
		[ml]	[l]		[pcs]
PUP 750 B3 (EN)	058501	750	41	beige	12
PUP 750 B3 GunGrade (EN/FR)	098012	750	41	beige	12

## The gun foam with proven resistance to water pressure



Sealing concrete manhole rings



Filling pipe penetrations

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Fibre cement
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster
- Stone

### CERTIFICATES

- General test certificate from building authorities P-NDS04-137
- Test for watertightness up to 0.5 bar for the adhesion of manhole rings
- Proven joint soundproofing:  $R(ST,w)=61 (-1;-3)$  dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss by  $0.0345 \text{ W}/(\text{m}^2\text{K})$
- Based on DIN 18542, proven airtightness of  $a < 0.1 \text{ m}^3/[\text{h}^* \text{m}^2 (\text{daPa})^{2/3}]$
- French VOC-emission class A+

### ADVANTAGES

- External testing of watertightness when used in connection with hinged manhole rings fulfils the requirements for a well foam.
- The special foam is ready and easy to use, and replaces the time- and work-intensive application of mortar.
- The high resistance to dilute chemicals and mineral oil, the resistance to acids and bacteria found in soil, and the resistance to rot all guarantee a lasting function.
- The easy dosage allows for a controlled filling and sealing, and ensures that the correct amount is used.
- The new non-sticking safety valve guarantees long-lasting functionality.

### APPLICATIONS

- To quickly fill joints between hinged manhole rings
- To seal and bind well shafts, manhole shafts, domestic sewage treatment plants and cisterns
- To insulate and fill wall penetrations, cavities, wall connections and finished elements

### FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment:  $+10^\circ\text{C}$  to  $+30^\circ\text{C}$  (can temperature:  $+5^\circ\text{C}$  to  $+30^\circ\text{C}$ )
- Non-tacky within approx. 15 minutes
- Bind manholes together before skin formation.
- Do not cut or spread foam coming from the hinge.
- Hardened after approx. 24 hours
- Temperature resistant from  $-40^\circ\text{C}$  to  $+90^\circ\text{C}$
- Layer thicknesses  $> 50 \text{ mm}$  foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

		Content per can	Max. foam yield (free foaming)	Colour	Sales unit
Item	Art.-No.	[ml]	[l]		[pcs]
PUP BS 750 B2 (DE/EN)	513763	750	45	beige	12



## The hardly flammable B1 gun foam



Filling cavities in the insulation



Foaming steel door frames

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- General test certificate from building authorities P-NDS04-620
- Proven joint soundproofing: of 10 and 20 mm joint width:  $R_{s,w} (C; C_{tr}) \geq 63 (-2;-5)$  dB
- French VOC-emission class A+

### ADVANTAGES

- The PUFS is hardly flammable in line with the B1 test and can therefore be used between solid, mineral or metal building materials. Thus it provides the highest level of safety.
- The new high-quality safety valve prevents adhesion when being stored horizontally or during long interruptions of work, thus guaranteeing long-lasting functionality.
- The easy dosage allows for a controlled filling and sealing, and ensures that the correct amount is used.

### APPLICATIONS

- High-efficiency thermal insulation on façades
- Insulating and filling in roofing work
- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling finished elements, wall connections, wall penetrations and cavities

### FUNCTIONING

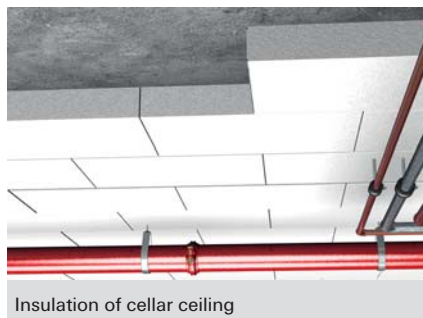
- 1-component PU foam
- Building material class B1
- Foam yield of extruded foam 45 l
- Processing temperature environment: +10 °C to +25 °C (can temperature: +10 °C to +25 °C)
- Non-tacky after approx. 10 minutes
- Can be cut after approx. 40 minutes
- Cures within 5 to 8 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

		Content per can	Max. foam yield (free foaming)	Colour	Sales unit
Item	Art.-No.	[ml]	[l]		[pcs]
PUP B1 750 (DE/EN)	045300	750	45	concrete grey	12



## The adhesive foam for ETIC systems with general technical approval



Insulation of cellar ceiling



Wall insulation

### BUILDING MATERIALS

- EPS-insulation panels
- Concrete
- Bitumen coatings
- Anodised layer
- Gypsum plasterboard
- Wood
- Cold bitumen sheeting
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- Building approval for bonding EPS boards in ETIC systems
- Adhesive tensile strength values (based on ETAG guideline 004/2013, section 5.1.4.1.2)
- French VOC-emission class A+

### ADVANTAGES

- The special recipe guarantees high adhesive tensile strength for secure fixing.
- The high foam yield allows for the bonding of up to 12 m<sup>2</sup> of wall space and is therefore especially economical.
- Really low post-expansion avoids the formation of cavities between the wall and insulation panel and guarantees a secure connection.
- The use of the can/gun system provides a time saving of approx. 30% and thus guarantees efficient work.
- The new non-sticking safety valve guarantees long-lasting functionality.

### APPLICATIONS

- Bonding of EPS rigid foam panels in accordance with ETAG Guideline 004/2013
- Fixing of external wall insulation, internal wall insulation and attic insulation
- Fixing of basement ceiling insulation
- Bonding of perimeter insulation panels

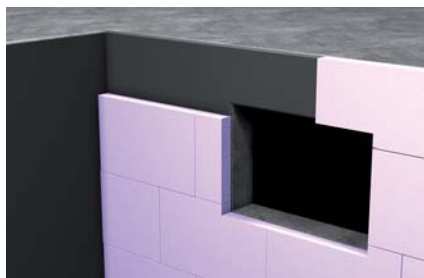
### FUNCTIONING

- 1-component PU foam
- Foam yield sufficient for up to 12 m<sup>2</sup> wall area
- Processing temperature environment: +5 °C to +25 °C (can temperature: +10 °C to +25 °C)
- Open Time approx. 10 minutes
- Can be cut after approx. 20 minutes
- Temperature resistant from -40 °C to +90 °C
- Extremely high heat insulation properties
- Shear resistance (EN 12090) 38,7 kPa
- Fresh foam stains can be removed immediately with fischer PU cleaner.
- When pressed on, an adhesive surface percentage of at least 40% must be achieved.
- Do not knock the insulation panels against the wall (this damages the foam structure).

### TECHNICAL DATA

Item	Art.-No.	Content per can	Max. foam yield	Colour	Sales unit
		[ml]	[m <sup>2</sup> ]		[pcs]
<b>PUP WDVS 750 (DE)</b>	<b>539164</b>	750	up to 12	light green	12
<b>PUP 750 ETICS (EN)</b>	<b>543448</b>	750	up to 12	light green	12

## The economic adhesive foam for perimeter insulation boards



Bonding perimeter insulation boards



Filling pipe penetrations

### BUILDING MATERIALS

- Concrete
- Bitumen coatings
- Anodised layer
- Gypsum plasterboard
- Wood
- Cold bitumen sheeting
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- General test certificate from building authorities P-NDS04-772
- French VOC-emission class A+

### ADVANTAGES

- The high foam yield allows for the bonding of approx. 13 m<sup>2</sup> of wall space, and is therefore especially economical.
- The use of the can/gun system provides a time saving of approx. 30% and thus guarantees efficient work.
- The special PU foam formulation ensures the best adhesion to concrete and bituminous substrates, and allows for the long-term fixing of insulation boards.
- The very low level of post-expansion avoids the formation of cavities and guarantees a long-lasting insulation.
- The new non-sticking safety valve guarantees long-lasting functionality.

### APPLICATIONS

- Bonding expanded polystyrene panels
- Insulating and filling wall penetrations
- Foaming in electrical installations
- Filling joints and cavities in all internal constructions
- Fixing and sealing walls and ceilings

### FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment: +10 °C to +25 °C (can temperature: +5 °C to +25 °C)
- Non-tacky after approx. 10 minutes
- Can be cut after approx. 40 minutes
- Temperature resistant from -40 °C to +90 °C
- Low heat conductivity
- Apply a min. of 3 end-to-end stripes per board, vertically from bottom to top on the external wall (spacing approx. 30 cm). The bottom board should be on fixed ground as protection from later slipping. After approx. 10 minutes apply the boards onto the holding surface and press hard.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

		Content per can	Max. foam yield (free foaming)	Colour	Sales unit
Item	Art.-No.	[ml]	[l]		[pcs]
PUP P 750 (DE)	506671	750	45	concrete grey	12

## The high-quality rapid installation foam with proven sound insulation and resistance of water pressure for professionals



Window connection joints



Sealing concrete manhole rings

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- General test certificate from building authorities P-NDS04-136 for B2
- Proven joint soundproofing for B2:  $R(ST,w) \geq 63$  (-1; -4) dB according ISO 10140-1
- Test for watertightness for the adhesion of manhole rings
- French VOC-emission class A+

### ADVANTAGES

- The proven 63 dB sound insulation fulfills the modern sound insulation and helps to reduce noise.
- The adapter foam has been approved as watertight by an external inspection and is thus suitable for use in wet conditions. It fulfils the requirements of a well foam.
- The fast screwed adapter allows immediate use and is thus uncomplicated to use without need for additional processing equipment.
- The new non-sticking safety valve guarantees long-lasting functionality.

### APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- Bonding and sealing manhole rings
- Insulating and filling in roofing work and dry construction
- Insulating and filling finished elements, wall connections, wall penetrations and cavities

### FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment: +5 °C to +30 °C (can temperature: +5 °C to +25 °C)
- Non-tacky after approx. 15 minutes
- Can be cut after approx. 45 minutes
- Hardened after approx. 24 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PU S 750 (DE)	040301 1)	750	45	beige	12
PU S 1/500 B2 (DE)	040300	500	30	beige	12

1) Without protective gloves, for commercial users only.

## The high-quality installation foam with reusable fix adapter system



Window connection joints



Sealing concrete manhole rings

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- General test certificate from building authorities P-NDS04-136 for B2
- Proven joint soundproofing:  $R(ST,w)=61 (-1; -3)$  dB in line with ISO EN 717-1
- Test for watertightness for the adhesion of manhole rings

### ADVANTAGES

- The reclosable fix adapter allows for immediate use and for the reuse of opened cans, thus guaranteeing long-lasting functionality.
- The used solid valve prevents adhesion when being stored horizontally and premature gas loss.
- The rapid installation foam has been approved as watertight by an external inspection and is thus suitable for use in wet conditions. It fulfils the requirements of a well foam.
- The ergonomic handle sits perfectly in the hand and allows for easy use.

### APPLICATIONS

- Bonding and sealing manhole rings
- Insulating and filling in roofing work and dry construction
- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling finished elements, wall connections and wall penetrations

### FUNCTIONING

- 1-component PU foam
- Building material class B2 or B3
- Processing temperature environment:  $+5^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$  (can temperature:  $+5^{\circ}\text{C}$  to  $+25^{\circ}\text{C}$ )
- Non-tacky after approx. 20 minutes
- Can be cut after approx. 40 minutes
- Cures within 5 to 8 hours
- Temperature resistant from  $-40^{\circ}\text{C}$  to  $+90^{\circ}\text{C}$
- Layer thicknesses  $> 50$  mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PU 500 B2 (DE)	050426	500	30	beige	12
PU 500 B3 (EN/FR/AR)	058500	500	28	beige	12
PU 750 B2 (DE)	053080	750	45	beige	12
PU 750 B3 (EN/FR/AR)	050427	750	41	beige	12
PU 750 B2 (EN, FR, AR)	534466	750	45	beige	12
PU 1/500 B3 HandHeld (EN/FR)	098010	500	28	beige	12
PU 1/750 B3 HandHeld (EN/FR)	098011	750	41	beige	12

## The high-quality 2-component rapid foam with high yield for secure fixing with pull activation



Foaming door frames



Foaming below bath tubs

### BUILDING MATERIALS

**Bonds to all standard building materials such as:**

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

### CERTIFICATES

- General test certificate from building authorities P-NDS04-666

### ADVANTAGES

- The humidity-independent system guarantees a controlled foaming, thus ensuring a safe and fast curing without repressing.
- The pull mechanism allows for a simple, safe activation of the components.
- The used solid valve prevents adhesion when being stored horizontally and premature gas loss.
- The extremely uniform and fine-pore foam structure provides high strength values and offers a maximum of functionality.
- The high foam yield allows for the setting of up to 3 door frames. Thus the foam is particularly economical.
- The high resistance to rotting and ageing ensures consistent quality and guarantees a long-lasting fixing.

### APPLICATIONS

- Installation of door frames (install expanders)
- Filling and insulating of cavities in walls and ceilings
- Foaming in windows, bath tubs and showers
- Fixing insulating elements, wooden cladding, sheet metal panels, control boxes

### FUNCTIONING

- 2-component PU foam
- Building material class B2
- Foam yield of extruded foam 13 l
- Processing temperature +15 °C to +25 °C
- Non-tacky after approx. 6 minutes
- Can be cut after approx. 10 minutes
- Cures after approx. 30 minutes
- Temperature resistant from -40 °C to +90 °C
- Fresh foam stains can be removed immediately with fischer PU cleaner.

### TECHNICAL DATA

		Content per can	Max. foam yield (free foaming)	Colour	Sales unit
Item	Art.-No.	[ml]	[l]		[pcs]
2K PU 400 (DE)	053081	400	13	light blue	12



## PUP K2



## PUP M3



## PUP M4 BLACK



### ADVANTAGES

- The light construction facilitates use on construction sites and allows for fatigue-free work.
- The impact-requiring control prevents the unintentional unscrewing of the regulating screw, and is therefore particularly user-friendly.
- The gun adapter is suitable for all standard systems and enables universal application.
- Opened cans can remain screwed onto the gun during interruptions of work without curing.

### ADVANTAGES

- The PUP M3 meets the tough requirements of a construction site and thus offers a long lifespan.
- The ergonomic handle allows for an ideal position of centre of gravity, and therefore precise handling.
- The infinitely variable control of the foam expulsion allows for a controlled filling and insulating, and enables application-orientated work.
- Opened cans can remain screwed onto the gun during interruptions of work without curing.

### ADVANTAGES

- The complete PTFE coating reduces cleaning to a minimum.
- Non-return ball and basket are coated with PTFE. This prevents bonding and guarantees a long-lasting function.
- The perfect combination of the ergonomically shaped handle and trigger makes handling particularly user-friendly.
- The tubes included with the 19 cm long, tapered pistol pipe mean that it can be individually lengthened for use in the narrowest joints, thus offering a high degree of flexibility.

### TECHNICAL DATA

Item	Art.-No.		Sales unit [pcs]
PUP K2	062400		1
PUP M3	033208		1
PUP M4 BLACK	513429		1



PU-cleaner



ADVANTAGES

- The active components ensure a high cleaning effect, making the cleaner ideal for the safe removal of fresh PU foam.
- The gun adapter is suitable for all standard systems and enables universal application.
- The separate spray head allows for the cleaning of external surfaces, making the product extremely versatile.
- The highly active cleaner can etch sensitive surfaces (paint, dye, textiles, plastics). Thus you should always conduct preliminary tests.

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Sales unit [pcs]
PUR 150 (DE)	053083	150	12
PUR 500 (DE/EN)	053085	500	12

## The high-quality premium sanitary silicone



Joints in sanitary areas



Sealings in the kitchen

### BUILDING MATERIALS

- Chrome
- Stainless steel
- Anodised layer
- Enamel, Tiles
- Glass, glazed surfaces
- Wood (with primer)
- H-PVC
- Ceramics
- Polyester
- Sanitary acrylic

### CERTIFICATES

- EN 15651 - Part 1: F EXT-INT-CC
- EN 15651 - Part 3: S (class XS1)

### ADVANTAGES

- The high-quality formulation allows for easy application and smoothing, and ensures efficient work.
- The outstanding movement capacity means that DSSA is ideal for high-stress expansion joints. This guarantees long-lasting jointing.
- The very good hold on smooth surfaces prevents damp from forming in the substrate and guarantees reliable functioning.
- The high wear resistance gives the surface a high level of protection when cleaning. Together with the fungicidal properties, an ideal jointing can be achieved that will last over the long term.

### APPLICATIONS

- Corner, movement and connection joints in sanitary areas (sinks, showers, bath tubs, expansion joints between tiles etc.)
- Connection joints in the kitchen
- Window and glass sealings
- Seal welds for display cabinets and glass blocks
- Small-scale adhesions (e.g. window bars)

### FUNCTIONING

- Chemical base: 1-component silicone acetate
- Permanently elastic
- With fungicide
- Skin formation time: approx. 6 minutes
- Processing temperature: +5 °C to +35 °C
- Temperature resistance: -50 °C to +200 °C
- Good chemical resistance
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Free of MDI and solvents
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DSSA TP (DE/EN)	053100	transparent	310	12
DSSA W (DE/EN)	053101	white	310	12
DSSA GR (DE/EN)	053102	grey	310	12
DSSA BG (DE/EN)	053103	bahama beige	310	12
DSSA DG (DE/EN)	053105	dark grey	310	12
DSSA SW (DE/EN)	053120	black	310	12
DSSA SG (DE/EN)	058530	silver grey	310	12
DSSA FUG (DE/EN)	512208	joint grey	310	12
DSSA SAG (DE/EN)	512209	sanitary grey	310	12
DSSA MA (DE/EN)	512210	manhattan	310	12
DSSA AN (DE/EN)	512211	anthracite	310	12

## The standard sanitary silicone



Joints in sanitary areas



Wash basins

### BUILDING MATERIALS

- Stainless steel
- Anodised layer
- Epoxy
- Tiles
- Glazed surfaces
- Glass
- H-PVC
- Ceramics
- Painted wood
- Polyester

### CERTIFICATES

- EN 15651 - Part 1: F EXT-INT-CC
- EN 15651 - Part 2: G-CC
- EN 15651 - Part 3: S (class S1)

### ADVANTAGES

- The 20% elasticity means that DSSI is ideal for expansion and connection joints. This guarantees long-lasting jointing.
- The very good hold on smooth surfaces, e.g. tiles, prevents damp forming in the substrate and guarantees reliable functioning.
- The fungicidal properties ensure a clean look over the long term.

### APPLICATIONS

- Joints in sinks and toilets
- Expansion joints between floor and wall tiles
- Joints around enamel and plastic showers and bath tubs
- Connection joints between timber and tiles
- Connection joints in the kitchen
- Seal welds for display cabinets and glass blocks
- Glazing wood and aluminium windows

### FUNCTIONING

- Chemical base: 1-component silicone acetate
- Permanently elastic
- With fungicide
- Skin formation time: approx. 25 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +100 °C
- Shore-A hardness 18
- Permitted overall deformation: 20% (ISO 11600)
- Good chemical resistance
- Very good resistance to weather, ageing and UV
- Not paintable
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
<b>DSSI TP (EN/FR/AR)</b>	<b>058515</b>	transparent	280	18
<b>DSSI W (EN/FR/AR)</b>	<b>058516</b>	white	280	18

## The silicone sealant with an acetate base for internal and external applications



Joints in sanitary areas



Sealings in the kitchen

### BUILDING MATERIALS

- Stainless steel
- Anodised layer
- Epoxy
- Tiles
- Glazed surfaces
- Glass
- H-PVC
- Ceramics
- Painted wood
- Polyester

### CERTIFICATES

- EN 15651 - Part 1: F EXT-INT-CC
- EN 15651 - Part 2: G-CC
- EN 15651 - Part 3: S

### ADVANTAGES

- Thanks to the practical elasticity of 20%, DMS is ideally suited to connection joints with expansion. This guarantees long-lasting jointing.
- The fungicidal properties ensure a clean look over the long term.
- The very good hold on smooth surfaces prevents damp from forming in the substrate and guarantees reliable functioning.
- The good resistance to UV, weathering and ageing means that DMS can be used both indoors and outdoors, and offers a high level of security over the long term.

### APPLICATIONS

- Bathrooms, showers and toilets
- Connection joints to sinks
- Expansion joints between tiles
- Connection joints in the kitchen
- Joints between timber and tiles
- Seal welds for display cabinets and glass blocks

### FUNCTIONING

- Chemical base: 1-component silicone acetate
- Permanently elastic
- With fungicide
- Skin formation time: approx. 25 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +100 °C
- Shore-A Härte 18
- Permitted overall deformation: 20% (ISO 11600)
- Very good resistance to weather, ageing and UV
- Not paintable
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DMS TP (EN/FR/AR)	040385	transparent	280	18
DMS W (EN/FR/AR)	040386	white	280	18
DMS GR (EN/FR/AR)	040389	grey	280	18
DMS SW (EN/FR/AR)	504413	black	280	18

## The silicone sealant for high temperature requirements



Sealing fireplaces



Sealing cookers

### BUILDING MATERIALS

- Aluminium (with primer)
- Chrome
- Stainless steel
- Anodised layer
- Enamel
- Tiles
- Glass
- Glazed surfaces
- Ceramics
- Not for corrosive adhesive surfaces such as non ferrous heavy metal, sheet zinc etc.

### ADVANTAGES

- The high temperature resistance of up to +300°C means that DHS can be used for joints with increased thermal load.
- Meanwhile, the high resistance to chemicals also allows for use in areas subjected to chemical loads, thus offering a high level of application safety.
- The very good adhesion to smooth surfaces allows for the components to be completely sealed. This allows for reliable functioning.
- DHS is easy to apply and smooth out. This allows for efficient work, and helps to guarantee a simple and time-saving application.

### APPLICATIONS

- Sealing of joints around cookers, ovens and fireplaces
- Sealing of joints around boilers and industrial furnaces
- Sealing of joints around pipes and channels subjected to high temperatures
- Sealing of ventilation grilles
- Sealing of air conditioning units

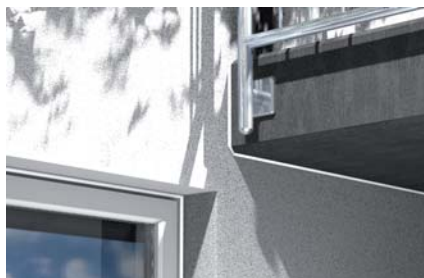
### FUNCTIONING

- Chemical base: 1-component silicone acetate
- Permanently elastic
- Skin formation time: approx. 5 - 6 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -60 °C to +280 °C (short term to +300 °C)
- Shore-A hardness 40
- Very good resistance to chemicals
- Very good resistance to weather, ageing and UV
- Not paintable
- Free of MDI and solvents
- Selection table for substrates - refer to page 534

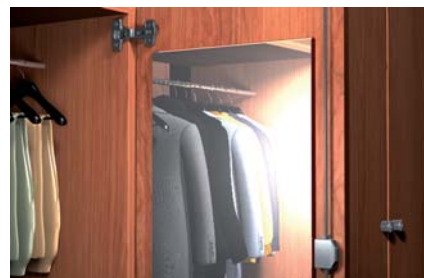
### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DHS RB (DE/EN)	053125	reddish brown	310	12

## The low-odour premium construction silicone with high adhesive spectrum



External connection joints



Fixing mirrors

### BUILDING MATERIALS

- Concrete
- Chrome
- Stainless steel
- Anodised layer
- Enamel, Tiles, Ceramics
- Glass, glazed surfaces
- Wood (with primer)
- H-PVC
- Copper, brass
- Masonry
- PMMA, PC, Polyester
- Steel
- Zinc

### CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT-CC (class 25LM)
- EN 15651 - Part 2: G-CC (class 25LM)
- EN 15651 - Part 3: S (class XS1)

### ADVANTAGES

- The high-quality, neutral silicone sealant with a very low volume shrinkage is suitable for demanding applications in construction and the industrial sector, and guarantees a high degree of functional safety.
- DBSA is low-odour and is therefore ideal for use in confined spaces.
- The silicone is easy to apply and smooth out, thus allowing for efficient work and a simple and time-saving jointing.
- The high wear resistance gives the surface a high level of protection when cleaning and thus ensures a perfect look over a long period.

### APPLICATIONS

- Connection and expansion joints in the construction industry (e.g. windows, doors, façades, light domes)
- Window glazing
- Movement and connection joints in kitchens, sanitary areas and installations
- Fixing mirrors (transparent version)
- Sealing machines, containers and building apparatus

### FUNCTIONING

- Chemical base: 1-component silicone neutral alkoxy
- Fulfils DIN EN ISO 11600 F+G 25
- Permanently elastic
- Low-odour
- With fungicide
- Skin formation time: approx. 12 min
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +120 °C
- Shore-A hardness 24
- Permitted overall deformation: 25%
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Resistant to wear and streak-free
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

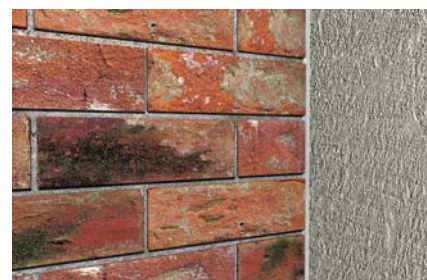
Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DBSA TP (DE/EN)	053090	transparent	310	12
DBSA W (DE/EN)	053091	white	310	12
DBSA GR (DE/EN)	053092	concrete grey	310	12
DBSA BR (DE/EN)	053093	brown	310	12
DBSA SW (DE/EN)	053094	black	310	12
DBSA BG (DE/EN)	053095	beige	310	12
DBSA SLG (DE/EN)	512213	slate grey	310	12
DBSA ANG (DE/EN)	540084	anthracite	310	12



## The versatile construction silicone



External connection joints



Joints between buildings

### BUILDING MATERIALS

- Concrete
- Chrome
- Stainless steel
- Anodised layer
- Enamel
- Epoxy
- Tiles
- Glass, glazed surfaces
- Wood (with primer)
- H-PVC
- Ceramics
- Copper
- Masonry
- Brass
- Polyester
- Steel
- Zinc

### CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT
- EN 15651 - Part 2: G
- EN 15651 - Part 3: S

### ADVANTAGES

- The neutral silicone sealant is suitable for various applications in construction and the industrial sector, and thus offers a high level of flexibility.
- The high movement capacity means that DBSI is ideal for expansion joints. This guarantees long-lasting jointing.
- DBSI is non-corrosive and is therefore well suited to copper and zinc-plated surfaces. Thus it can be used without problems in the metal processing industry.

### APPLICATIONS

- Connection and expansion joints in the construction industry (e.g. windows, doors, façades, light domes)
- Connection joints on windows and doors
- Sealing façades, curtain walling panels and metal structures
- Movement and connection joints in kitchens, sanitary areas and installations

### FUNCTIONING

- Chemical base: 1-component silicone neutral oxime
- Permanently elastic
- With fungicide
- Skin formation time: approx. 5 minutes
- Processing temperature: +5 °C to +30 °C
- Temperature resistance: -40 °C to +120 °C
- Shore-A hardness 24
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DBSI W (DE/EN)	094416	white	310	12
DBSI TP (DE/EN)	094417	transparent	310	12

## The discolouration-free silicone sealant for marble and natural stone



Joints on natural stone panels



Joints on tiles and natural stone and marble panels

### BUILDING MATERIALS

- Marble
- Natural stone (e.g. granite, porphyry, quartzite, sandstone)

#### Also suitable for:

- Concrete
- Stainless steel
- Anodised layer
- Tiles, Ceramics
- Glass
- Wood (with primer)
- H-PVC
- Copper
- Masonry
- PMMA, PC
- Sanitary acrylic
- Steel
- Zinc

### CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT-CC (class 25LM)
- EN 15651 - Part 2: G-CC (class 25LM)
- EN 15651 - Part 3: S

### ADVANTAGES

- The specially adapted formulation prevents edge soiling and gives a lasting clean look, particularly for natural stone and marble.
- DNS is easy to use and smooth, thus allowing for efficient work. This guarantees a fast and simple jointing.
- The neutral interlacing silicone with an alkoxy base is low-odour and is therefore ideal for use in confined spaces.

### APPLICATIONS

- Sealing and jointing marble and natural stone for internal and external use
- Joints in sanitary areas
- Joints in façade construction
- Corner joints in floors and walls
- Movement-compensating adhesion of natural stone onto metal structures (e.g. stair treads)

### FUNCTIONING

- Chemical base: 1-component silicone neutral alkoxy
- Permanently elastic
- Low-odour
- With fungicide
- Skin formation time approx. 15 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +120 °C
- Shore-A hardness 21
- Non-corrosive
- Good chemical resistance
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Selection table for substrates - refer to page 534

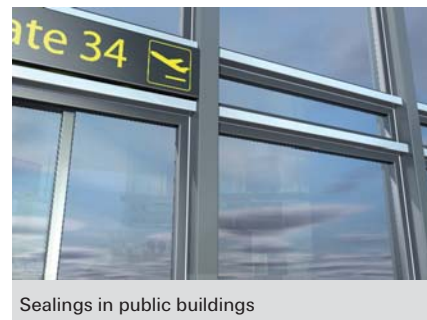
### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DNS TP (DE/EN)	053121	transparent	310	12

## The hardly flammable silicone sealant



Joints on fire protection doors



Sealings in public buildings

### BUILDING MATERIALS

- Concrete
- Chrome
- Stainless steel
- Anodised layer
- Enamel
- Tiles
- Glass, glazed surfaces
- Ceramics
- Copper, brass
- Masonry
- Polyester
- Steel
- Zinc

### CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT-CC (class 25LM)
- EN 15651 - Part 2: G-CC (class 25LM)

### ADVANTAGES

- The good fire-inhibiting properties provide maximum safety for the sealing of solid, mineral or metal building materials.
- Non-corrosive, thus can be used on aluminium, copper and zinc-plated surfaces. This guarantees problem-free use within the metal processing industry.
- Due to the audited, high 25% elasticity, DFS is particularly suitable for joints subjected to high stress. This guarantees a permanent seal.

### APPLICATIONS

- Sealing connection and expansion joints that are required to have a fire-resistant effect against the spreading of fire, water, smoke and poisonous fumes
- Sealing components that have increased requirements concerning their properties in the case of fire

### FUNCTIONING

- Chemical base: 1-component silicone neutral
- Hardly flammable material (building material class DIN 4102-B1) in line with DIN 4102-1
- Permanently elastic
- Shore-A hardness 20
- Skin formation time: approx. 10 minutes
- Processing temperature: +5 °C to +40 °C
- 100% modulus 0,40 N/mm<sup>2</sup>
- Temperature resistance: -40 °C to +120 °C
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DFS GR (DE/EN)	053131	grey	310	12

## The universal hybrid-sealant-adhesive for indoor and outdoor use



Bonding and sealing of attachments



Sealing ventilation ducts

### BUILDING MATERIALS

- Aluminium
- Concrete
- Chrome
- Stainless steel
- Anodised layer
- Tiles
- Glass, glazed surfaces
- H-PVC
- Ceramics
- Copper, brass
- Masonry
- PMMA, PC
- Polyester
- Steel
- Zinc

### CERTIFICATES

- LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants
- **Coloured version:**
- EN 15651 part 1: F-EXT-INT-CC (Class 25 HM)
- EN 15651 - Part 3: S (XS3)
- EN 15651 - Part 4: PW-EXT-INT-CC (Class 25 HM)
- Suitable for use in room ventilation systems according to VDI 6022 (Ass. Of Germ. Engineers), sheet 1 tested according to DIN EN ISO 846
- Declaration of no objection - tested for use in food-related area (ISEGA)
- GEV-EMICODE EC1 PLUS - very low emission
- M1 emission classification for building materials

### ADVANTAGES

- Due to the high 25% flexibility, DKM is particularly suitable for joints subjected to high stress. This guarantees a permanent seal.
- The high initial adhesion from up to 75 kg/m<sup>2</sup> (50 kg/m<sup>2</sup> crystal clear) makes it possible to attach lots of components without the need for additional fixing, and thus reduces the amount of time required.
- The mould inhibiting quality guarantees the tested antibacterial inertness over a long period.
- DKM is low-odour and is therefore ideal for the use in confined spaces.

### APPLICATIONS

- Attachment of strips, panels, cladding and insulation materials to wall
- Connection and expansion joints in the building industry according to EN 15651-1 (20 HM) as well as for general joint sealing
- In building work, and joint and seam sealing in climate and ventilation technology (HVAC systems according to DIN EN ISO 846)
- Sealing and attaching metal constructions, sheet reinforcements on chimneys and windowsills, eaves flashing attachment on flat roofs and skylights
- Colored version suitable for mirror bonding

### FUNCTIONING

- Chemical base: 1K Hybrid
- Approved acc. to DIN EN ISO 846 (coloured version)
- Permanently elastic
- Low-odour
- Mould inhibiting quality
- Skin formation time: approx. 10 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +90 °C
- Total authorised deformation: 25 %
- Non-corrosive
- Bonds on a moist base material
- Very good resistance to weather, ageing and UV (coloured version)
- Compatible with paint and paintable
- Free of silicone, MDI and solvents
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
<b>DKM-290ML</b>	<b>517598</b>	white	290	12
<b>DKM-290 ML grey (DE/EN)</b>	<b>517599</b>	grey	290	12
<b>DKM-290 ML black (DE/EN)</b>	<b>517600</b>	black	290	12
<b>DKM-290 ML beige (DE/EN)</b>	<b>533831</b>	beige	290	12
<b>DKM-290 ML transparent (DE/EN)</b>	<b>533830</b>	crystal clear	290	12

## The elastic acrylic sealant for internal and external applications with immediate rain resistance



External connection joints



Connection joints in the outdoor area

### BUILDING MATERIALS

- Concrete
- Anodised layer
- Fibre cement
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Metal
- Aerated concrete
- Plaster
- Brick
- Zinc

### TEST CERTIFICATE

- EN 15651-1: F-EXT-INT (class 12.5P)
- GEV-EMICODE EC1 PLUS - very low emission
- French VOC-emission class A+

### ADVANTAGES

- The immediate rain resistance allows for external application in all weather conditions, thus avoiding interruption of work.
- The high movement capacity means that DFA is ideal for expansion joints. This guarantees long-lasting jointing.
- The optimised formulation ensures that strongly absorbent substrates do not cause splitting in the joints. This increases functional safety.
- The water-based acrylate sealant has a neutral odour and is therefore ideal for use in confined spaces.

### APPLICATIONS

- For internal and external application
- Internal connection joints between wood, plastic and metal windows and walls
- Joints in dry and internal construction
- Joints between stairs and walls, ceilings and walls
- Connection joints for shutter boxes and window sills
- Renovation work (split jointing)

### FUNCTIONING

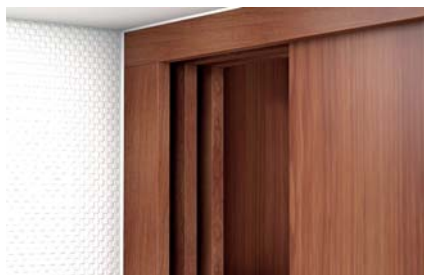
- Chemical base: 1-component dispersion acrylic
- Elasto-plastic
- Low-odour
- Skin formation time: approx. 5 minutes
- Processing temperature: +5 °C to +40 °C
- Permissible total deformation 20 % (according to ISO 7389)
- Temperature resistance: -20 °C to +75 °C
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Can be painted and plastered
- Frost-protected in the cartridge
- Free of silicone, MDI and solvents

### TECHNICAL DATA

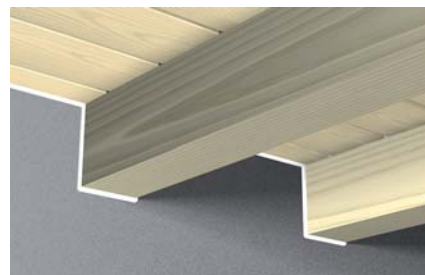
Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DFA WH 310 (DE/EN)	541709	white	310	12



## Quick paintable sealant with maximum security against cracks and discolourations



Wall connection joints



Internal expansion joints

### BUILDING MATERIALS

- Concrete
- Anodised layer
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Polystyrene
- Aerated concrete
- Plaster
- Brick

### PRÜFZEUGNIS

- EN 15651-1:2012: Type F-EXT-INT (class 7,5P)
- GEV-EMICODE EC1 PLUS - very low emission
- French VOC-emission class A+

### ADVANTAGES

- The sealant can be painted after already one hour, allowing subsequent painting work to start more quickly.
- The further-developed DMA formulation suppresses paint cracking, thus eliminating the need for time-consuming rework.
- The really good paint compatibility ensures the great adhesion of commercially available paints to the sealant and prevents the discolouration of the paint layer. This guarantees a good, even appearance.
- The water-based acrylate sealant has a neutral odour and is free from phthalate plasticisers, making it ideal for use in confined spaces.

### APPLICATIONS

- For internal and external application
- For sealing joints between wooden and metal window frames and concrete/masonry
- Joints between walls and ceilings, steps and walls, concrete and ceiling elements and skirting
- Connection joints for shutter boxes and window sills
- Joints in dry and internal construction
- Renovation work (split jointing)

### FUNCTIONING

- Chemical base: 1-component dispersion acrylic
- Elasto-plastic
- Low-odour
- Skin formation time: approx. 10 minutes
- Processing temperature: +5 °C to +40 °C
- Adheres on moist substrates
- Practically no shrinkage
- Temperature resistance: -20 °C to +75 °C
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Can be painted and plastered
- Free of silicone, MDI and solvents
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DMA W (DE/EN)	512186	pure white	310	12



## The structured acrylic sealant for plastered walls



Joints in the roof area



Closing external masonry cracks

### BUILDING MATERIALS

- Concrete
- Anodised layer
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Polystyrene
- Aerated concrete
- Plaster
- Brick

### CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT

### ADVANTAGES

- The pitted structure is ideal for coarse surfaces, and ensures a perfect appearance, e.g. on rough plaster.
- The sealant can be painted and plastered and allows for an outstanding hold of standard paints/plasters on the sealant, thus guaranteeing a non-critical post-treatment.
- The good resistance to UV, weather and ageing allows for use both indoors and outdoors. This guarantees versatile and long-lasting jointing.

### APPLICATIONS

- Filler paste to repair coarse surfaces on internal and external walls
- Connection joints with low movement
- Joints in dry and internal construction
- Joints between walls and ceilings
- Joints on window and shutter connections

### FUNCTIONING

- Chemical base: 1-component dispersion acrylic
- Elasto-plastic
- Low-odour
- Skin formation time: approx. 5 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -20 °C to +75 °C (rain-resistant once cured)
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Paintable
- Frost-protected in the cartridge
- Free of silicone, MDI and solvents
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DSA W (DE/EN)	512185	white	310	12

## The acrylic sealant for internal joints



Sealing door frames



Closing internal masonry cracks

### BUILDING MATERIALS

- Concrete
- Anodised layer
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Aerated concrete
- Plaster
- Brick

### CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT

### ADVANTAGES

- The good hold on absorbent substrates guarantees a secure sealing and thus allows for a reliable and economic application.
- The sealant can be painted and plastered and allows for a good hold of standard paints/plasters on the sealant, thus guaranteeing a non-critical post-treatment.
- The water-based acrylate sealant has a neutral odour and is therefore ideal for use in confined spaces.

### APPLICATIONS

- Fractures in masonry and other solid building materials in internal areas
- Connection joints with low movement
- Joints in window sill connections
- Connection joints inside buildings between windows, doors, stairs, ceilings and walls

### FUNCTIONING

- Chemical base: 1-component dispersion acrylic
- Elasto-plastic
- Low-odour
- Skin formation time: approx. 20 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -20 °C to +75 °C
- Non-corrosive
- Compatible with paint
- Can be painted and plastered
- Frost-protected in the cartridge
- Free of silicone, MDI and solvents
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DA W (DE/EN)	053110	white	310	12
DA GR (DE/EN)	053111	grey	310	12
DA BR (DE/EN)	053112	brown	310	12
DA W (EN/FR/AR)	058512	white	280	24

## The ready-to-use, extrudable joint mortar for the long-lasting closing of masonry joints



Masonry joints



Wall breakthrough

### BUILDING MATERIALS

- Concrete
  - Pumice
  - Fibre cement
  - Gypsum
  - Wooden materials
  - Sand-lime brick
  - Ceramics
- Clinker brick
  - Masonry
  - Aerated concrete
  - Plaster
  - Cement
  - Brick

### ADVANTAGES

- The ready-to-use, sprayable joint mortar means that there is no need to add water or carry out time-consuming pre-mixing work. It enables clean, purposeful work. This means that you avoid dirtying surrounding areas and wasting material.
- Good adhesion even on slightly damp substrates practically allows for all-weather work and prevents forced interruptions.
- The structure of the high-quality water-based polymer has been perfectly designed with the visual appearance of the mortar in mind. This ensures a discreet joint and perfect appearance.

### APPLICATIONS

- Repairing masonry joints
- Closing masonry cracks
- Fixing roof tiles
- Bonding tiling and bricks
- Repairing chipped edges
- Closing drill holes in facing masonry during repair work
- General repair work (e.g. drill holes with cracked edges)
- For a better reusability, to close opened cartridges with adhesive tape

### FUNCTIONING

- Chemical base: 1C polymer dispersion
- Plastic
- Consistency: Firm
- Practically odour-free
- Skin formation time: Approx. 10 minutes.
- Processing temperature: +5 °C to +40 °C (not below +5 °C)
- Temperature resistance up to -30 °C (fully cured)
- Weather-proof after approx. 24 hours.
- Very good resistance to UV, weather and ageing
- Paintable
- Frost-protected in the cartridge
- Free of silicone, MDI and solvents-  
Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents	Contents per plastic bag	Sales unit
			[ml]	[pcs]	[pcs]
<b>DEC CG (DE/EN)</b>	<b>534474</b>	cement grey	310	—	12
<b>V-Nozzle Express Cement</b>	<b>524315</b>	—	—	5	1

## The permanently elastic joint sealant with a strong hold on all substrates



Chimney flashings



Sealing gutters

### BUILDING MATERIALS

- Concrete
- Bitumen sheeting
- Roofing felt
- Stainless steel
- Wood
- Clinker brick
- Copper
- Masonry
- Metal
- Brick
- Zinc

12

Foams, sealants

### ADVANTAGES

- Thanks to the high elasticity of 25%, DDK is ideally suited to high-stress joints. This guarantees long-lasting jointing.
- DDK holds without a base coat, including on moist and bituminous substrates, and is therefore suitable for all applications in the roofing area. For a high degree of economy.
- The immediate rain resistance allows for external application in all weather conditions, thus avoiding interruption of work.
- DDK is non-corrosive, and thus can be used on aluminium, copper and zinc-plated surfaces. This offers maximum flexibility.

### APPLICATIONS

- Sealing of roofing membranes
- Grouting roof penetrations such as chimneys or light domes, as well as edge connections
- Sealing of metal and plastic gutters
- Sealings around antennas and ventilation ducts
- Sealing of chimney flashings
- Sealant for metal structures

### FUNCTIONING

- Chemical base: 1-component synthetic rubber
- Permanently elastic
- Highly transparent formulation
- Skin formation time: 15 - 20 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -25 °C to +100 °C
- Permitted overall deformation: 25%
- Allows for emergency roof repairs
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Paintable
- Frost-protected in the cartridge
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DDK TR (DE/EN)	049103	transparent	310	12

## The special sealant to fill joints between bitumen sheeting



Sealings around skylights



Sealings around roofs with bitumen sheeting

### BUILDING MATERIALS

- Concrete
- Bitumen sheeting
- Roofing felt
- Stainless steel
- Wood
- Clinker brick
- Copper
- Plastics
- Masonry
- Metal
- Brick
- Zinc
- Polystyrene

### ADVANTAGES

- The special bitumen-based formulation seals roofing membranes and roofing felt securely. This guarantees long-lasting functionality.
- DD also holds to moist substrates without a base layer. This makes application largely independent of the weather and thus helps to avoid interruption of work.
- DD is non-corrosive, and thus can be used on aluminium, copper, zinc-plated surfaces and polystyrene. This offers maximum flexibility.

### APPLICATIONS

- Sealing roofing membranes and roofing felt
- Bonding bitumen shingle
- Grouting roof penetrations such as chimneys or light domes, as well as edge connections
- Sealing of metal and plastic gutters
- Sealings around antennas and ventilation ducts

### FUNCTIONING

- Chemical base: 1-component bitumen
- Odorless, because it is solvent-free
- Plastic
- Skin formation time > 15 hours
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -20 °C to +80 °C
- Max. movement absorption 10%
- Non-corrosive
- Selection table for substrates - refer to page 534

### TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DD SW (DE/EN)	053127	black	300	12



## KP M1



### ADVANTAGES

- The handy, robust solid metal construction for standard cartridges up to 310 ml bears up against requirements on the construction site and, as such, is also suitable for professional use.
- The continuous in-feed allows for a precise dosage, making it easy to use.
- The slim shape of the device allows for an exact application, even in difficult to reach spots, thus offering a high level of flexibility

## KP M2



### ADVANTAGES

- The 18:1 transmission ratio makes extrusion rapid and energy-efficient even in the case of highly viscous materials, thus guaranteeing stress-free work.
- The robust design with the special, hardened drive block meets the tough requirements of a construction site and thus offers a long lifespan.
- Due to the accessible cartridge, it is possible to align the extrusion nozzle perfectly in place and guarantee application-orientated work.

## KP M3



### ADVANTAGES

- The 18:1 transmission ratio makes extrusion rapid and energy-efficient even in the case of highly viscous materials, thus guaranteeing stressfree work.
- The robust design with the hardened twice drive blocks and the hardened push rod meets the tough requirements of a construction site and thus offers a long lifespan.
- The electro-welded cartridge shell is freely rotatable.
- Due to the accessible cartridge, it is possible to align the extrusion nozzle perfectly in place and guarantee application-orientated work.
- The equipment with a ladder hook facilitates the retraction of the push rod and offers a convenient possibility of depositing during work interruptions.

### TECHNICAL DATA

Item	Art.-No.	Sales unit [pcs]
KP M1	053115	1
KP M2	053117	1
KP M3	541441	1



## KP M600



### ADVANTAGES

- The 18:1 transmission ratio makes extrusion rapid and energy-efficient even in the case of highly viscous materials, thus guaranteeing stressfree work.
- The robust design with the hardened push rod with anti-slip effect withstands the tough requirements of a construction site and thus offers a long lifespan.
- The equipment with a ladder hook facilitates the retraction of the push rod and offers a convenient possibility of depositing during work interruptions.
- Automatic tension remove (with on / off function) prevents run after.
- 2 different pusher plates (plastic for tubular bags & metal for cartridges) enable flexible use.

### TECHNICAL DATA

Item	Art.-No.	Sales unit [pcs]
KP M600	540941	1

## SEALANT SELECTION MATRIX

+ suitable T requires test - not suitable	Chem. basis	Substrate																									
		ABS / Polystyrene	Acrylic glass (Macrolon, perspex etc.)	Acrylic tubs (sanitary acrylic)	Aluminium	Concrete	Concrete block	Bitumen	Non ferrous heavy metal (copper, brass)	Stainless steel	Sandblasted iron	Enamel	Tiles	Gypsum / gypsum plasterboard	Glass	Hard PVC	Wood	Ceramics	Natural stone / marble	Polyester	Aicrete	Plaster	Resopal	Stoneware	Brick / clinker brick	Zinc / galvanizing	
DSSA Premium sanitary silicone	Silicone acetate	+	-	+	+	-	-	-	-	+	-	+	+	-	+	+	+	+	-	+	-	-	+	+	-	-	
DSSI Sanitary silicone	Silicone acetate	-	-	+	+	-	-	-	-	+	-	+	+	-	+	+	+	+	-	+	-	-	+	+	-	-	
DMS Multi-silicone	Silicone acetate	+	-	T	+	-	-	-	-	+	-	+	+	-	+	-	+	+	-	+	-	-	+	+	-	-	
DHS Premium high temperature silicon	Silicone acetate	+	-	-	+	T	-	-	T	+	-	+	+	T	+	-	+	+	-	+	T	T	+	+	T	T	
DBSA Premium construction silicone	Silicone alkoxy	+	+	T	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	
DBSI Roof and wall silicone	Silicone oxime	+	-	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	
DNS Premium silicone for natural stone	Silicone oxime	+	-	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
DFS Premium B1 silicone	Silicone oxime	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	
DKM Construction sealant Premium	Hybride	T	+ <sup>1)</sup>	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	
DFA Facade acrylic Premium	Dispersion acrylic	-	-	-	+	+	-	-	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	+	+	+	
DMA Premium painting acrylic	Dispersion acrylic	-	-	-	+	+	-	-	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	+	+	+	
DSA Premium structured acrylic	Dispersion acrylic	-	-	-	+	+	-	-	-	+	-	-	+	+	-	T	+	T	-	+	+	+	+	+	+	+	
DA Acrylic Sealant	Dispersion acrylic	-	-	-	+	+	-	-	-	+	-	-	+	T	-	-	+	T	-	+	+	+	+	+	+	T	
DDK Premium all-weather sealant	Synthetic rubber	+	-	-	+	+	-	+	+	+	+	-	+	-	-	+	+	+	-	+	+	+	+	+	+	+	
DD Roof sealing compound	Bitumen	-	-	-	+	+	-	+	+	+	+	-	+	-	-	-	+	+	-	+	-	T	-	+	+	+	

<sup>1)</sup> perspex not

**Note:** Avoid direct contact between the silicone and bituminous or plasticiser materials (e.g. EPDM, butyl, neoprene). The written and spoken information contained in this technical datasheet and our practical support is provided to the best of our knowledge and does not represent binding information or guarantees as described in § 443 of the German Civil Code. We recommend that you test the suitability of our products for the intended application prior to use. Due to the diverse range of applications of the individual product and the unpredictable conditions on site, we also recommend testing the adhesion prior to use.

## SEALANT COLOUR BOARD

**DSSA Premium sanitary silicone**

<b>Art.No.</b> <b>53100</b>	<b>Art.No.</b> <b>53101</b>	<b>Art.No.</b> <b>53103</b>	<b>Art.No.</b> <b>58530</b>	<b>Art.No.</b> <b>512208</b>	<b>Art.No.</b> <b>53102</b>	<b>Art.No.</b> <b>512209</b>	<b>Art.No.</b> <b>512210</b>	<b>Art.No.</b> <b>53105</b>	<b>Art.No.</b> <b>512211</b>	<b>Art.No.</b> <b>53120</b>
transparent	white	bahama beige	silver grey	joint grey	grey	sanitary grey	manhattan	dark grey	anthracite	black

## DHS Premium high temperature silicone

**Art.-No.**  
**53125**  
reddish brown

**DBSA Construction silicone**

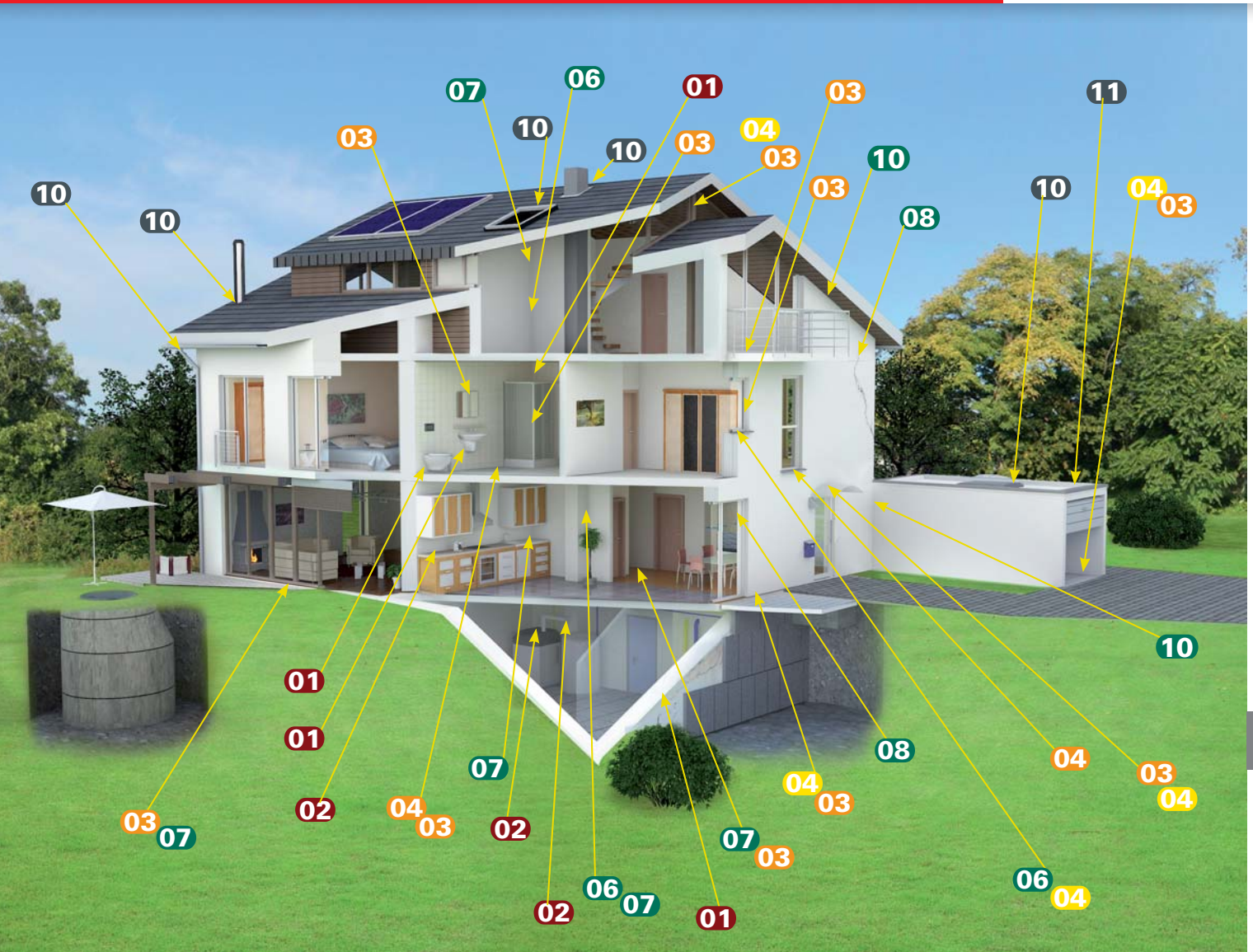
Art.-No. 53090	Art.-No. 53091	Art.-No. 540085	Art.-No. 53095	Art.-No. 540084	Art.-No. 540086	Art.-No. 53092	Art.-No. 540087	Art.-No. 53093	Art.-No. 512213	Art.-No. 53094
transparent	white	cream white RAL 9001	beige	anthracite grey	aluminium RAL 9006	concrete grey	aluminium RAL 9007	brown	slate grey	black

## DFS Premium B1 silicone

**Art.-No.**  
**53131**  
grey

**DA Acrylic sealant**

<b>Art.-No.</b> <b>53110</b> white	<b>Art.-No.</b> <b>58512</b> white	<b>Art.-No.</b> <b>53111</b> grey	<b>Art.-No.</b> <b>53112</b> brown



## Example of use for sealants

- |  |  |
|--|--|
| <b>01</b> DSSA Premium sanitary silicone         | <b>06</b> DMA Premium painting acrylic       |
| <b>02</b> DHS Premium high temperature silicone  | <b>07</b> DA Acrylic sealant                 |
| <b>03</b> DBSA Premium construction silicone     | <b>08</b> DSA Premium structured acrylic     |
| <b>04</b> DBSI Roof and wall silicone            | <b>09</b> DFA Premium acrylic sealant facade |
| <b>04</b> DNS Premium silicone for natural stone | <b>10</b> DDK Premium all-weather sealant    |
| <b>05</b> DFS Premium B1 silicone                | <b>11</b> DD Roof sealing compound           |

## Fast-drying surface and corrosion protection with outstanding long-term effect for metals.



Column bases



Stand mounting

### BUILDING MATERIALS

- All iron and steel surfaces
- Blank laminations

### ADVANTAGES

- In the salt spray test in line with DIN 50021, coated metal parts displayed no corrosion, even after 500 hours.
- The high proportion of zinc in the dry film provides secure protection to all metal surfaces that are permanently exposed to the elements.
- Thanks to the adhesive layer of corrosion protection and the fact that it can be painted over, it is also ideal as a high-quality base layer.
- The high resistance to cracking and flaking of a metal base material was confirmed by the mandrel flex test in line with DIN EN ISO 1519 (without damage).

### APPLICATIONS

- For all metals that need corrosion protection
- Rust protection base layer for surfaces threatened by water and weather
- For the coating of drilling and cutting points as well as welded joints
- Conductive interlayer for spot welding
- Repairing damaged zinc coatings

### FUNCTIONING

- Dark-grey colour (similar to RAL 7042)
- Metal proportion of over 92% in dry film
- Shake can well for approx. 3 minutes
- Apply at a distance of 20–30 cm in a cross coat
- Surface dust-dry after just approx. 8 minutes
- Fully hardened within 24 hours
- Smooth, non-porous film
- Abrasion-resistant
- Excellent corrosion protection with long-term effect
- Heat-resistant up to approx. 500 °C
- Electroconductive and suitable for spot welding
- Ideal processing temperature of 16 °C to 25 °C

### TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Sales unit [pcs]
FTC-ZS (EN/FR/ES/PT)	509242	400	12

## Bright color as newly galvanised metals in combination with heat-resistant corrosion protection due to flake technology.



Metal stairs



Roof construction: metal structures

### BUILDING MATERIALS

- All iron and steel surfaces
- Hot-dip galvanised surfaces following drilling, ironwork or welding
- Non-ferrous heavy metal
- Blank laminations

### ADVANTAGES

- In the salt spray test in line with DIN EN ISO 9227, coated metal parts displayed no corrosion, even after 300 hours.
- The innovative metal flakes form a highly resistant protective layer, even against extreme weather influences. This guarantees long-lasting protection.
- The color "bright grade" has been perfectly adapted to that of hot-dip galvanisation. This acts as an optical color compensator.
- Thanks to the excellent holding properties on blank metal, it guarantees a lasting connection to the base material.

### APPLICATIONS

- For all metals that need corrosion protection
- For HVAC systems
- For post-galvanising and repairing damaged areas of galvanised parts
- Metal constructions
- Guard rails
- For the coating of drilling and cutting points as well as welded joints
- Conductive interlayer for spot welding

### FUNCTIONING

- Zinc coating in fresh hot-dipped coloring with high gloss level (RAL 9006)
- Flaky metal pigments
- Metal content in dry film > 60%
- Shake can well for approx. 2 minutes
- Apply at a distance of 25 - 30 cm in a cross coat
- Surface dust-dry after just approx. 8 minutes
- Surface is dust-dry after approx. 15 minutes and fast to handle after approx. 60 minutes
- Fully hardened within 24 hours
- Long-term heat resistance up to approx. +300 °C
- Ideal processing temperature of +16 °C to +25 °C
- High abrasion resistance

### TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Sales unit [pcs]
FTC-ZB (EN/FR/ES/PT)	534786	400	12
FTC-ZB (EN/AR/FR/PT)	537223	400	12



**Ideal for repairing damaged zinc coatings using colour-matching corrosion protection.**



Ventilation systems



Ladders

## BUILDING MATERIALS

- All iron and steel surfaces
- Hot-dip galvanised surfaces following drilling, ironwork or welding
- Non-ferrous heavy metal

## ADVANTAGES

- Zinc-alu spray represents a subtle repair to damaged hot-dip galvanised areas thanks to its colour matching with the hot-dip galvanisation.
- Thanks to the excellent holding properties on blank metal, it guarantees a lasting connection to the base material.
- The fast-drying Zinc-alu spray guarantees good, weatherproof corrosion protection and, as such, is suitable for use both indoors and out.

## APPLICATIONS

- For post-galvanising and repairing damaged areas of galvanised parts, drilling and cutting points and welded joints
- Repairing damaged zinc coatings
- Climate control and ventilation technology
- Guard rails
- Metal constructions
- Sheet metal coverings

## FUNCTIONING

- Silver-grey colour (similar to RAL 9006) with high gloss level
- Shake can well for approx. 2 minutes
- Apply at a distance of 25–30 cm in a cross coat
- Surface dust-dry after just approx. 8 minutes
- Touch-dry after 20–25 minutes
- Fully hardened within 24 hours
- Smooth, non-porous film
- High abrasion resistance
- Long-term heat resistance up to approx. 200 °C (briefly up to 300 °C)
- Ideal processing temperature of 16 °C to 25 °C

## TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Sales unit [pcs]
FTC-ZA (EN/FR/ES/PT)	509241	400	12












## 13 Adhesives

		Page
Assembly adhesive MK		542
Power adhesive express KK		543
All-round adhesive gluing and sealing KD		544
All-round adhesive gluing and sealing KD transparent		545
Flexible power adhesive premium HTM		546



## The building adhesive for interior areas with high initial adhesion



Skirting



Timber constructions

### BUILDING MATERIALS

- Concrete
- Pumice
- Fibre cement
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Metal
- Polystyrene hard foam
- Aerated concrete
- Plaster
- Brick

### CERTIFICATES

- Conform to LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants

### ADVANTAGES

- The extremely high initial adhesion of 140 kg/m<sup>2</sup> makes it possible to attach lots of components without the need for additional fixings, and thus reduces the amount of time required.
- The components can be adjusted for a few minutes after they have been attached. This makes installation easier.
- The acrylate adhesive has a neutral odour and is therefore ideal for use in confined spaces.
- The special recipe makes it compatible with foamed polystyrene, e.g. Styrofoam®. MK is, therefore, suitable for a broad range of applications.

### APPLICATIONS

- Skirting
- Timber sub-structures
- Décorative, acoustic and insulation panels
- Cable ducts
- Window sills
- Tiles
- Door signs

### FUNCTION / ASSEMBLY

- Chemical base: One-component acrylate dispersion
- Creme white in colour
- Processing temperature +5 °C to +35 °C
- Setting time approx. 15 minutes
- High initial adhesion of 140 kg/m<sup>2</sup>
- Fully functional after 24 to 48 hours
- High ultimate strength (up to 22 kg/cm<sup>2</sup> for wood to wood)
- Temperature resistance -20 °C to +70 °C
- Non-drip (suitable for use on ceilings)
- Addresses uneven surfaces
- At least one of the components to be bonded must be absorbent.
- Reclosable nozzle
- Free from solvents, silicone and MDI
- Extrude with silicone application gun

### TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
<b>MK WHITE 310ML (DE/EN)</b>	<b>053128</b>	310	400	Cartridge	white	12

## The buliding adhesive for extremely fast and water-resistant bond with a high final strength



Capstones



Bonding in interior construction

### BUILDING MATERIALS

- ABS
- Concrete
- Pumice
- Anodised layer
- Fibre cement
- Gypsum
- Gypsum plasterboard
- Wooden materials
- H-PVC
- Sand-lime brick
- Ceramics
- Clinker brick
- Masonry
- Metal
- Natural stone
- Polystyrene hard foam
- Aerated concrete
- Plaster
- Brick

### CERTIFICATES

- According to the requirements of DIN EN 204-D4 to weathering resistant bondings of wood and derived wood products
- According to the requirements of DIN EN 14257 (Watt 91) to temperature-resistant bondings of wood and derived wood products
- Conform to LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants
- EMICODE® EC 1 Plus - very low emission

13

Adhesives

### ADVANTAGES

- The polyurethane adhesive is resistant to moisture and thus can be used in exterior areas.
- The extremely quick hardening shortens the pressing and joining times. Thus subsequent work can be completed more quickly.
- The optimised recipe achieves a high adhesion, including in the case of high temperatures, for high security.
- The special recipe makes it compatible with foamed polystyrene, e.g. Styrofoam®. Thus, KK is suitable for a broad range of applications.

### APPLICATIONS

- Gluing timber sub-structures
- Stair construction and stair renovations
- Laminate cladding
- Skirting boards
- Décorative, acoustic and insulation panels
- Professional modelling
- Door signs
- Cable ducts
- General repair and installation mortar

### FUNCTION / ASSEMBLY

- Chemical base: One-component PUR adhesive
- Beige in colour
- Processing temperature 0 °C to +35 °C
- Setting time approx. 3 minutes
- Fully functional after approx. 10 minutes (for invisible joints)
- High final strength of > 10 N/mm² (> 100 kg/cm²)
- Temperature resistance -40 °C to +110 °C
- Non-drip (suitable for use on ceilings)
- Lightly foaming / bridges gaps
- Assembly parts have to be fixed until functional strength has been reached
- Reclosable nozzle
- Free from solvents and silicone
- Extrude with silicone application gun

### TECHNICAL DATA

Item	Art-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
KK BEIGE 310ML (DE/EN)	059014	310	460	Cartridge	beige	12

## The flexible adhesive and sealant for interior and exterior use with high initial tack even on wet surfaces



Sheet metal coverings



Bonding and sealing of mirrors

### BUILDING MATERIALS

- ABS
- Concrete
- Pumice
- Gypsum plasterboard
- Glass
- Wooden materials
- H-PVC
- Ceramics
- Copper
- Masonry, clinker brick
- Metals
- Natural stone
- Polycarbonate and PMMA
- Polystyrene hard foam
- Aerated concrete
- Plaster
- Brick

### CHARACTERISTICS

- EN 15651 - Part 1: F EXT-INT (class 20 HM)
- EN 15651 - Part 3: S (class XS1)
- EN 15651 - Part 4: PW-INT
- LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants

### ADVANTAGES

- The extremely high initial adhesion of 110 kg/m<sup>2</sup> makes it possible to attach lots of components without the need for additional fixing, and thus reduces the amount of time required.
- The MS polymer® allows for an elastic adhesion for vibration-dampening and stress-compensating connections for demanding applications.
- KD is almost odour-free and therefore particularly suitable for closed rooms.
- Non-corrosive, thus can be used on copper and zinc plated surfaces for maximum flexibility in application.

### APPLICATIONS

#### Stress-compensating bonding and sealing of:

- Standard mirrors
- Vibrating constructions
- Metal profiles
- Joints and seams in ventilated constructions
- Insulation material, ledges, panels and cladding
- Kitchens and built-in furniture
- Stair treads and window sills
- Floor joints, connection joints in car body, vehicle construction, metal construction and ship building

### FUNCTION / ASSEMBLY

- Chemical base: One-component hybrid polymer
- Processing temperature +5 °C to +35 °C
- Setting time approx. 5 minutes
- High initial adhesion of 110 kg/m<sup>2</sup>
- Curing: approx. 3 mm per day
- High elasticity of 20 %
- Shore A 50 ± 5
- Temperature resistance: -40 °C to +90 °C
- Also bonds on a moist base material
- Prevents mould build-up, even without additional ingredients
- Suitable for bonding non-absorbent components (see TDS)
- Can be painted (see TDS)
- Free from solvents and silicone
- Waterproof and Sea water resistant
- Very good resistance to weather, age and UV

### TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
KD WHITE 290ML	059389	290	420	Cartridge	white	12
KD GREY 290ML (DE/EN)	503318	290	420	Cartridge	grey	12
KD BLACK 290ML (DE/EN)	503319	290	420	Cartridge	black	12



## The transparent hybrid polymer for discreet adhesive and sealant joints for interior and exterior use.



Bonding and sealing aluminium profiles



For invisible glued and sealed joints

### BUILDING MATERIALS

- ABS
- Concrete
- Stainless steel
- Anodised layer
- Tiles
- Glass, glazed surfaces
- Wooden materials
- H-PVC
- Ceramics
- Copper, brass
- Masonry, Clinker brick
- Metals
- Polycarbonate and PMMA
- Polystyrene hard foam
- Steel
- Brick
- Zinc

### CERTIFICATES

- EN 15651 - Part 1: F INT
- LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants

### ADVANTAGES

- The transparent formula is perfect for discreet adhesion and sealing and guarantees the optimum appearance.
- The high initial adhesion of 70 kg/m<sup>2</sup> allows many components to be attached without additional fixing.
- Thanks to the high elasticity of 20%, KD transparent is also ideally suited for high-stress expansion joints and guarantees permanent sealing at all times.
- Non-corrosive, thus can be used on copper and zinc plated surfaces for maximum flexibility in application.
- KD clear is almost odour-free and therefore particularly suitable for closed rooms.

### APPLICATIONS

#### Stress-compensating bonding and sealing of:

- Glass and other transparent materials, preferably in interior areas
- Insulation material, ledges, panels and cladding
- Kitchens and built-in furniture
- Constructions in timber, bodywork, metal, container and shipbuilding industries

### FUNCTIONING

- Chemical Base: One-component hybrid polymer
- Very easy to apply
- Prevents the formation of mould, even without additional active substances
- Skin formation time: approx. 10 minutes
- High initial adhesion of 50 kg/m<sup>2</sup>
- Cures after approx. 3 mm/24h
- Processing temperature: +5 °C to +35 °C
- High elasticity of 20%
- Shore A 38 ± 5
- Also bonds on a moist base material
- Temperature resistance: -40 °C to +90 °C
- Compatible with paint; paintable
- Natural stone may discolour
- Free from solvents, isocyanat- and silicon

### TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
<b>KD CRYSTAL CLEAR 290ML (DE/EN)</b>	<b>503317</b>	290	300	Cartridge	crystal clear	12

## The flexible high-performance adhesive with very high initial adhesion to many absorbent and non-absorbent substrates



Bonding of wall cladding



Bonding of mirrors

### BUILDING MATERIALS

- ABS
- Concrete
- Stainless steel
- Anodised layer
- Natural stone, marble
- Glass, glazed surfaces
- Wooden materials
- H-PVC
- Ceramics
- Copper, brass
- Masonry, clinker brick, tiles
- Metals
- Polycarbonate and PMMA
- Polystyrene hard foam
- HPL panels
- Brick
- Zinc

### TEST CERTIFICATE

- EMICODE EC 1 Plus - very low emission
- French VOC emission class A+

### ADVANTAGES

- The extremely high initial adhesion of > 290 kg/m<sup>2</sup> makes it possible to attach lots of components without the need for additional fixings, and thus reduces the amount of time required.
- The high final tensile strength of 2.2 N/mm<sup>2</sup> guarantees really safe glued connections.
- The MS Polymer® enables elastic bonding for vibration-dampening and stress-compensating connections in challenging applications.
- HTM is practically odourless and is therefore ideal for use in confined spaces.
- It is non-corrosive and can therefore be used on aluminium, copper and zinc-plated surfaces, making it particularly flexible.

### APPLICATIONS

- Stress compensating bonding of:
- Standard mirrors
  - Vibrating constructions
  - Metal profiles
  - Seams in ventilation construction
  - Insulation material, ledges, panels and cladding
  - Kitchens and built-in furniture
  - Stair treads and window sills
  - Different types of stone
  - Also of non-absorbent materials (see technical data sheet)
  - A wide variety of materials in container, body, metal, ship and vehicle construction

### FUNCTIONALITY

- Chemical base: One-component hybrid polymer
- Colour: White
- Processing temperature +5 °C to +40 °C
- Processing time of around 10 minutes
- Hardening time of 2-3 mm/24 h
- Extremely high initial adhesion > 290 kg/m<sup>2</sup>
- Shore A 56
- Temperature resistance: -40 °C to +90 °C
- Adhesive, even on a damp base
- Suitable for bonding non-absorbent components (see TDS)
- Can be painted (see TDS)
- Free from solvents, MDI and silicone
- Very good resistance to weather, ageing and UV

### TECHNICAL DATA















Item	Art.-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
HTM WH 290 (DE/EN)	541712	290	450	Cartridge	white	12
V-Nozzle Express Cement	524315	—	—	—	—	1







# 14 Drills and bits

		Page
Hammer drill bit Quattric II		550
Hammer drill bit SDS Plus II Pointer		553
Masonry drill bit Pointer M		557
Hammer drill bit SDS Max II / SDS Max IV		558
Hollow drill bit FHD		561
Stone drill bit D-S		562
Premium chisel FCP		563
Standard chisel		564
Profi-bit FPB		565
Diamond-bit FDB		566
Maxx-bit FMB		567
Bit holder FBH		568
Bit-Set		569
Accessories for impact driver		570

## The expert for the best performance in reinforced concrete



### ADVANTAGES

- Carbide head (up to  $\varnothing$  10 mm) for long service life.
- Power shoulders for improved breakup performance in concrete.
- Massive main cutting edges for quick drilling progress.
- Reinforcement chamfers prevent jamming in the reinforcement.
- Centring tip for simple positioning.
- Wear mark for simple recognition of wear limit in accordance with PGM.
- Two-piece spiral for quick drilling progress and increased service life.

### APPLICATIONS

#### To create approval-compliant drill holes in:

- Reinforced concrete
- Concrete
- Solid brick
- Sand-lime brick

#### Also suitable for:

- Natural stone

### CHARACTERISTICS





## TECHNICAL DATA



Hammer drill **Quattric II**



Detail:  
Top of drill Quattric II  
Ø 5 - 10 mm



Detail:  
Top of drill Quattric II  
Ø 11 - 16 mm



Detail:  
Top of drill Quattric II  
17 - 32 mm

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Working length [mm]	Total length [mm]	Type of packaging	Contents	Sales unit [pcs]
Quattric II 5/50/115	549973	5	50	115	Plastic clip	1	1
Quattric II 5/100/165	549974	5	100	165	Plastic clip	1	1
Quattric II 5/150/215	544214	5	150	215	Plastic clip	1	1
Quattric II 5,5/50/115	549971	5,5	50	115	Plastic clip	1	1
Quattric II 5,5/100/165	549972	5,5	100	165	Plastic clip	1	1
Quattric II 6/50/115	549983	6	50	115	Plastic clip	1	1
Quattric II 6/100/165	549979	6	100	165	Plastic clip	1	1
Quattric II 6/150/215	549981	6	150	215	Plastic clip	1	1
Quattric II 6/200/265	549985	6	200	265	Plastic clip	1	1
Quattric II 6/250/315	549986	6	250	315	Plastic clip	1	1
Quattric II 6,5/100/165	549975	6,5	100	165	Plastic clip	1	1
Quattric II 6,5/150/215	549976	6,5	150	215	Plastic clip	1	1
Quattric II 6,5/200/265	549977	6,5	200	265	Plastic clip	1	1
Quattric II 6,5/250/315	549978	6,5	250	315	Plastic clip	1	1
Quattric II 8/50/115	549993	8	50	115	Plastic clip	1	1
Quattric II 8/100/165	549988	8	100	165	Plastic clip	1	1
Quattric II 8/150/215	549990	8	150	215	Plastic clip	1	1
Quattric II 8/200/265	549994	8	200	265	Plastic clip	1	1
Quattric II 8/250/315	549992	8	250	315	Plastic clip	1	1
Quattric II 8/300/365	549995	8	300	365	Plastic clip	1	1
Quattric II 8/400/465	549996	8	400	465	Plastic clip	1	1
Quattric II 10/50/115	549928	10	50	115	Plastic clip	1	1
Quattric II 10/100/165	549922	10	100	165	Plastic clip	1	1
Quattric II 10/150/215	549925	10	150	215	Plastic clip	1	1
Quattric II 10/200/265	549929	10	200	265	Plastic clip	1	1
Quattric II 10/250/315	549927	10	250	315	Plastic clip	1	1
Quattric II 10/300/365	544224	10	300	365	Plastic clip	1	1
Quattric II 10/390/455	549930	10	390	455	Plastic clip	1	1
Quattric II 10/540/600	544222	10	540	600	Plastic clip	1	1
Quattric II 12/110/160	549932	12	110	160	Plastic clip	1	1
Quattric II 12/160/210	549936	12	160	210	Plastic clip	1	1
Quattric II 12/210/260	549934	12	210	260	Plastic clip	1	1
Quattric II 12/260/310	549939	12	260	310	Plastic clip	1	1
Quattric II 12/400/450	549935	12	400	450	Plastic clip	1	1
Quattric II 12/550/600	544213	12	550	600	Plastic clip	1	1
Quattric II 12/950/1000	549931	12	950	1000	Plastic clip	1	1
Quattric II 14/110/160	549941	14	110	160	Plastic clip	1	1
Quattric II 14/160/210	549944	14	160	210	Plastic clip	1	1
Quattric II 14/210/260	549942	14	210	260	Plastic clip	1	1
Quattric II 14/260/310	549945	14	260	310	Plastic clip	1	1
Quattric II 14/400/450	549943	14	400	450	Plastic clip	1	1
Quattric II 14/550/600	544223	14	550	600	Plastic clip	1	1
Quattric II 14/950/1000	549940	14	950	1000	Plastic clip	1	1
Quattric II 15/110/160	549946	15	110	160	Plastic clip	1	1
Quattric II 15/160/210	549947	15	160	210	Plastic clip	1	1
Quattric II 15/210/260	544215	15	210	260	Plastic clip	1	1
Quattric II 16/110/160	549950	16	110	160	Plastic clip	1	1
Quattric II 16/160/210	549951	16	160	210	Plastic clip	1	1
Quattric II 16/210/260	549952	16	210	260	Plastic clip	1	1
Quattric II 16/260/310	549953	16	260	310	Plastic clip	1	1
Quattric II 16/400/450	549954	16	400	450	Plastic clip	1	1

## TECHNICAL DATA



Hammer drill **Quattric II**



Detail:  
Top of drill Quattric II  
Ø 5 - 10 mm



Detail:  
Top of drill Quattric II  
Ø 11 - 16 mm



Detail:  
Top of drill Quattric II  
17 - 32 mm

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Working length [mm]	Total length [mm]	Type of packaging	Contents	Sales unit [pcs]
Quattric II 16/550/600	549955	16	550	600	Plastic clip	1	1
Quattric II 16/950/1000	549948	16	950	1000	Plastic clip	1	1
Quattric II 18/200/250	549956	18	200	250	Plastic tube	1	1
Quattric II 18/400/450	549957	18	400	450	Plastic tube	1	1
Quattric II 20/200/250	549958	20	200	250	Plastic tube	1	1
Quattric II 20/400/450	549959	20	400	450	Plastic tube	1	1
Quattric II 22/200/250	549960	22	200	250	Plastic tube	1	1
Quattric II 22/400/450	549961	22	400	450	Plastic tube	1	1
Quattric II 24/200/250	549962	24	200	250	Plastic tube	1	1
Quattric II 24/400/450	549963	24	400	450	Plastic tube	1	1
Quattric II 25/200/250	549964	25	200	250	Plastic tube	1	1
Quattric II 25/400/450	549965	25	400	450	Plastic tube	1	1
Quattric II 28/200/250	549966	28	200	250	Plastic tube	1	1
Quattric II 28/400/450	549967	28	400	450	Plastic tube	1	1
Quattric II 30/200/250	549968	30	200	250	Plastic tube	1	1
Quattric II 30/400/450	549969	30	400	450	Plastic tube	1	1
Quattric II 32/400/450	549970	32	400	450	Plastic tube	1	1
Quattric II 6/50/115 XP5	549984	6	50	115	Plastic box	5	1
Quattric II 6/100/165 XP5	544225	6	100	165	Plastic box	5	1
Quattric II 6/150/215 XP5	549982	6	150	215	Plastic box	5	1
Quattric II 6,5/100/165 XP5	544217	6,5	100	165	Plastic box	5	1
Quattric II 6,5/150/215 XP5	544218	6,5	150	215	Plastic box	5	1
Quattric II 6,5/200/265 XP5	544219	6,5	200	265	Plastic box	5	1
Quattric II 8/100/165 XP5	549989	8	100	165	Plastic box	5	1
Quattric II 8/150/215 XP5	549991	8	150	215	Plastic box	5	1
Quattric II 10/100/165 XP5	549924	10	100	165	Plastic box	5	1
Quattric II 10/150/215 XP5	549926	10	150	215	Plastic box	5	1
Quattric II 12/110/160 XP5	549933	12	110	160	Plastic box	5	1
Quattric II 12/160/210 XP5	549937	12	160	210	Plastic box	5	1
Quattric II 12/210/260 XP5	549938	12	210	260	Plastic box	5	1
Quattric II 14/110/160 XP5	544220	14	110	160	Plastic box	5	1
Quattric II 14/160/210 XP5	544221	14	160	210	Plastic box	5	1
Quattric II 6/100/165 XP10	549980	6	100	165	Plastic box	10	1
Quattric II 8/100/165 XP10	544216	8	100	165	Plastic box	10	1
Quattric II 10/100/165 XP10	549923	10	100	165	Plastic box	10	1

## The two-flute cutter is setting new standards when it comes to drilling speed



### ADVANTAGES

- The optimised drill geometry allows for rapid drilling progress, reduced wear and tear, and less effort.
- The centring tip allows for easy and precise drilling and prevents slipping on smooth surfaces.
- The "Power Breakers" on the drill bit head have a "destructive effect". They create micro-cracks in the material and achieve a noticeably improved drilling speed.
- The larger reinforcement chamfers (+35%) guarantee that the drill acts in the best possible way when it hits concrete reinforcements. This considerably reduces the risk of problems caused by drill jamming.
- The new Vario KVS helix offers further benefits: The narrow crown width behind the drill bit head reduces friction and ensures a more powerful transfer of energy during impact drilling. The improved helix allows for an ideal transportation of the drill residue. The spiral shape increases stability and, with it, the break resistance.

### APPLICATIONS

**To create approval-compliant drill holes in:**

- Concrete
- Solid brick
- Sand-lime brick

**Also suitable for:**

- Natural stone

### CHARACTERISTICS



## TECHNICAL DATA


 Hammer drill bit **SDS Plus II Pointer**

Detail: top of drill

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Working length [mm]	Total length $l$ [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
<b>SDS Plus II 4/50/110</b>	<b>531753</b>	4	50	110	Plastic clip	1	1
<b>SDS Plus II 4/100/160</b>	<b>531754</b>	4	100	160	Plastic clip	1	1
<b>SDS Plus II 5/50/110</b>	<b>531755</b>	5	50	110	Plastic clip	1	1
<b>SDS Plus II 5/100/160</b>	<b>531756</b>	5	100	160	Plastic clip	1	1
<b>SDS Plus II 5/150/210</b>	<b>531757</b>	5	150	210	Plastic clip	1	1
<b>SDS Plus II 5/250/310</b>	<b>531759</b>	5	250	310	Plastic clip	1	1
<b>SDS Plus II 5,5/100/160</b>	<b>531761</b>	5,5	100	160	Plastic clip	1	1
<b>SDS Plus II 5,5/150/210</b>	<b>531762</b>	5,5	150	210	Plastic clip	1	1
<b>SDS Plus II 5,5/250/310</b>	<b>531763</b>	5,5	250	310	Plastic clip	1	1
<b>SDS Plus II 6/50/110</b>	<b>531765</b>	6	50	110	Plastic clip	1	1
<b>SDS Plus II 6/100/160</b>	<b>531766</b>	6	100	160	Plastic clip	1	1
<b>SDS Plus II 6/150/210</b>	<b>531767</b>	6	150	210	Plastic clip	1	1
<b>SDS Plus II 6/200/260</b>	<b>531768</b>	6	200	260	Plastic clip	1	1
<b>SDS Plus II 6/250/310</b>	<b>531769</b>	6	250	310	Plastic clip	1	1
<b>SDS Plus II 6,5/50/110</b>	<b>531770</b>	6,5	50	110	Plastic clip	1	1
<b>SDS Plus II 6,5/100/160</b>	<b>531771</b>	6,5	100	160	Plastic clip	1	1
<b>SDS Plus II 6,5/150/210</b>	<b>531772</b>	6,5	150	210	Plastic clip	1	1
<b>SDS Plus II 6,5/200/260</b>	<b>531773</b>	6,5	200	260	Plastic clip	1	1
<b>SDS Plus II 6,5/250/310</b>	<b>531774</b>	6,5	250	310	Plastic clip	1	1
<b>SDS Plus II 7/50/110</b>	<b>531775</b>	7	50	110	Plastic clip	1	1
<b>SDS Plus II 7/100/160</b>	<b>531776</b>	7	100	160	Plastic clip	1	1
<b>SDS Plus II 7/150/210</b>	<b>531777</b>	7	150	210	Plastic clip	1	1
<b>SDS Plus II 7/200/250</b>	<b>531778</b>	7	200	250	Plastic clip	1	1
<b>SDS Plus II 8/50/110</b>	<b>531779</b>	8	50	110	Plastic clip	1	1
<b>SDS Plus II 8/100/160</b>	<b>531780</b>	8	100	160	Plastic clip	1	1
<b>SDS Plus II 8/150/210</b>	<b>531781</b>	8	150	210	Plastic clip	1	1
<b>SDS Plus II 8/200/260</b>	<b>531782</b>	8	200	260	Plastic clip	1	1
<b>SDS Plus II 8/250/310</b>	<b>531783</b>	8	250	310	Plastic clip	1	1
<b>SDS Plus II 8/350/400</b>	<b>531784</b>	8	350	400	Plastic clip	1	1
<b>SDS Plus II 8/400/460</b>	<b>531785</b>	8	400	460	Plastic clip	1	1
<b>SDS Plus II 8/550/600</b>	<b>531786</b>	8	550	600	Plastic clip	1	1
<b>SDS Plus II 9/100/160</b>	<b>531788</b>	9	100	160	Plastic clip	1	1
<b>SDS Plus II 9/150/210</b>	<b>531789</b>	9	150	210	Plastic clip	1	1
<b>SDS Plus II 9,5/100/160</b>	<b>531790</b>	9,5	100	160	Plastic clip	1	1
<b>SDS Plus II 10/50/110</b>	<b>531791</b>	10	50	110	Plastic clip	1	1
<b>SDS Plus II 10/100/160</b>	<b>531792</b>	10	100	160	Plastic clip	1	1
<b>SDS Plus II 10/150/210</b>	<b>531793</b>	10	150	210	Plastic clip	1	1
<b>SDS Plus II 10/200/260</b>	<b>531794</b>	10	200	260	Plastic clip	1	1
<b>SDS Plus II 10/250/310</b>	<b>531795</b>	10	250	310	Plastic clip	1	1
<b>SDS Plus II 10/300/350</b>	<b>531796</b>	10	300	350	Plastic clip	1	1
<b>SDS Plus II 10/400/450</b>	<b>531797</b>	10	400	450	Plastic clip	1	1
<b>SDS Plus II 10/550/600</b>	<b>531798</b>	10	550	600	Plastic clip	1	1
<b>SDS Plus II 10/750/800</b>	<b>531799</b>	10	750	800	Plastic clip	1	1
<b>SDS Plus II 10/950/1000</b>	<b>531800</b>	10	950	1000	Plastic clip	1	1
<b>SDS Plus II 11/100/160</b>	<b>531801</b>	11	100	160	Plastic clip	1	1
<b>SDS Plus II 11/250/310</b>	<b>531802</b>	11	250	310	Plastic clip	1	1
<b>SDS Plus II 12/100/160</b>	<b>531803</b>	12	100	160	Plastic clip	1	1
<b>SDS Plus II 12/150/210</b>	<b>531804</b>	12	150	210	Plastic clip	1	1
<b>SDS Plus II 12/200/260</b>	<b>531805</b>	12	200	260	Plastic clip	1	1
<b>SDS Plus II 12/250/310</b>	<b>531806</b>	12	250	310	Plastic clip	1	1
<b>SDS Plus II 12/300/360</b>	<b>531807</b>	12	300	360	Plastic clip	1	1
<b>SDS Plus II 12/400/450</b>	<b>531808</b>	12	400	450	Plastic clip	1	1
<b>SDS Plus II 12/550/600</b>	<b>531809</b>	12	550	600	Plastic clip	1	1

## TECHNICAL DATA



Hammer drill bit **SDS Plus II Pointer**

Detail: top of drill

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Working length [mm]	Total length l [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
SDS Plus II 12/950/1000	531810	12	950	1000	Plastic clip	1	1
SDS Plus II 13/100/160	531811	13	100	160	Plastic clip	1	1
SDS Plus II 13/150/210	531812	13	150	210	Plastic clip	1	1
SDS Plus II 13/200/260	531813	13	200	260	Plastic clip	1	1
SDS Plus II 13/250/310	531814	13	250	310	Plastic clip	1	1
SDS Plus II 14/100/160	531815	14	100	160	Plastic clip	1	1
SDS Plus II 14/150/210	531816	14	150	210	Plastic clip	1	1
SDS Plus II 14/200/260	531817	14	200	260	Plastic clip	1	1
SDS Plus II 14/250/310	531818	14	250	310	Plastic clip	1	1
SDS Plus II 14/400/450	531819	14	400	450	Plastic clip	1	1
SDS Plus II 14/550/600	531820	14	550	600	Plastic clip	1	1
SDS Plus II 14/950/1000	531821	14	950	1000	Plastic clip	1	1
SDS Plus II 15/100/160	531822	15	100	160	Plastic clip	1	1
SDS Plus II 15/150/210	531823	15	150	210	Plastic clip	1	1
SDS Plus II 15/200/260	531824	15	200	260	Plastic clip	1	1
SDS Plus II 15/400/450	531825	15	400	450	Plastic clip	1	1
SDS Plus II 16/100/160	531826	16	100	160	Plastic clip	1	1
SDS Plus II 16/150/210	531827	16	150	210	Plastic clip	1	1
SDS Plus II 16/200/260	531828	16	200	260	Plastic clip	1	1
SDS Plus II 16/250/310	531829	16	250	310	Plastic clip	1	1
SDS Plus II 16/400/450	531830	16	400	450	Plastic clip	1	1
SDS Plus II 16/550/600	531831	16	550	600	Plastic clip	1	1
SDS Plus II 16/750/800	531832	16	750	800	Plastic clip	1	1
SDS Plus II 16/950/1000	531833	16	950	1000	Plastic clip	1	1
SDS Plus II 17/150/210	531834	17	150	210	Plastic clip	1	1
SDS Plus II 17/400/450	531835	17	400	450	Plastic clip	1	1
SDS Plus II 18/150/200	531836	18	150	200	Plastic clip	1	1
SDS Plus II 18/250/300	531837	18	250	300	Plastic clip	1	1
SDS Plus II 18/400/450	531838	18	400	450	Plastic clip	1	1
SDS Plus II 18/550/600	531839	18	550	600	Plastic clip	1	1
SDS Plus II 18/950/1000	531840	18	950	1000	Plastic clip	1	1
SDS Plus II 19/150/200	531841	19	150	200	Plastic clip	1	1
SDS Plus II 19/400/450	531842	19	400	450	Plastic clip	1	1
SDS Plus II 20/150/200	531843	20	150	200	Plastic clip	1	1
SDS Plus II 20/250/300	531844	20	250	300	Plastic clip	1	1
SDS Plus II 20/400/450	531845	20	400	450	Plastic clip	1	1
SDS Plus II 20/550/600	531846	20	550	600	Plastic clip	1	1
SDS Plus II 20/950/1000	531847	20	950	1000	Plastic clip	1	1
SDS Plus II 22/200/250	531849	22	200	250	Plastic clip	1	1
SDS Plus II 22/400/450	531850	22	400	450	Plastic clip	1	1
SDS Plus II 22/550/600	531851	22	550	600	Plastic clip	1	1
SDS Plus II 22/950/1000	531852	22	950	1000	Plastic clip	1	1
SDS Plus II 24/200/250	531853	24	200	250	Plastic clip	1	1
SDS Plus II 24/400/450	531854	24	400	450	Plastic clip	1	1
SDS Plus II 25/200/250	531855	25	200	250	Plastic clip	1	1
SDS Plus II 25/400/450	531856	25	400	450	Plastic clip	1	1
SDS Plus II 25/550/600	531857	25	550	600	Plastic clip	1	1
SDS Plus II 26/200/250	531858	26	200	250	Plastic clip	1	1
SDS Plus II 26/400/450	531859	26	400	450	Plastic clip	1	1
SDS Plus II 6/50/110 QP	531860	6	50	110	Plastic box	10	1
SDS Plus II 6/100/160 QP	531861	6	100	160	Plastic box	10	1
SDS Plus II 8/100/160 QP	531862	8	100	160	Plastic box	10	1
SDS Plus II 8/150/210 QP	531863	8	150	210	Plastic box	10	1

## TECHNICAL DATA



Hammer drill bit **SDS Plus II Pointer**

Detail: top of drill

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Working length [mm]	Total length $l$ [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
<b>SDS Plus II 10/100/160 QP</b>	<b>531864</b>	10	100	160	Plastic box	10	1
<b>SDS Plus II 10/150/210 QP</b>	<b>531865</b>	10	150	210	Plastic box	10	1
<b>SDS Plus II 10/200/260 QP</b>	<b>531866</b>	10	200	260	Plastic box	10	1
<b>SDS Plus II 10/250/310 QP</b>	<b>531867</b>	10	250	310	Plastic box	10	1
<b>SDS Plus II 12/100/160 QP</b>	<b>531868</b>	12	100	160	Plastic box	10	1
<b>SDS Plus II 12/150/210 QP</b>	<b>531869</b>	12	150	210	Plastic box	10	1
<b>SDS Plus II 12/200/260 QP</b>	<b>531870</b>	12	200	260	Plastic box	10	1



## The perfect drill bit for all perforated building materials



### ADVANTAGES

- Shortened SDS-Plus shank reduces the impact of the machine on the drill and prevents possible damage to the substrate (it is recommended to use the drill bit without impact).
- Precise and accurate drill holes without damage to the substrate thanks to shortened SDS-Plus shank to guarantee correct fixing with increased load capacities in all types of perforated building materials.
- Diamond sharpened carbide tip with advanced cutting edges ensure fast and safe drilling progress in different materials.
- Large spiral flutes for optimal removal of dust.

### APPLICATIONS

#### To create drill holes in:

- Hollow bricks
- Aerated concrete
- Perforated sand-lime bricks

#### Ideal for:

- Frame-fixings or ETICS systems e.g. SXRL, FIS HK, fischer Thermax, EWI and VBS-M

### CHARACTERISTICS



### TECHNICAL DATA



Masonry drill bit **Pointer M**

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Working length [mm]	Total length [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
<b>Pointer M 6/350/410</b>	<b>546204</b>	6	350	410	Pouch	1	1
<b>Pointer M 8/200/260</b>	<b>544382</b>	8	200	260	Pouch	1	1
<b>Pointer M 10/200/260</b>	<b>543630</b>	10	200	260	Pouch	1	1
<b>Pointer M 12/200/260</b>	<b>543631</b>	12	200	260	Pouch	1	1
<b>Pointer M 14/200/260</b>	<b>543632</b>	14	200	260	Pouch	1	1
<b>Pointer M 16/200/260</b>	<b>543633</b>	16	200	260	Pouch	1	1
<b>Pointer M 16/100/400</b>	<b>543634</b>	16	100	400	Pouch	1	1
<b>Pointer M 18/350/410</b>	<b>546205</b>	18	350	410	Plastic tube	1	1
<b>Pointer M 20/100/400</b>	<b>543635</b>	20	100	400	Plastic tube	1	1
<b>Pointer M 22/350/410</b>	<b>546206</b>	22	350	410	Plastic tube	1	1

## The hammer drill bits with SDS Max drill chuck



### ADVANTAGES

- The SDS Max drill chuck ensures optimum transfer of force and allows for quick drilling progress for large volume drill holes.
- The drill bit head with four cutting edges prevents jamming in the concrete reinforcement.
- The quadruple flute reliably transports the drilling dust from the drill hole, thus reducing wear.
- The core-reinforced flute ensures maximum transfer of energy, and guarantees a low-vibration drilling.
- The PGM®-compliant cutting element guarantees perfect-fit drill holes to fulfil the highest safety requirements.

### APPLICATIONS

#### To create approval-compliant drill holes in:

- Reinforced concrete (SDS Max IV)
- Concrete
- Solid brick
- Sand-lime brick

#### Also suitable for:

- Natural stone

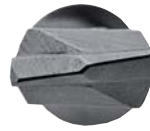
### CHARACTERISTICS



## TECHNICAL DATA



Hammerdrill **SDS Max II and IV**



Detail:  
Top of drill SDS Max II  
Ø 12 - 15 mm



Detail:  
Top of drill SDS Max IV  
from Ø 16 mm

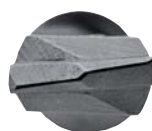
Item	Art.-No.	Drill hole diameter d <sub>0</sub> [mm]	Working length [mm]	Total length l [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
<b>SDS Max II 12/200/340</b>	<b>504188</b>	12	200	340	Plastic tube	1	1
<b>SDS Max II 12/400/540</b>	<b>504189</b>	12	400	540	Plastic tube	1	1
<b>SDS Max II 12/800/920</b>	<b>098278</b>	12	800	920	Plastic tube	1	1
<b>SDS Max II 14/200/340</b>	<b>504192</b>	14	200	340	Plastic tube	1	1
<b>SDS Max II 14/400/540</b>	<b>504194</b>	14	400	540	Plastic tube	1	1
<b>SDS Max II 14/1000/1120</b>	<b>098279</b> <sup>1)</sup>	14	1000	1120	Plastic tube	1	1
<b>SDS Max II 15/200/340</b>	<b>504196</b>	15	200	340	Plastic tube	1	1
<b>SDS Max IV 15/400/540</b>	<b>524562</b>	15	400	540	Plastic tube	1	1
<b>SDS Max IV 16/200/340</b>	<b>504198</b>	16	200	340	Plastic tube	1	1
<b>SDS Max IV 16/400/540</b>	<b>504199</b>	16	400	540	Plastic tube	1	1
<b>SDS Max IV 16/800/920</b>	<b>504200</b>	16	800	920	Plastic tube	1	1
<b>SDS Max IV 16/1200/1320</b>	<b>504206</b>	16	1200	1320	Plastic tube	1	1
<b>SDS Max IV 18/200/340</b>	<b>504207</b>	18	200	340	Plastic tube	1	1
<b>SDS Max IV 18/400/540</b>	<b>504208</b>	18	400	540	Plastic tube	1	1
<b>SDS Max IV 18/800/920</b>	<b>504209</b>	18	800	920	Plastic tube	1	1
<b>SDS Max IV 18/1200/1320</b>	<b>504213</b>	18	1200	1320	Plastic tube	1	1
<b>SDS Max IV 20/200/320</b>	<b>504214</b>	20	200	320	Plastic tube	1	1
<b>SDS Max IV 20/400/520</b>	<b>504217</b>	20	400	520	Plastic tube	1	1
<b>SDS Max IV 20/800/920</b>	<b>504222</b>	20	800	920	Plastic tube	1	1
<b>SDS Max IV 20/1200/1320</b>	<b>504223</b>	20	1200	1320	Plastic tube	1	1
<b>SDS Max IV 22/200/320</b>	<b>504224</b>	22	200	320	Tube	1	1
<b>SDS Max IV 22/400/520</b>	<b>504225</b>	22	400	520	Plastic tube	1	1
<b>SDS Max IV 22/800/920</b>	<b>504226</b>	22	800	920	Plastic tube	1	1
<b>SDS Max IV 24/200/320</b>	<b>504228</b>	24	200	320	Plastic tube	1	1
<b>SDS Max IV 24/400/520</b>	<b>504229</b>	24	400	520	Plastic tube	1	1
<b>SDS Max IV 25/200/320</b>	<b>504235</b>	25	200	320	Plastic tube	1	1
<b>SDS Max IV 25/400/520</b>	<b>504236</b>	25	400	520	Plastic tube	1	1
<b>SDS Max IV 25/800/920</b>	<b>504237</b>	25	800	920	Plastic tube	1	1
<b>SDS Max IV 25/1200/1320</b>	<b>504238</b>	25	1200	1320	Plastic tube	1	1
<b>SDS Max IV 25/2000/2120</b>	<b>098287</b>	25	2000	2120	Plastic tube	1	1
<b>SDS Max IV 28/250/370</b>	<b>504240</b>	28	250	370	Plastic tube	1	1
<b>SDS Max IV 28/450/570</b>	<b>504241</b>	28	450	570	Plastic tube	1	1
<b>SDS Max IV 28/550/670</b>	<b>504242</b>	28	550	670	Plastic tube	1	1
<b>SDS Max IV 28/800/920</b>	<b>504243</b>	28	800	920	Plastic tube	1	1
<b>SDS Max IV 30/250/370</b>	<b>504245</b>	30	250	370	Plastic tube	1	1
<b>SDS Max IV 30/450/570</b>	<b>504246</b>	30	450	570	Plastic tube	1	1
<b>SDS Max IV 30/800/920</b>	<b>057779</b>	30	800	920	Plastic tube	1	1
<b>SDS Max IV 30/1230/1350</b>	<b>040187</b> <sup>1)</sup>	30	1210	1350	Plastic tube	1	1
<b>SDS Max IV 30/1620/1740</b>	<b>040188</b> <sup>1)</sup>	30	1620	1740	Plastic tube	1	1
<b>SDS Max IV 30/2020/2140</b>	<b>040189</b> <sup>1)</sup>	30	2000	2140	Plastic tube	1	1
<b>SDS Max IV 32/450/570</b>	<b>504248</b>	32	450	570	Plastic tube	1	1
<b>SDS Max IV 32/800/920</b>	<b>504249</b>	32	800	920	Plastic tube	1	1
<b>SDS Max IV 35/250/370</b>	<b>504251</b>	35	250	370	Plastic tube	1	1
<b>SDS Max IV 35/450/570</b>	<b>504256</b>	35	450	570	Plastic tube	1	1
<b>SDS Max IV 35/550/670</b>	<b>504257</b>	35	550	670	Plastic tube	1	1
<b>SDS Max IV 35/800/920</b>	<b>504258</b>	35	800	920	Plastic tube	1	1
<b>SDS Max IV 35/1200/1320</b>	<b>504259</b>	35	1200	1320	Plastic tube	1	1
<b>SDS Max IV 35/1620/1740</b>	<b>040191</b>	35	1620	1740	Plastic tube	1	1
<b>SDS Max IV 35/2020/2140</b>	<b>040192</b>	35	2000	2140	Plastic tube	1	1
<b>SDS Max IV 38/450/570</b>	<b>504268</b>	38	450	570	Plastic tube	1	1
<b>SDS Max IV 40/250/370</b>	<b>504269</b>	40	250	370	Plastic tube	1	1

<sup>1)</sup> delivery on request

## TECHNICAL DATA



Hammerdrill **SDS Max II and IV**



Detail:  
Top of drill SDS Max II  
Ø 12 - 15 mm



Detail:  
Top of drill SDS Max IV  
from Ø 16 mm

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Working length [mm]	Total length $l$ [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
<b>SDS Max IV 40/450/570</b>	<b>504270</b>	40	450	570	Plastic tube	1	1
<b>SDS Max IV 40/800/920</b>	<b>504271</b>	40	800	920	Plastic tube	1	1

1) delivery on request

## Hollow drill bit for drilling with low dust as well as for efficient and approved anchoring



### ADVANTAGES

- Drilling and drill hole cleaning in one single step saves the normal cleaning of chemical and mechanical anchoring when the hollow drill bit is regulated by their respective approvals. This saves up to 55% of the complete drill hole creation process.
- The drill hole will be cleaned thoroughly guaranteeing a secure fixing (drilling dust reduces performance of fixing materials).
- Reducing the drill dust prevents jamming when drilling therefore provides a faster and frictionless drilling progress.
- Immediate extraction of drilling dust at the drill tip for a clean and healthy work place.
- Centering tip allows for accurate positioning on uneven surfaces reducing slip.

### APPLICATIONS

**To create approval-compliant drill holes in:**

- Reinforced concrete
- Concrete

**Also suitable for:**

- Solid brick
- Solid sand-lime brick
- Natural stone

### CHARACTERISTICS



### TECHNICAL DATA



Hollow drill bit **FHD**



Detail:  
Top of drill FHD  
Ø 12 - 14 mm



Detail:  
Top of drill FHD  
Ø 16 - 18 mm  
Top of drill FHD Max  
Ø 16 - 35 mm

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Working length [mm]	Total length [mm]	Type of packaging	Contents	Sales unit [pcs]
<b>FHD 12/200/330</b>	<b>546597</b>	12	200	330	Plastic clip	1	1
<b>FHD 14/250/380</b>	<b>546598</b>	14	250	380	Plastic clip	1	1
<b>FHD 16/250/380</b>	<b>546599</b>	16	250	380	Plastic clip	1	1
<b>FHD 18/320/450</b>	<b>546600</b>	18	320	450	Plastic clip	1	1
<b>FHD Max 16/400/620</b>	<b>546601</b>	16	400	620	Plastic clip	1	1
<b>FHD Max 18/400/620</b>	<b>546602</b>	18	400	620	Plastic clip	1	1
<b>FHD Max 20/400/620</b>	<b>546603</b>	20	400	620	Plastic clip	1	1
<b>FHD Max 24/400/620</b>	<b>546604</b>	24	400	620	Plastic clip	1	1
<b>FHD Max 28/600/820</b>	<b>546605</b>	28	600	820	Plastic clip	1	1
<b>FHD Max 30/600/820</b>	<b>546606</b>	30	600	820	Plastic clip	1	1
<b>FHD Max 35/650/870</b>	<b>546607</b>	35	650	870	Plastic clip	1	1

## Universal masonry drill bit for impact and rotary drilling in masonry and natural stone



### ADVANTAGES

- 130° carbide cutting edge for long service life, very heat resistant.
- Robust version in accordance with DIN 8039, roll forged.
- Optimum drill dust removal through special spiral geometry.
- Suitable for rotary and impact drilling.

### APPLICATIONS

- For regular drilling especially in stone and masonry

### CHARACTERISTICS



### TECHNICAL DATA



Stone drill bit **D-S**

Item	Art.-No.	Drill hole diameter $d_0$ [mm]	Working length [mm]	Total length $l$ [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
D-S HM 3,0 x 30/60	542976	3	30	60	Pouch	1	1
D-S HM 4,0 x 38/75	542977	4	38	75	Pouch	1	1
D-S HM 5,0 x 44/85	542978	5	44	85	Pouch	1	1
D-S HM 6,0 x 54/100	542979	6	54	100	Pouch	1	1
D-S HM 6,0 x 135/200	551390	6	135	200	Pouch	1	1
D-S HM 7,0 x 54/100	542980	7	54	100	Pouch	1	1
D-S HM 8,0 x 67/120	542981	8	67	120	Pouch	1	1
D-S HM 8,0 x 135/200	542991	8	135	200	Pouch	1	1
D-S HM 10,0 x 67/120	542982	10	67	120	Pouch	1	1
D-S HM 10,0 x 135/200	542992	10	135	200	Pouch	1	1
D-S HM 12,0 x 85/150	542983	12	85	150	Pouch	1	1
D-S HM 12,0 x 135/200	542993	12	135	200	Pouch	1	1
D-S HM 13,0 x 85/150	542984	13	85	150	Pouch	1	1
D-S HM 14,0 x 85/150	542985	14	85	150	Pouch	1	1
D-S HM 15,0 x 85/150	542986	15	85	150	Pouch	1	1
D-S HM 16,0 x 85/150	542987	16	85	150	Pouch	1	1
D-S HM 18,0 x 100/160	542988	18	100	160	Pouch	1	1
D-S HM 20,0 x 100/160	542989	20	100	160	Pouch	1	1
D-S Set 4-10mm 5pcs P	543025	4-5-6-8-10	—	—	Plastic cassette	5	1
D-S Set 3-10mm 8pcs P	543027	3-10	—	—	Plastic cassette	8	1



## Premium Chisel with SDS Plus and SDS Max shank for maximum performance and lifetime



### ADVANTAGES

- Extended working tip in comparison to the standard chisel for an increased lifetime.
- Self-sharpening design for economical working and reducing downtime.
- Advanced 'jam protection' for reduced friction.
- Specially designed working tip increases the performance and ensures a high removal of material.

### APPLICATIONS

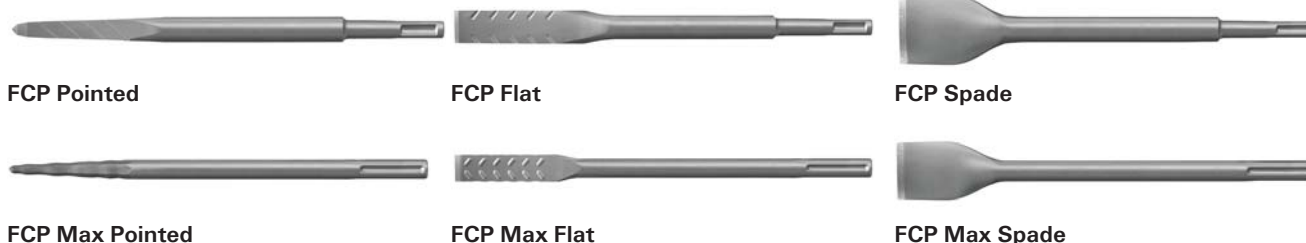
Suitable for creating holes, slots and installation paths as well as break-throughs in:

- Concrete
- Masonry
- Natural stone

### CHARACTERISTICS



### TECHNICAL DATA



Item	Art.-No.	Type	Length l [mm]	Width B [mm]	Contents [pcs]	Sales unit [pcs]
<b>FCP Pointed 250</b>	<b>546314</b>	Pointed	250	—	1	1
<b>FCP Flat 20/250</b>	<b>546315</b>	Flat	250	20	1	1
<b>FCP Spade 40/250</b>	<b>546316</b>	Spade	250	40	1	1
<b>FCP Max Pointed 400</b>	<b>546317</b>	Pointed	400	—	1	1
<b>FCP Max Flat 25/400</b>	<b>546318</b>	Flat	400	25	1	1
<b>FCP Max Spade 50/380</b>	<b>546319</b>	Spade	380	50	1	1
<b>FCP Set</b>	<b>546320</b>	Pointed, Flat, Spade	—	—	3	1
<b>FCP Max Set</b>	<b>546321</b>	Pointed, Flat, Spade	—	—	3	1

## High-performance Standard chisel with SDS Plus and SDS Max drill chuck



### ADVANTAGES

- The SDS Plus and SDS Max drill chuck for the chisel allow for use with professional hammer drilling machines, and ensure a proven and safe transfer of force.
- The use of a high quality, specially hardened steel with surface protection increases the life span of the tools.
- The high oscillation endurance allows for high work comfort and contributes to the achievement of clean results.

### APPLICATIONS

**Suitable for creating holes, slots and installation paths in:**

- Concrete
- Masonry
- Natural stone

### CHARACTERISTICS



### TECHNICAL DATA



SDS Plus and SDS Max Pointed



SDS Plus and SDS Max Flat



SDS Plus and SDS Max Spade



SDS Plus and SDS Max Hollow



SDS Plus and SDS Max Tile

Item	Art.-No.	Type	Length l [mm]	Width B [mm]	Contents [pcs]	Sales unit [pcs]	
SDS Plus Pointed 250	504277	Pointed	250	12	1	1	
SDS Max Pointed 280	504281	Pointed	280	16	1	1	
SDS Max Pointed 400	504282	Pointed	400	20	1	1	
SDS Max Pointed 600	504283	Pointed	600	27	1	1	
SDS Plus Flat 20/250	504278	Flat	250	20	1	1	
SDS Max Flat 25/280	504284	Flat	280	25	1	1	
SDS Max Flat 25/400	504286	Flat	400	25	1	1	
SDS Max Flat 25/600	504287	Flat	600	25	1	1	
SDS Plus Scaling 40/250	504279	Spade	250	40	1	1	
SDS Max Scaling 50/400	504288	Spade	400	50	1	1	
SDS Max Scaling 80/300	504290	Spade	300	80	1	1	
SDS Max Scaling 115/350	504291	Spade	350	115	1	1	
SDS Plus Hollow 22/250	504280	Hollow	250	22	1	1	
SDS Max Hollow 26/300	504293	Hollow	300	26	1	1	
SDS Plus I M-Tile scaling 40/250	531437	Tile scaling	250	40	1	1	
SDS Max Tile Scaling 50/400	504295	Tile scaling	400	50	1	1	

## The all-rounding bit within convincing quality



### ADVANTAGES

- The bits manufactured from special steel with high hardness degree are suitable for both hand driven and machine guided applications.
- The perfect fitting inside screws ensures working with low-wear of the product and consequently long lifetime and clean working results.
- The profile guarantees an ideal connection for an optimal power and torque transmission that prevents damages of the surface or the screw-heads.
- Also available as clearly arranged bit-set with 11 or 31 pcs including bit-holder.

### APPLICATIONS

**Number of internal drives in various profile sizes, such as:**

- PH, PZ cross-slot
- TX star recess
- Suitable for 1/4" drives

### TECHNICAL DATA



Profi-bit **FPB T W**



Profi-bit **FPB PZ W**



**FPB PH 2 DRYWALL W 1**

Item	Art.-No.	Drive	Length l [mm]	Contents	Sales unit [pcs]
<b>FPB T 30 90 mm PROFİ Bit W 1</b>	<b>542369</b>	TX30	90	1 Bit	1
<b>FPB T 30 150 mm PROFİ Bit W 1</b>	<b>542372</b>	TX30	150	1 Bit	1
<b>FPB T 40 90 mm PROFİ Bit W 1</b>	<b>542370</b>	TX40	90	1 Bit	1
<b>FPB T 40 150 mm PROFİ Bit W 1</b>	<b>542373</b>	TX40	150	1 Bit	1
<b>FPB T 50 PROFİ Bit W 1</b>	<b>533085</b>	TX50	25	1 Bit	10
<b>FPB T 50 90 mm PROFİ Bit W 1</b>	<b>542371</b>	TX50	90	1 Bit	1
<b>FPB PH 2 50MM PROFİ Bit W 1</b>	<b>533105</b> 1)	PH 2	50	1 Bit	10
<b>FPB PH 2 DRYWALL W 1</b>	<b>533090</b>	PH 2	25	1 Bit	10
<b>FPB PZ 2 50MM PROFİ Bit W 1</b>	<b>533109</b>	PZ2	50	1 Bit	10
<b>FPB PZ 4 PROFİ Bit W 1</b>	<b>533099</b>	PZ 4	32	1 Bit	10
<b>FPB T 10 PROFİ Bit W 10</b>	<b>533112</b>	TX10	25	10 Bit	10
<b>FPB T 15 PROFİ Bit W 10</b>	<b>533113</b>	TX15	25	10 Bit	10
<b>FPB T 20 PROFİ Bit W 10</b>	<b>533114</b>	TX20	25	10 Bit	10
<b>FPB T 25 PROFİ Bit W 10</b>	<b>533115</b>	TX25	25	10 Bit	10
<b>FPB T 30 PROFİ Bit W 10</b>	<b>533116</b>	TX30	25	10 Bit	10
<b>FPB T 40 PROFİ Bit W 10</b>	<b>533117</b>	TX40	25	10 Bit	10
<b>FPB PH 1 PROFİ Bit W 10</b>	<b>533118</b>	PH1	25	10 Bit	10
<b>FPB PH 2 PROFİ Bit W 10</b>	<b>533119</b>	PH 2	25	10 Bit	10
<b>FPB PH 3 PROFİ Bit W 10</b>	<b>533120</b>	PH3	25	10 Bit	10
<b>FPB PZ 1 PROFİ Bit W 10</b>	<b>533121</b>	PZ1	25	10 Bit	10
<b>FPB PZ 2 PROFİ Bit W 10</b>	<b>533122</b>	PZ2	25	10 Bit	10
<b>FPB PZ 3 PROFİ Bit W 10</b>	<b>533123</b>	PZ3	25	10 Bit	10

1) Delivery time on request.

## The non-slip bit



### ADVANTAGES

- The coating with diamond-sapphire-particles ensures the best possible power-transfer and prevents the bit tip from slipping out of the screw head.
- The diamond-coated bit with a high hardness grade guarantees the greatest service life and corrosion resistance.
- The torsion zones created by the tapered bit cross-section offers relief in the case of extreme loads. For a more effortless installation and maximum operating efficiency.
- The high dimensional accuracy allows for an ideal fit. For clean results and a long life span.

### APPLICATIONS

**Number of internal drives in various profile sizes, such as:**

- PH, PZ cross-slot
- TX star recess
- Suitable for 1/4" drives

### TECHNICAL DATA



Diamond-bit **FDB T W**

Item	Art.-No.	Drive	Length l [mm]	Contents	Sales unit [pcs]
<b>FDB T 10 DIAMANT Bit W 10</b>	<b>533136</b>	TX10	25	10 Bit	10
<b>FDB T 15 DIAMANT Bit W 10</b>	<b>533137</b>	TX15	25	10 Bit	10
<b>FDB T 20 DIAMANT Bit W 10</b>	<b>533138</b>	TX20	25	10 Bit	10
<b>FDB T 25 DIAMANT Bit W 10</b>	<b>533139</b>	TX25	25	10 Bit	10
<b>FDB T 30 DIAMANT Bit W 10</b>	<b>533140</b>	TX30	25	10 Bit	10
<b>FDB T 40 DIAMANT Bit W 10</b>	<b>533141</b>	TX40	25	10 Bit	10
<b>FDB PH 1 DIAMANT Bit W 10</b>	<b>533142</b>	PH1	25	10 Bit	10
<b>FDB PH 2 DIAMANT Bit W 10</b>	<b>533143</b>	PH 2	25	10 Bit	10
<b>FDB PH 3 DIAMANT Bit W 10</b>	<b>533144</b>	PH3	25	10 Bit	10
<b>FDB PZ 1 DIAMANT Bit W 10</b>	<b>533145</b>	PZ1	25	10 Bit	10
<b>FDB PZ 2 DIAMANT Bit W 10</b>	<b>533146</b>	PZ2	25	10 Bit	10
<b>FDB PZ 3 DIAMANT Bit W 10</b>	<b>533147</b>	PZ3	25	10 Bit	10

## The ultimate torsion-bit



### ADVANTAGES

- The ultimate solution for extreme installation torques. Ideal for usage in high-performance power-and impact-tools.
- Optimal geometry of the profile guarantees unique performance and durability for sophisticated applications and users.
- The elastic torsion zone releases at extreme loads to ensure a gentle working and maximum operating efficiency.
- The high dimensional accuracy allows for an ideal fit. For clean results and a long life span.
- Also available as clearly arranged bit-set with 8pcs including bit-holder.

### APPLICATIONS

**Number of internal drives in various profile sizes, such as:**

- TX star recess
- Suitable for 1/4" drives

### TECHNICAL DATA



Maxx-bit FMB T

Item	Art.-No.	Drive	Length   [mm]	Contents	Sales unit [pcs]
<b>FMB T10 Maxx Bit W 5</b>	<b>533154</b>	TX10	29	5 Bit	10
<b>FMB T15 Maxx Bit W 5</b>	<b>533155</b>	TX15	29	5 Bit	10
<b>FMB T20 Maxx Bit W 5</b>	<b>533156</b>	TX20	29	5 Bit	10
<b>FMB T25 Maxx Bit W 5</b>	<b>533157</b>	TX25	29	5 Bit	10
<b>FMB T30 Maxx Bit W 5</b>	<b>533158</b>	TX30	29	5 Bit	10
<b>FMB T40 Maxx Bit W 5</b>	<b>533159</b>	TX40	29	5 Bit	10

## The bit holder for rapid bit exchange



### ADVANTAGES

- The bit holder family for 1/4" bits with magnetic insert hold the bit securely in the drill chuck and offers a smooth installation procedure.
- Robust and slim bit holder for an easy bit exchange.
- Ideal for direct machine connection or enlargement of the bits to reach difficult areas.
- With the FBH Quick Bit Slim the Bit automatically locked when plugged in and provides a secure hold. By pulling back the sleeve the bit can be easily taken out.

### APPLICATIONS

- The bit holders for use in cylinder drill chucks

### TECHNICAL DATA

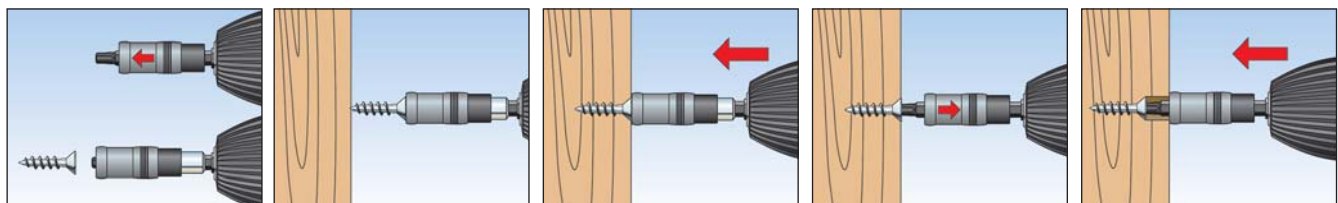


Bit holder **FBH W 1**



Bit holder **FBH Quick Bit Slim W 1**

Item	Art.-No.	Drive	Length	Contents	Sales unit
			[mm]	[pcs]	[pcs]
<b>FBH Bit Holder W 1</b>	<b>533148</b>	1/4"	50	1	1
<b>FBH Quick Bit Slim W 1</b>	<b>533150</b>	1/4"	50	1	1





## Useful bit sets for a multitude of applications



### ADVANTAGES

- Safe and clearly arranged keeping of the content assuring a reliable usage day by day.
- The robust and durable construction fulfilling even hardest requirements.
- The bit sets combining compact dimensions with easy handling and containing the most common bits as well as the bit holder.

### APPLICATIONS

- The ideal bit sets for quick and efficient working.
- For a high variation of applications

### TECHNICAL DATA

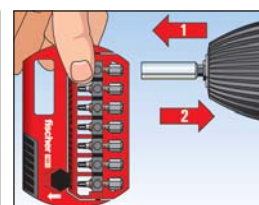
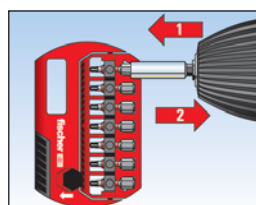
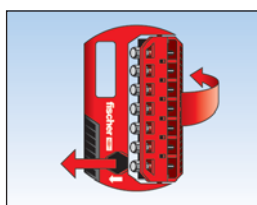
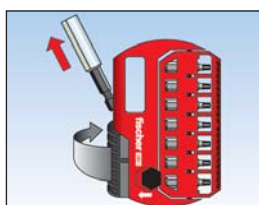
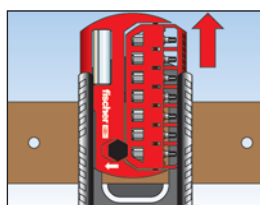


Bit Set **FPB Profi W 31** with belt clip



Bit Set **FPB Profi W 11**

Item	Art.-No.	Contents	Sales unit
			[pcs]
<b>FPB Bit Set Profi W 31</b>	<b>533152</b>	2x PZ1, 4x PZ2, 2x PZ 3, 2x PH1, 4x PH2, 2x PH 3, 1x TX8, 2x TX10, 1x TX15, 2x TX20, 2x TX25, 1x TX27, 1x TX30, 1x TX40, each 1x Slot 4,5; 5,5; 6,0, 1x Universal bit holder	1
<b>FPB Bit Set Profi W 11</b>	<b>533153</b>	each 1x PZ1, PZ3, 2x PZ2, each 1x TX10, TX15, TX20, TX25, TX30, TX40, 1x Universal bit holder	1



## Ideal for use in high-performance power- and impact-tools



### ADVANTAGES

- Optimal geometry of the profile guarantees unique performance and durability for complex applications and users.
- The high dimensional accuracy allows for an ideal fit. For clean results and a long life span.

### APPLICATIONS

- The ultimate solution for extreme installation torques

### TECHNICAL DATA



Nut SW



Nut TX



Profi-bit **FPB T50 5/16"**

Item	Art.-No.	Connection / drive	Total length	Sales unit
			I [mm]	
<b>Nut SW10</b>	<b>538577</b>	1/2" / SW10	78	1
<b>Nut SW13</b>	<b>538578</b>	1/2" / SW13	38	1
<b>Nut SW15</b>	<b>538579</b>	1/2" / SW15	38	1
<b>Nut SW17</b>	<b>538580</b>	1/2" / SW17	38	1
<b>Nut SW21</b>	<b>538581</b>	1/2" / SW21	38	1
<b>Nut TX40</b>	<b>538575</b> <sup>1)</sup>	1/2" / 1/4"	35	1
<b>Nut TX50</b>	<b>538576</b> <sup>2)</sup>	1/2" / 5/16"	35	1
<b>FPB Profi-Bit T50 5/16"</b>	<b>538574</b>	5/16" / TX50	35	1

1) Suitable for FMB T40 Maxx Bit

2) Suitable for FPB Profi-Bit T50 5/16"



## Building Material – Concrete

The substrate's quality is crucial when selecting the correct fixing:

A differentiation is made between concrete, masonry and panel building materials. Concrete is made from a mixture of cement, aggregates and water.

### Concrete's main properties are:

- High level of compressive strength, but only low tensile strength ( $\approx 10\%$  of the compressive strength).
- Inserting individual rebars and or mats will increase tensile strength (steel + concrete = reinforced concrete).
- Structure easily reproducible as it is regulated by standards, therefore it is an ideal anchor base.



### Concrete is mainly split into two categories:

**Standard concrete and lightweight concrete.** While standard concrete contains gravel; lightweight concrete contains additives such as pumice, expanded clay or polystyrene® usually with a lower compressive strength or bulk density. This leads to unfavourable conditions for anchor fixings.

**The load bearing capacity of heavy duty fixings depends on the concrete's compressive and tensile strength.** This is indicated by the numbers in the abbreviations: e.g. the most commonly used concrete compressive strength is C20/25 with a cube compressive strength of 25 N/mm<sup>2</sup>.

### EXPERT TIP

#### Standard concrete qualities:

C12/15 to C50/60, even higher grades are also available for special applications. The majority of anchors approved for concrete may only be used from concrete quality from C20/25 up to a max. of C50/60. In the past, designations from DIN 1045 were used in Germany: B25 ( $\approx$  C20/25) to B55 ( $\approx$  C45/55).

#### C20/25 means:

- C = concrete
- 20 = compressive strength  $f_{ck}$  or  $f_{ck}$ ,  $c_{yl}$  of a concrete test cylinder ( $\varnothing$  150 mm, height 300 mm) in N/mm<sup>2</sup>
- 25 = compressive strength  $f_{ck}$ , cube of a concrete test cube (edge length 150 mm) in N/mm<sup>2</sup>

- **Normal concrete** without accelerating additives reaches its nominal strength after 28 days. Only then can the fixing be installed in compliance with the approval/assessment.

- **Fresh concrete:** still workable up to approx. one hour after pouring.
- **Green concrete:** starts to harden after four hours, no longer workable.
- **New concrete:** is hardened after 28 days, however minimum compressive strength not yet reached.
- **Hard concrete:** more than 28 days old, nominal strength reached.

## Compressive strength classes in different countries

Country	Specimen	Dimensions <sup>1)</sup> [cm]	Concrete strength class	Unit	Standard
China	Cube	15x15x15	C15, C20, C25, C30, C35, C40, C45, C50, C55, C60	N/mm <sup>2</sup>	GB50010-2010
Denmark	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm <sup>2</sup>	DS/EN 206
Germany	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm <sup>2</sup>	EN 206
France	Cylinder	16x32	B20, B25, B30, B35, B40, B45, B50	N/mm <sup>2</sup>	BAEL 91
Great Britain	Cube	15x15x15	C20, C25, C30, C37, C40, C45, C55, C60	N/mm <sup>2</sup>	BS EN 12390-3:2009
Italy	Cube	15x15x15	C 8/10, C12/15, C16/20, C20/25, C25/30, C28/35, C30/37, C32/40, C35/45, C40/50, C45/55, C50/60	N/mm <sup>2</sup>	UNI EN 206
Japan	Cylinder	10x20	≥ 15	N/mm <sup>2</sup>	JIS A 1108
Korea	Cylinder	10x20, 15x30	18, 21, 24, 27, 30	N/mm <sup>2</sup>	KS F 2405
The Netherlands	Cylinder	15x30	C 8/10, C12/15, C16/20, C20/25, C25/30, C30/37, C35/45, C40/50, C45/55, C50/60	N/mm <sup>2</sup>	NEN-EN 206-1
Austria	Cube	15x15x15	C 8/10, C12/15, C16/20, C20/25, C25/30, C30/37, C35/45, C40/50, C45/55, C50/60	N/mm <sup>2</sup>	ÖNORM B 4710-1
Sweden	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm <sup>2</sup>	SS-EN206
Switzerland	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm <sup>2</sup>	SIA 262
Spain	Cylinder	15x30	Unreinforced concrete: HM-20, HM-25, HM-30, HM-35, HM-40, HM-45, HM-50 Reinforced concrete: HA-25, HA-30, HA-35, HA-40, HA-45, HA-50 Pre-stressed concrete: HP-25, HP-30, HP-35, HP-40, HP-45, HP-50	N/mm <sup>2</sup>	EHE-08
USA	Cylinder	15x30	2000, 2500, 3000, 3500, 4000, 5000, 6000, 7000, 8000	Psi	ACI 318

<sup>1)</sup> Conversion:  $f_{\text{Cylinder}} = 0.85 \times f_{\text{Cube, 20x20x20}} = 1.05 \times f_{\text{Cube, 15x15x15}}$

### EXPERT TIP

- **Anchors** used in **new concrete** must be **suitable** for this purpose, or may only bear loads after reaching the minimum compressive strength.
- **Concrete** always shows **cracks** (shrinkage during hardening, loading).
- In **cracked concrete**, anchors which are tested in cracked concrete must be used. These **anchors** must be able to **expand** when concrete starts to crack e. g. expansion anchors (e. g. FAZ II), form locking anchors or undercut anchors (e. g. FZA), or bonded anchors (e. g. FIS SB).
- **Cutting through reinforcement steel** while making **drill holes** is **not permitted**. In special cases, non load-bearing steels can be cut after consultation with the responsible engineer.
- The load bearing capacity of the concrete along the entire drill hole must be guaranteed (no honeycombing in the concrete, no voids and pockets).
- **Pre-stressed concrete**: A certain drilling distance must be maintained from the tensioning strands as stated in the approval/assessment (e. g. FHY, FBS 6 or EA II).

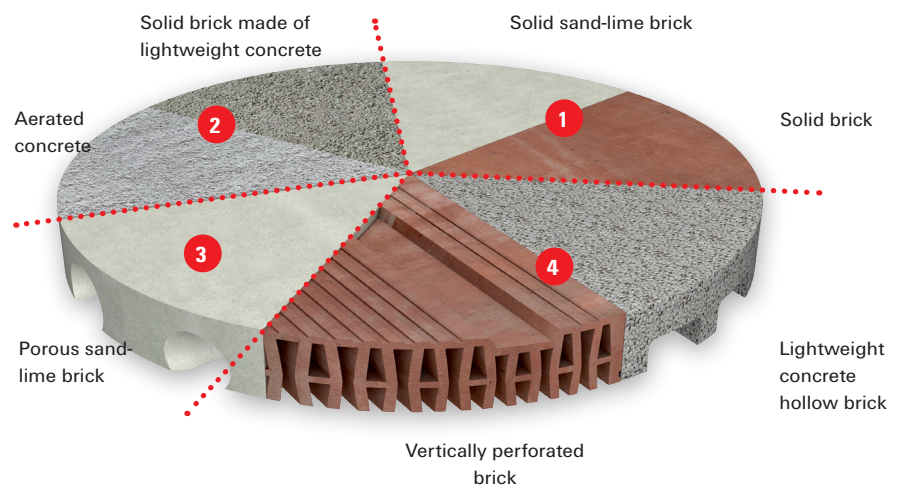
### NOTE

## Building Material – Masonry

Compared to concrete, there is a larger variety of masonry building materials.

Masonry can be classified according to:

- brick type used (e. g. natural stone, lime stone or aerated concrete).
- wall type (e. g. single or double layer).
- brick strength class and gross density.



Generally, masonry is classified into four groups:

**1 Solid bricks with a dense structure** are a highly compression resistant building material, without cavities or low hole surface percentage (up to a max. 15 % e. g. as grip holes). This type is very well suited for anchor fixings.

**2 Solid bricks with porous structure** usually have a very large number of pores and low compressive strength. Therefore, special fixings should be used, e. g. fixings with a longer expansion zone or bonded anchors.

**3 Perforated bricks with a compact structure** (perforated and hollow bricks) are mostly manufactured from the same compressive strength materials as solid blocks but with cavities. If higher loads are introduced into these building materials, special fixings should be used (e. g. bonded anchors, FIS V), which bridge or fill the cavities.

**4 Perforated bricks with porous structure** have many cavities and pores and thus generally a low compressive strength. In this case, special care is required when selecting the fixing. Suitable fixings include those with a long expansion zone or form locking injection anchors.

### EXPERT TIP

- Before **fixing in masonry**, determine which brick type (designation, size, compressive strength) and mortar type (mortar category) has been used.
- For **safety anchoring** in unknown or old masonry, pull out tests must be carried out on-site to determine the anchor load bearing capacity.
- For **fixings close to the edge**, it is important to know if the wall is a load bearing wall as this prevents the risk of brick pull out.
- Even **solid brick** can have holes (e. g. MZ, KS). The holes are mostly larger grip-holes in the centre of the brick (up to max. 15 % cavity proportion per brick).
- Always drill without hammer function in **perforated and hollow bricks**. Here, special, sharply ground drills with hard metal tips are suitable.
- **Plaster or other non load-bearing layers** may not be added to the load-bearing base and are not to be used in calculating the anchorage depth.

- **Avoid anchoring into masonry joints** as much as possible due to joint inhomogeneity. If anchoring into a joint cannot be avoided (e. g. plaster on masonry) loads should be reduced.
- For **systems approved by building authorities, anchoring in joints** (vertical or horizontal joints) is regulated in the approval notices.
- For **anchoring high loads** in perforated bricks, the anchorage depth should be increased.
- **Expansion fixings** (e. g. FAZ II or FBN II) are not suitable for use in masonry due to its high expansion forces which may lead to cracks in the brick. Frame fixings are suitable due to its longer expansion part.
- **Bonded anchors** achieve the highest possible loads in masonry.

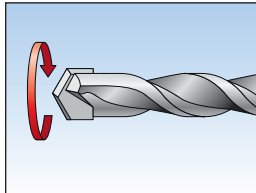




## Drilling

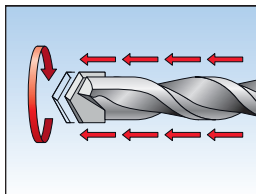
The building material determines the drilling method.

Five methods are possible:



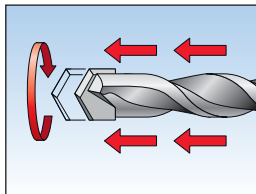
### Rotary drilling

Rotary drilling without impact, uses a sharply ground carbide drill bit. When this method is used, the drill hole does not become too large and the perforated brick's webs do not break.



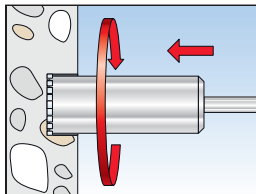
### Impact drilling (mechanical)

Impact drill with rotation and a high number of light strokes, is suitable for dense structured building materials.



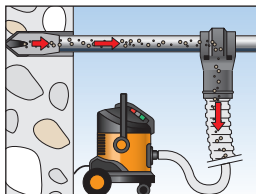
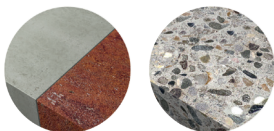
### Hammer drilling (pneumatic)

Hammer drill uses rotation and a low number of light strokes with high impact energy, also suitable for dense structured solid building materials.



### Diamond or core drilling process

Mainly used for larger drill hole diameters or for heavily reinforced components and/or if noise or vibration must be reduced.



### Hollow drilling

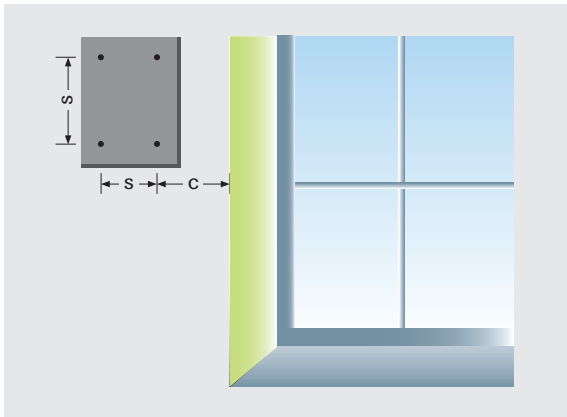
Special drill with a hollow core, which is connected to a vacuum cleaner. Cleans the drilled hole during the drilling operation. No further brushing or blowing is required. Can be used in concrete and masonry with dense structure.

### EXPERT TIP

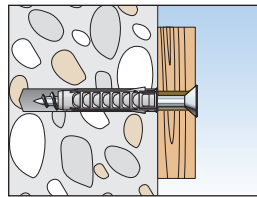
- The drilling method for approved anchors is specified in the **approval/assessment**.
- Drill bits with **excessively worn cutting** edges should **not be used** (see approval/assessment).
- For certain fixings, **special drills** are required (e.g. a stop drill) as per approval/assessment.
- **Drill holes** must be **carefully cleaned** (blown out and brushed). See the respective approval/assessment or manufacturer's specifications.
- The **drill hole depth** is always exactly specified and relates to a given anchoring base thickness. For general applications without an approval/assessment the following applies: the drill hole depth + 30 mm should not exceed the anchoring base thickness.
- In case of **incorrect drilled** holes (hitting reinforcements or wrong location), the location for the new drill hole is regulated in the applicable fixing approval/assessment). Usually, the distance for the new drill hole must be twice the depth of the incorrect drill hole. The wrong drill hole must be filled with injection mortar (e.g. FIS V).
- **Diamond core drilling** is only permitted if stated in the approval/assessment or according to manufacturer's guidelines (e.g. RSB, FIS EM, FAZ II, FBS II...).
- **The load bearing capacity is reduced** by water filled holes or wet substrates especially for chemical or plastic fixings.
- **Cutting** through a reinforcement is not permitted.
- **The drill hole** must be drilled perpendicular to the anchor base (an inclination of up to 5° is permitted). Exceptional cases are regulated in the anchor approval/assessment and or according to manufacturer's guidelines.

# Installation

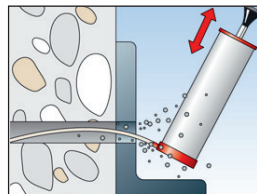
In general, the following aspects must be taken into consideration during installation:



**The edge distance and centre distance**, as well as the component thickness and width, must be carefully observed to ensure that the fixing can take the required load. Otherwise, it may lead to spalling of the construction material or cracks. For fixings without approval, e.g. nylon fixings, a minimum edge distance of  $c = 1 \times h_{ef}$  ( $h_{ef}$  = anchorage depth) and a minimum spacing of  $s = 1 \times h_{ef}$  must be adhered to for concrete. When using non approved metal anchors, a minimum edge distance of  $c = 1.5 \times h_{ef}$  and a minimum spacing of  $s = 3 \times h_{ef}$  must be adhered to. When using hammer-set anchors, spacing and edge distance can increase due to higher expansion forces.



**The drill hole depth** must be larger than the anchorage depth (exception chemical anchor systems), to ensure that the screw has enough room at the end of the fixing element to penetrate at least one time the screw's diameter.



**Drill hole cleaning** after drilling, e.g. by blowing out, brushing or suction, is generally necessary. The load bearing capacity will be reduced, if the hole is not cleaned. (Exceptions: approved anchor systems where no hole cleaning is required, e.g. FHB II + PF - High speed capsule).

## EXPERT TIP

- **Strictly adhere to specifications** for component geometry, edge and spacing distances. If this is not taken into account, the component will be damaged or the anchor capacity will be reduced.
- **Drill hole cleaning is essential.** The specifications in the approvals and the manufacturer's specifications must be observed.

## NOTE

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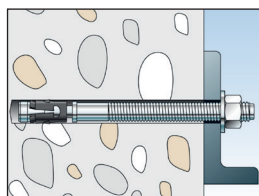
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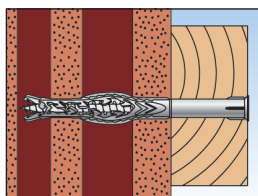
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## Installation types

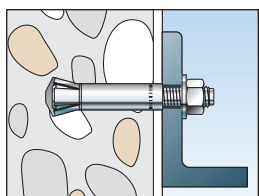
There are three different types of installation.



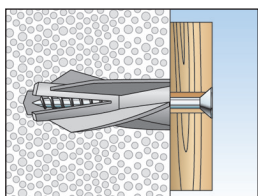
Anchor bolt FAZ II



Frame fixing SXRL



Zykon anchor FZA



Aircrete anchor GB

### Push-through installation

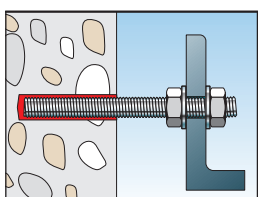
In particular for simplifying installation for series installations or for attachments with two or more fixing points:

- If the attachment's hole diameter is larger than the drill bit diameter, then the attachment can be used as a template.  
Please note: The drill bit tip is generally larger than the nominal diameter of the drill.
- In addition to facilitating a simple installation, an exact fit is also achieved.
- The fixing is inserted into the drill hole through the attachment and then tightened (e.g. FAZ II, FBN II, FH II).

### Pre-positioned installation

The anchor is installed before fastening the attachment. If drilling is not done precisely, then the holes in the attachment will not match up. This could mean that the anchors cannot be installed or could cause damage to the anchors. The installation sequence:

- Transfer the hole pattern of the fixture to the anchor base.
- Drill and clean the holes, install the attachment and then fix the attachment (e.g plastic fixings: S, SX, UX; metal fixings: FZA, EA II).



Threaded rod FIS A

### Stand-off installation

This allows attachments to be compression and tension resistant at a certain distance from the anchor base. For this purpose, external threaded metal anchors (e.g. FAZ II, FBN II) or internal threaded anchors (e.g. EA II) with screws or threaded rods are clamped against the anchor base surface while using a bearing washer and nut. When using chemical systems with threaded rods (e.g. FIS SB, FIS V, FIS EM, and FIS A), the installation can be done without using a bearing washer and nut.

### EXPERT TIP

- **Clearance holes in the attachment** are specified for the respective anchor size in the approvals/assessments and manufacturer's guidelines.
- **For stand - off installations** with shear loads on the anchor, additional bending moment occurs and this must be considered.
- **The attachment must lie** fully flush on the surface base or it must have either a compression resistant levelling layer of max. 3 mm or half the anchor's diameter, otherwise the anchor must be checked for bending.
- **The attachment shall be in contact with the anchor** over its entire thickness, otherwise the anchor must be checked for bending.
- **Usable length is the maximum fixing height**  $t_{fix}$  which takes into account the attachment's thickness plus additional non-bearing layers (e.g. plaster, air, insulation etc.).
- Post-installed anchors must be tightened with a specific torque. A calibrated torque wrench must be used to ensure the correct pre-stressing force and the correct installation of the anchor. For **chemical anchors, the prescribed hardening time must be adhered to** before tightening torque or service load can be applied.
- Anchors must be mounted as a standard unit as delivered. The exchange or removal of parts is not permitted.

# Loads

When selecting an anchor, it is necessary to know the load on the total construction and the resulting action forces.

Action forces can differ based on:

Dimension ▪ Direction ▪ Type of load ▪ Point of application

There are various types of loads:

Approvals generally give characteristic resistance. In the manufacturer's guidelines, **"permissible loads"** are specified for products with approvals. For anchors without an approval, **"recommended loads"** are given by the manufacturer.

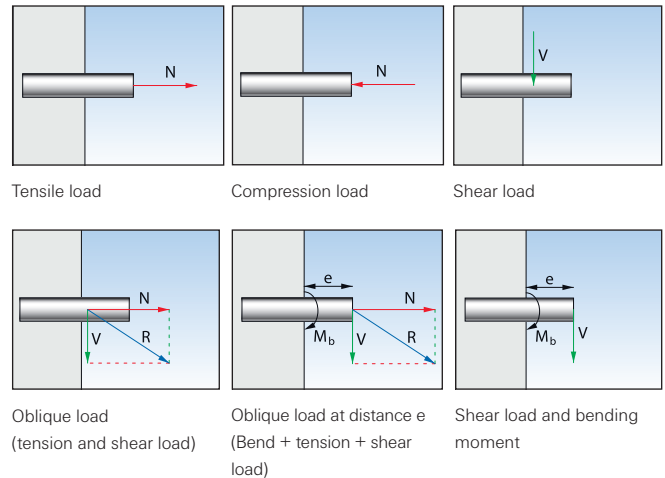
- **Determine the size**, direction and point of application of the load. These parameters determine which anchor should be used.
- **Characteristic resistance** ( $N_{RK}$  or  $V_{RK}$ ) describes the 5 % fractile of resistance. (Value with a 95 % probability of being exceeded, with a confidence level of 90 %).
- **Permissible loads** are working loads that already include an appropriate safety factor. These only apply if the approval conditions are complied with ( $N_{zul}$  or  $V_{zul}$ ).
- **Recommended loads or maximum working loads** include an adequate safety factor. These only apply if the manufacturer's specifications are complied with ( $F_{rec}$  – valid for all load directions,  $N_{rec}$  – for compressive or tensile load or  $V_{rec}$  for shear load).
- **The calculation** is carried out by dividing the respective failure load or characteristic loads by a safety factor.
- **Recommended safety factors compared to the average failure load:**

Steel and bonded anchors	$\gamma \geq 4$
Plastic anchors	$\gamma \geq 7$
Hammerfix anchors N	$\gamma \geq 4$
- **Recommended safety factors compared to the characteristic failure loads:**

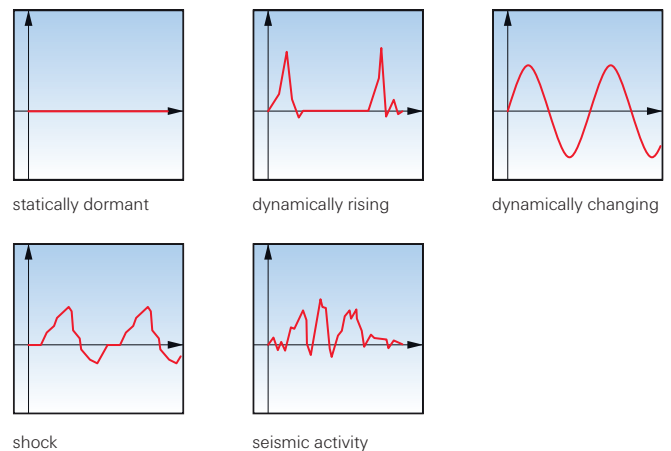
Steel and bonded anchors	$\gamma \geq 3$
Plastic anchors	$\gamma \geq 5$

For deviations to the regulation, see load tables. For certain products, the safety factors may deviate. In general, the global safety factor is calculated using the scatter of the failure load, the failure probability and the reliability index of a product.
- **The specified loads** apply to individual anchors that are installed away from the edge, i.e. there is no influence from edges or other anchors.
- **The characteristic spacing and edge distances**, marked with  $c_{crN}$  and  $c_{crV}$ , give the distances at which an anchor achieves its max. characteristic load.

Load directions



Types of loads



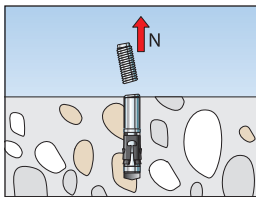
- **The specified minimum spacing and edge distance**, marked with  $s_{min}$  and  $c_{min}$ , indicates the distance at which no failure of the building material will occur when installing the anchor (cracks). These distances are mandatory and must be complied with. The characteristic spacing and edge distances may be shorter but not less than the minimum values but at the same time the load bearing capacity must be reduced. When combined loads occur, loads are determined separately for tensile and shear load and the overall utilization is determined by means of an interaction equation. As a rule, the sum of the ratio values from tensile and shear loads is less than 1.2.



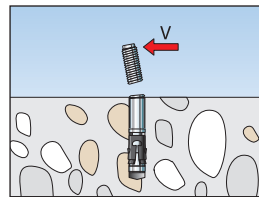


# Failure modes

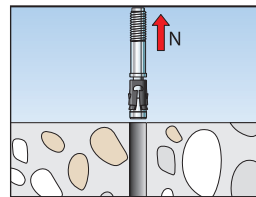
If there is excessive stress, incorrect installation or a substrate with inadequate load bearing capacity, the following types of failure can occur.



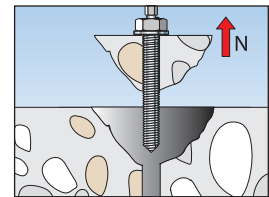
Steel failure tension



Steel failure shear



Pull out



Combined failure

## Steel failure:

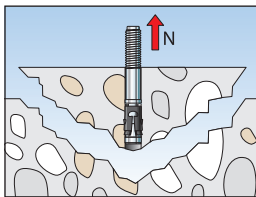
- Insufficient steel strength for the applied load

## Pull out failure:

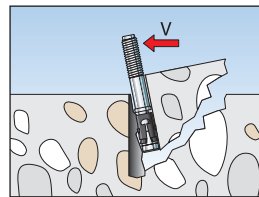
- Friction failure and or adhesion failure due to high load or incorrect installation

## Combined failure:

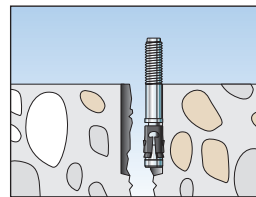
- Pull out
- Concrete failure near the surface



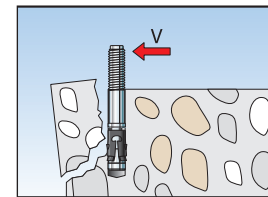
Concrete cone failure



Pry-out failure



Concrete splitting failure



Concrete edge failure

## Anchor base failure:

- Tensile load "N" or shear load "V" too high
- Inadequate strength of anchor base
- Insufficient embedment depth

## Anchor base splitting:

- Insufficient component dimensions
- Deviation from the spacing and edge distances
- Excessive expansion pressure

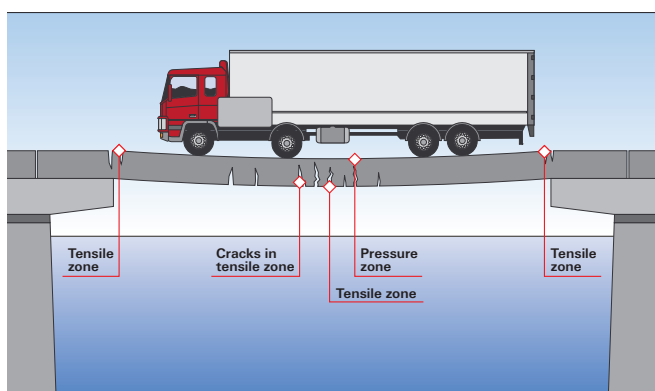
## EXPERT TIP

- In most anchor approvals/assessments, the anchoring of **predominately static loads** is regulated. However, there are also approvals which regulate non-static loads (fatigue loads, e.g. FHB dyn).
- Seismic loads for post-installed anchors are regulated in Europe according to ETAG 001 Appendix E. The assessment is to be carried out in accordance with EOTA TR045 until the Eurocode 1992-4 is introduced. The seismic performance of an anchor system is categorised by performance categories C1 and C2. The classification of the seismic performance categories C1 and C2 for seismicity level and the evaluation category is the responsibility of the respective Member State (in Germany, an approval in accordance with ETAG 001 is sufficient. Classification in accordance with C1 and C2 is not necessary). The performance category and the characteristic values are found in the respective ETA (e.g. FAZ II, FH II, FIS SB, FIS EM...).
- **The main causes for anchor failure are overloading, incorrect installation or an insufficient load bearing anchoring base.**

## NOTE

## Cracks in concrete components

Cracks can occur anywhere in concrete at any time:  
Factors involved in this are loads such as dead loads, traffic or wind loads, concrete shrinkage and creeping or external influences such as seismic activity or ground motion result in stresses and deformations thus leading to cracks.



### Example:

If a bridge designed as a single-span element is loaded, the bridge will buckle. Due to this buckling, cracks could occur in the element's tensile area.

Concrete is not able to support tensile loads, therefore, reinforcements are placed in the element to take the tensile load area numerous cracks are formed that are barely visible to the naked eye. This is called the cracked tensile zone.

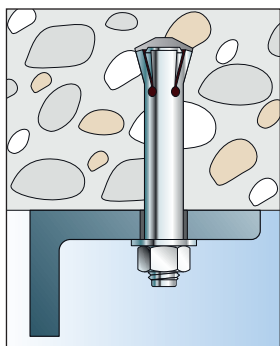
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### Suitable anchor systems for cracked concrete

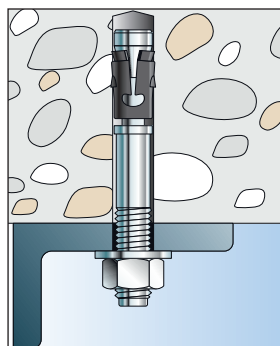
When fixing in concrete, **cracks** are always **expected in the anchoring area which will have an impact on the load bearing capacity** of the anchor system. However, it is very complicated, if not impossible, to prove whether the concrete is cracked or not cracked.

**For safety reasons, designers and craftsmen should always use anchor bolts which are suitable for cracked concrete.**

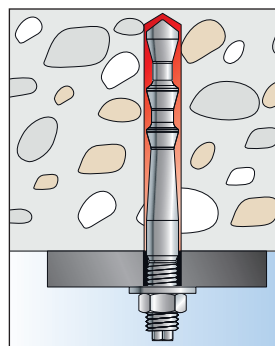
Fixings with an approval/assessment according to ETAG 001 for cracked concrete have proven their suitability in cracks, therefore they can be used without any restrictions in tensile and compression zones of a concrete member.



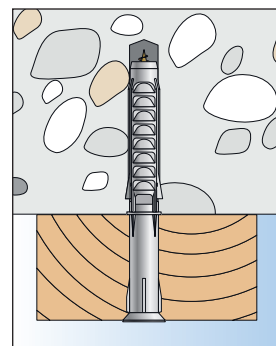
Undercut anchor FZA



Bolt anchor FAZ II



Threaded rod FHB II



Frame fixing SXS

Due to safety reasons, always use crack-suitable anchor systems such as FAZ II, FH II, FHB II, FIS SB, FIS EM or FIS V.

# Fire protection – Fundamentals

General requirements of building structures  
for fire protection.

## Structural installations

**Structural installations are to be ordered, erected, changed and brought into commission in such a way that:**

- the emergence of a fire is prevented from breaking out.
- the spread of fire and smoke (spread of fire) is prevented.
- in the event of a fire, the rescue of people and animals is possible.
- effective fire-fighting operations are possible.

## German regulation

In Germany, the procedure for construction and operational fire protection are specified by the fire protection standard DIN 4102, the Model Building Ordinance (MBO), Regional Construction Ordinances (LBO) and various trade-specific regulations from professional associations.

**The following applies as per Section 1 and 2 of DIN 4102:**

**Building materials** such as **concrete, wood, stone, metal** etc., are classified according to their behaviour **into flammable or non-flammable building material classes**.

However, **components composed** of different **flammable and non- flammable materials** are not classified into fire classes in building construction but they are evaluated as a complete system according to their fire resistance duration. The fire resistance duration R is indicated in minutes and classified according to two categories:

- **Components with a fire resistance duration** of R30 and R60 are fire-inhibiting.
- **Fire-resistant**, are all components with a fire resistance duration of R90, R120 and R180.

Tested systems such as cable, ventilation or duct systems are not only tested for fire resistance, but also for functional capability in the event of fire (e.g. supply lines to sprinkler systems). The fire resistance duration of these systems is e.g. E30 to E120 for electrical cable systems or L30 to L120 for specified ventilation ducts. The anchors that are used to fasten these systems must have at least the same fire resistance duration.

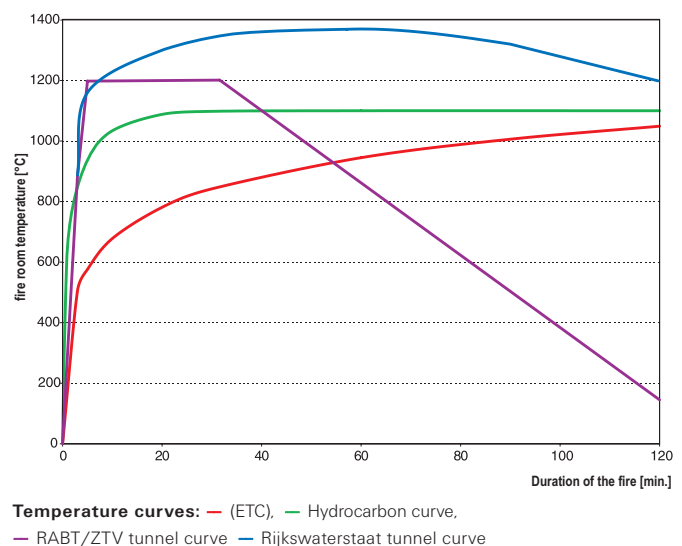
## European standardisation

**In accordance with the European Norm DIN EN 13501-1, the classification** of fire behaviour of building materials / products is similar to that of DIN 4102. The classifications are, however, much more precise.

In addition to, the main classification criteria concerning flammability, flame spread and heat released, e.g. smoke development and dropping behaviour is tested.

Fire resistance of components has been tested in Germany in accordance with the European Norm DIN EN 1363 or DIN EN 1365 since 2000. The fire resistance duration is then labelled with the letter R for "Resistance".

The standard temperature-time curve (ETK) of DIN 4102 and ISO 834 is based on a simulation of real fire conditions and forms the evaluation basis that is used worldwide to determine the fire resistance duration. In addition, there are other temperature curves for special fire exposures, e.g. the hydrocarbon curve for destructive fires caused by flammable liquids or the RAB/ZTV tunnel curve (Germany) or the Rijkswaterstaat tunnel curve (the Netherlands), which describe tunnel fires.



## Fire protection in fastening technology

The fastening technology has a vital importance in fire protection.

To ensure the functional capability and stability of railings, pipe systems, fire safety doors or ceiling elements.

**Assessing fixings for fire is carried out in accordance with the technical regulation EOTA TR020 or in accordance with fire protection reports.**

The labelling and classification of anchors and fixings is classified in:

- 1 Fire behaviour (e.g. non-flammable)
- 2 Fire resistance duration (e.g. R90)

For this purpose, the legal regulations set down in the final draft of the Delegated Act "Fire Behaviour" must be observed.

EOTA TR020 only states anchor performance ratings that have an **ETA for cracked concrete!** Meanwhile, a new evaluation document issued by the German Institute for Construction Engineering (DIBt) is used to determine the characteristic load values and the corresponding fire resistance duration.

A partial safety factor of  $\gamma_M = 1.0$  on the load side is used in the event of fire.

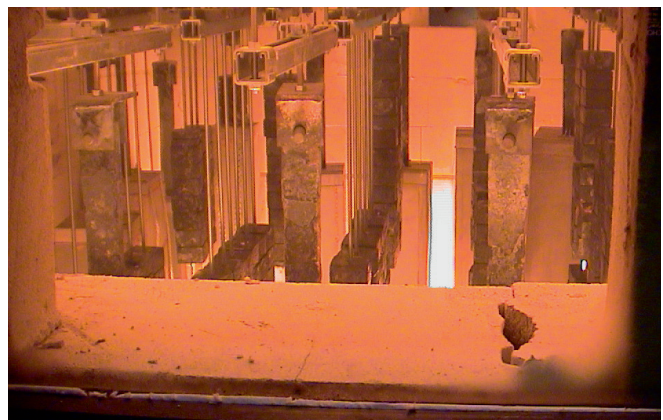
The fire values only refer to anchor bolts that are directly exposed to flames.

Alternatively, anchors can be protected from direct exposure to fire by using fire protection panels or fire protecting coatings.

For fixing cladding systems, it is assumed that the load bearing capacity of specified plastic screw anchors in concrete with an external diameter of 10 mm and a metal screw diameter of 7 mm and an anchoring depth of  $h_{ef} = 50$  mm with a polyamide PA6 plastic sleeve has a sufficient fire resistance of at least 90 minutes (R90), if the permissible load (no permanent centric tensile load) is  $\leq 0.8$  kN.



Before the fire test



During the fire test



After the fire test

## Corrosion – Fundamentals

Corrosion is a chemical reaction which degrades metal.

The less noble the metal ("electrochemical potential"), the more severe the material damage is, resulting in metal loss or corrosion flakes. For this reason, different appearance patterns have been determined. **The most common types of corrosion in fixings and anchors are:**

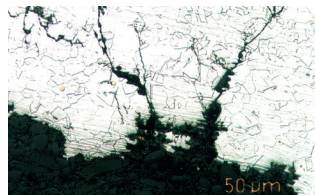
**Surface corrosion:** In this case, the metal corrodes relatively uniformly over the entire surface or over a part of the surface. An example of this is the invisible rusting of a screw in the transition area from anchor plate to hole due to condensation. The result: A connection that appears completely intact from the outside, but suddenly fails.

**Contact corrosion:** If metals with a different nobility are in contact with each other in a conductive medium, the less noble metal always corrodes (the anode). Whereas stainless is not affected. A decisive factor is the surface ratios of the two types of metal: The greater the surface area of the most noble metal in comparison with the less noble, the greater the corrosion. For example, if larger stainless steel sheets are screwed with galvanised screws, the screws will be aggressively attacked within a very short time. Whereas using stainless screws in galvanised sheets poses no problems.

**Stress corrosion cracking:** Permanent internal or external tensile stresses lead to metal strain or corrosion. In this process, a crack develops due to mechanical stresses, which grows under increasing loads and thus creates a path for progressive corrosion. For example, this occurs with stainless steel of corrosion resistance Class III e.g. A4, in an atmosphere containing chlorine (swimming pools). Generally, stress corrosion cracking is not visible with fixings and usually leads to sudden failure of the anchoring.



In 1985, the suspended concrete ceiling of an indoor swimming pool collapsed in Uster, Switzerland. The stainless steel ceiling attachments exhibited no external defects, but were completely destroyed internally in some cases due to stress corrosion cracking.



Example of trans-crystalline stress corrosion cracking on stainless steel 1.4401 with high chloride concentration

## Corrosion protection

There are different ways to protect fastenings from corrosion. The most important are:

**Galvinised zinc coating** (or also electrolytic zinc coating) followed by passivation is the most common corrosion protection used in metal finishing. A zinc coating thickness of 3 – 10 µm offers excellent corrosion protection for damp rooms and outdoor use.

**Hot-dip galvanising** is the application of a metal zinc coating by dipping it in molten zinc (at approx. 450 °C). Zinc layer thickness's of 45 – 80 µm offer an excellent corrosion protection for moist rooms and outdoor use.

**Stainless steel fixings of corrosion resistance class III e.g. A4**, material no. 1.4401, 1.4404 and 1.4571 as well as two phased duplex steel (austenitic and ferritic structure/ magnetic) are suitable for anchoring in damp rooms, in open air, in industrial atmospheres or near the sea (but not directly in sea water).

**Stainless steel anchors made from high corrosion-resistant steel of the corrosion resistance class V** e.g. material no. 1.4529 are used in especially aggressive environments e.g. in atmospheres containing chlorine (swimming pools), in road tunnels or with direct sea water contact. Due to their high molybdenum content they are resistant to such aggressive environments. That means that steel type 1.4529 – containing chrome, molybdenum and nickel – has an alloy content of 58 %. The rest consists of iron and carbon. Due to this very high alloy content, the production for this steel type is very expensive, but on the other hand the connection is safe and maintenance – free in terms of corrosion.



## Dynamics

For predominantly non-static loads.

The general building approvals issued by the **German Institute of Construction Engineering (DiBt)** and the **European Technical Approvals / Assessments (ETA)** are mainly valid for predominately static loads. However, there are certain applications e.g. swinging cranes, crane rails, jib cranes, elevator guide rails, machines, industrial robots and blast fans in tunnels including antenna and masts which are subjected to dynamic effects.

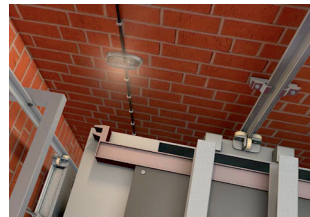
In general, the anchoring of components with more than > 1000 load cycles must be carried out using fastening elements that have been checked and approved for this purpose. Until recently, the design for post-installed anchors for such dynamically loaded applications was nearly impossible. Time consuming and costly expert reports and or approvals for individual applications were required.

**The bonded anchors: fischer Highbond anchor FHB dyn and fischer UMV multicone dyn and FDA have a German DiBt approval for dynamic loads.** In the approval, only fatigue loads are considered as dynamic loads and not loads from shock or seismic activity.

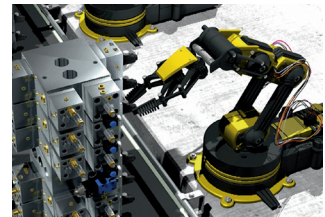
The approvals apply to the anchoring of dynamic loads with unlimited numbers of load cycles, for tension and for shear loads.

In addition, the FHB dyn is manufactured in anchor size M12 and M16 from highly corrosion-resistant steel (e.g. corrosion resistant Class V - 1.4529).

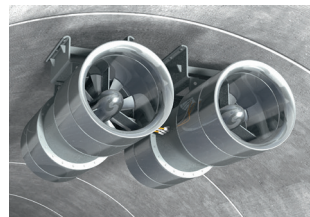
Dynamic load tests have shown - compared to normal stainless steel grades of corrosion resistant class III (e.g. 1.4401 also known as 316) - that this material is not only highly suitable for indoor and outdoor humid environments, as well as other aggressive conditions, it is also highly suitable for dynamic loadings.



Elevator guide rails



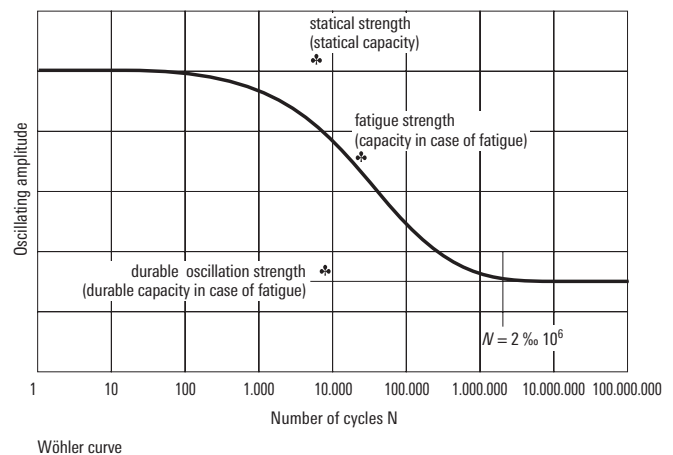
Industrial robots

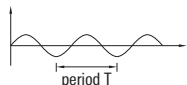
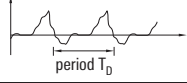
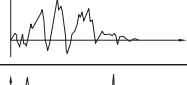



Blast fans



Antenna and masts



Action	Run of the oscillation	Possible cause
harmonic	 sinusoidal period T	Unbalances, tumbling machines
periodic	 optional, periodical period T <sub>0</sub>	Regularly abutting parts (e.g. punching machines), rail- and road traffic
transient	 optional, nonperiodical	Earthquakes
impulsive	 optional, with very short time of influence	Impact, explosion



## Legal basis

The European Union (EU) determines the legal foundation for the assessment, CE labelling and bringing building products into the European Economic Area (EEA).

### **The aim is to reduce trade barriers by harmonising the requirements of building products.**

REGULATION (EU) No 305/2011 (Construction Products Regulations) OF THE EUROPEAN PARLIAMENT AND COUNCIL fully came into force on 1st July 2013. The Construction Products Regulation is law in all EU countries. However, the Construction Product Directive 89/106 / EEC is not law in all EU countries.

Construction products are products, or parts which are permanently incorporated into buildings. Their performance influences the structure's basic requirements (e.g. mechanical strength). Therefore, construction products and materials for safety relevant applications are affected.

#### **Important building requirements include:**

- 1 Mechanical strength and stability
- 2 Fire protection
- 3 Hygiene, health and environmental protection
- 4 Safety and accessibility during use
- 5 Sound protection
- 6 Energy saving and heat protection
- 7 Sustainable use of natural resources

When a construction product is covered by a harmonised standard (hEN), or a European Technical Assessment or Approval (ETA) has been issued for this product, the manufacturer is obligated to draw up a Declaration of Performance (DoP) for this product and affix the CE marking on the product. The application for an ETA for a construction product by the manufacturer is voluntary. National approvals may only be issued if a construction product is not marked with a CE label.

Existing European Technical Approvals (ETA) are valid until the end of the validity date and will be amended with the Declaration of Performance (DoP) by the manufacturer from the due date. The reference number of the DoP is part of the CE marking and must be determined by the manufacturer. The Declarations of Performance (DoP) are available on the fischer website under "Approvals/Assessments": <http://www.fischer.de/sdb>.

The CE mark is the only means to certify whether the manufacturer has conformed to the applicable harmonised requirements of construction products. The CE label allows the construction product to be freely traded without trade barriers in the European Economic Area.

Each Member State determines the essential characteristics for use of the construction product and its performance in its territory. The unrestricted use of a construction product in a Member State depends on whether performance values exist in the DoP for the essential characteristics determined by the Member State. If one characteristic is declared with "NPD" (No Performance Determined), this can lead to a ban on use in a Member State. Therefore, each member State must establish Product Contact Points, which will provide information on these regulations. In Germany, this is the Federal Institute for Material Research and Testing (BAM: see [www.pcp.bam.de](http://www.pcp.bam.de)).

## Assessment procedure

Fasteners which are not covered by a harmonised standard (hEN)  
can apply for an ETA (European Technical Assessment)  
on the basis of a European Assessment Document (EAD).

Existing assessment documents, such as ETAGs (European Technical Approval Guidelines) for metal and plastic fixings are still valid and transferred into EADs in accordance with the EU Construction Products Regulation (CRP). The ETAGs and the new EADs can be downloaded from the EOTA website: <http://www.eota.eu>

The assessment document for mechanical fasteners (ETAG 001-1, -2, -3, -4 or in the future, EAD 33-0232) and the assessment document for bonded anchors (ETAG 001-5 or in the future, EAD 33-0499) divides possible approvals of metal fixings into 12 options.

Options 1-6 are for use in cracked and non-cracked concrete, options 7-12 are only for use in non-cracked concrete. Anchors of Option 1 offer the largest range of flexibility for assessment, since performance values for concrete of the strength classes C20/25 to C50/60, as well as the minimum spacing and edge distances are available (see table below).

Section 6 of the ETAG 001 (in the future, EAD 33-0747) regulates the assessment of metal fixings in cracked and non-cracked concrete for multiple use for non-structural systems. Non-load bearing systems include components which do not contribute to the stability of the construction, they only transmit their dead or wind load. These are, for instance, simple suspended ceilings and false ceilings, pipelines and façade claddings.

When using fixings for multiple use, it is assumed that if excessive slippage or failure of a fixing point occurs, that the load will be transferred to neighbouring fixing point. A fixing point can be defined as a single anchor or a group of anchors.

This is known as a redundant system, where stability is not affected by an individual anchor failure.

### Possible assessment options according to EAD

Options	Cracked concrete	Non-cracked concrete	One value for all concrete strengths	Different values for C20/25 to C50/60	One value for load direction	Separate values for tensile and shear capacity	$c_{cr} / s_{cr}$	$c_{min} < c_{cr}$ / $s_{min} < s_{cr}$	Design method as per EN 1992-4
1	✓	x	x	✓	x	✓	✓	✓	A
2			✓	x					
3			x	✓					B
4			✓	x					
5			x	✓					C
6			✓	x					
7	x	✓	x	✓	x	✓	✓	✓	A
8			✓	x					
9			x	✓					B
10			✓	x					
11			x	✓					C
12			✓	x					

# Design of fastenings

Two different anchor designs are differentiated.

## Method with global safety factors

**Permissible loads are determined from the average failure load or from the 5 % fractile load and compared with the action load.**

The safety factor depends on the anchoring system, the type of installation and external influences such as temperature and or humidity. Global safety factors are generally  $\gamma = 3$  for steel and bonded anchors and  $\gamma = 5$  for plastic anchors.

## Methods with partial safety factors

**According to this method, it is shown that the value of the design actions  $S_d$  does not exceed the value of the design resistance  $R_d$  ( $S_d \leq R_d$ ).**

The action on fixings are determined according to the same rules and used the same partial safety factors employed in reinforced concrete design (see Eurocode 1990; national appendix must be observed).

The design resistance is determined by using the characteristic resistance and the partial safety factor of the material ( $\gamma_M$ ), which takes into account the scatter of the material. The values can be taken directly from the ETA. Safety is national law. The design method as well as the related partial safety factors are determined by the Member State.

Only the product-specific coefficient for installation is specified in the ETA, which is used to calculate the partial factor  $\gamma_M$ . The design standard EN 1992-4, which is expected to be ratified in 2018, contains the national determined partial safety factors (observe the respective national appendix).

The design method as set down according to ETAG 001, Annex C - design method for metal anchors and the design method according to TR029 - bonded anchor design in concrete, as well as CEN/TS 1992-4, Section 4 (mechanical anchors) and Section 5 (chemical anchors) are the current methods for anchor design based on a European Technical Approval or Assessment (ETA). Moreover, the ETAG 001 Annex C distinguishes between three different design methods (A, B and C), method A being the most important and the most economical method since anchors are considered separately for all load directions and failure modes. Methods B and C play a minor role and are hardly used.

## Other important design provisions are:

### EOTA TR020

Anchor design in concrete under fire exposure, or CEN/TS 1992-4, Part 1, Appendix D

### EOTA TR045

Anchor design in concrete for seismic actions

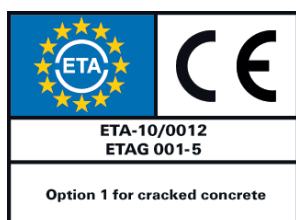
The applicable assessment design methods are generally indicated in the respective ETA. It is important that design methods are not commingled.

The design for metal anchor (under static and seismic loads as well as under fire exposure) is summarised in EN1992-4, i.e. in Section 4 of the Eurocode 2, but then must be ratified by each Member State and, if applicable, adapted for national annexes. As soon as EN1992-4 is published, all other design methods (ETAG 001 Annex C, TR045, TR020, TR029 and CEN/TS 1992-4) are no longer valid.

fischer has developed a simple yet powerful design software for daily use: the fischer - C-FIX. The software enables designers and users to carry out anchor designs according to different design methods. Complex anchor arrangements can be calculated quickly and easily. The feature "multiple design" makes it possible to select the best technical and cost saving solution.

## Approvals, markings and their importance

The most important symbols  
are presented below.



### European Technical Approval / Assessment

Issued by a European approval authority (e.g. DIBt) on the basis of the guidelines for European technical approvals (ETAG). ETA (English): European Technical Approval/Assessment. CE: The CE marks the conformity of the product to all applicable legal provisions in which their installation is intended. This means that the CE mark only certifies that the requirements determined in the relevant harmonisation legal provisions of the union have been complied with. Products with the CE mark can be freely traded in the European Economic Market.



### ICC International Code Council

ICC Evaluation Service Inc. (ICC ES) issues reports, e.g. for subsequent anchoring on the basis of the International Building Code® and the related standards in the United States of America



### FM Certificate

Recognised for use in local water-based fire extinguisher systems (Factory Mutual Research Corporation for Property Conservation, American insurance company).



### General building authority approval

German approval, issued by the DIBt, Berlin with the accompanying certificate of conformity for construction products with the general building authority approval. Confirmed by a material testing institute.

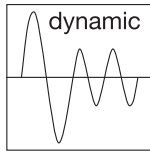


### Fire-tested fixing

The anchor was subjected to a fire test. It is an "investigation report to test the anchor under fire exposure (fire behaviour) (with R-Class). Fire tests are not required when using the simplified verification method according to TR020 - then the values can be transferred directly to the ETA.



This product is made from **high corrosion resistant steel** of corrosion resistance class V, e.g. 1.4529.



#### Dynamically loadable anchors

The anchor is suitable and approved for anchoring of "not predominantly static" (i.e. dynamic) loads. static" (i.e. dynamic) loads. static" (i.e. dynamic) loads.

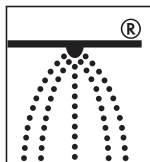


#### General construction-related test certificate



The fixing is suitable for anchoring under **seismic influence**.

Please note: The ICC-ESRs also allow seismic stress (see Category C1 and C2 in accordance with the ETAG 001 Annex E).

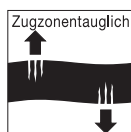


**Mark** for labels that confirm compliance with the VDS-CEA guidelines for **sprinkler systems, planning and installation**.

Fixings labelled as such may be used for fixing pipes for extinguishing systems.



Tested for **flammability** in accordance with VDE.



#### Fixings for tensile zones

The fixing is suitable and approved for anchoring in cracked concrete (tensile zone) and in uncracked concrete (compression zone).



Fixing made of high-quality, ageing-resistant **nylon** (polyamide).



**Component test with window frame screws** in accordance with ift guideline MO-01/1; Testing structural connections on windows.

The term "approvals" used in the catalogue consists of documents that are available and can be used as evidence of the usability of building products for which the documents were issued. These are (fire) reports, general construction-related approvals issued by the German Institute for Construction Technology Berlin (e.g. Z-21...) or European Technical Approvals or Assessments (ETA). In general, the usability of construction products in an EU Member State is

given, if the performance of the significant characteristics required in each Member State has been clarified/ confirmed by the manufacturer. Information on the significant necessary characteristics in a country can be found at the national Product Information Contact (Link: [http://ec.europa.eu/Docs\\_Room/documents/4170/attachments/1/translations/en/renditions/native](http://ec.europa.eu/Docs_Room/documents/4170/attachments/1/translations/en/renditions/native)).



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By implementing the fischer process system (fPS) we offer you the quickest and most efficient service.



### Global presence with the fischer international sales team

- One-on-one assistance from multi lingual staff.
- Immediate information and individual solutions regarding the widest range of fixings and fasteners worldwide.
- 46 own subsidiaries and distribution to more than 100 countries worldwide.
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16

Service



### Qualified technical consulting from the fischer technical team

- Support for engineers, consultants and craftsmen.
- More than 130 engineers worldwide give legally compliant technical advice and product recommendations.
- Services include test installations, pull-out tests, individual designs and comparative calculations.
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## Competence and innovation through own research, development and production

- Market research of trends and customer requirements.
- Own research and development teams for chemical, steel and plastic fastenings.
- In-house tool making, special machine construction and production facilities for total process control.
- fischer Process System (FPS) ensures innovative and high quality products.



## Wide range of fastening and supplementary products for professional and DIY customers

- Comprehensive assortment of chemical, steel and plastic fastenings.
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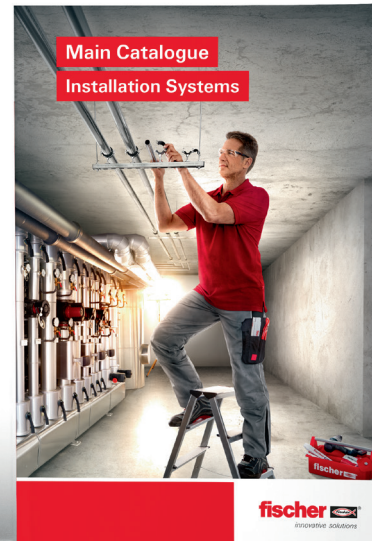
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