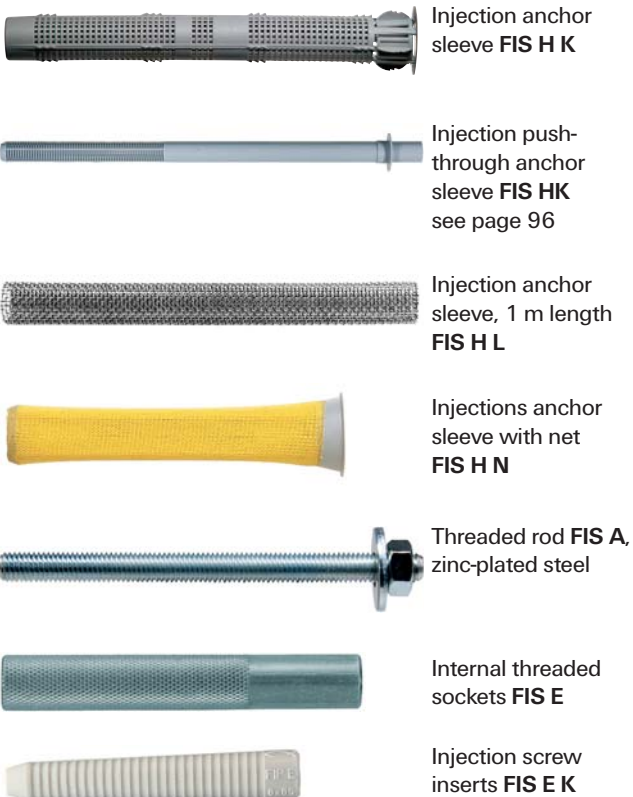


Injection technique for masonry

The expansion-free anchoring for the professional user.

OVERVIEW



Approval:

- German approval (DIBt) in conjunction with Injection mortar FIS V, FIS VS, FIS VW FIS HK and FIS A resp. FIS E for solid and hollow material



With anchor sleeve suitable for:

- Vertical perforated bricks
- Perforated sand-lime brick
- Hollow blocks
- Solid brick
- Solid sand-lime brick
- Hollow pumice plank
- Slabs made of perforated bricks and other perforated blocks

Without anchor sleeve suitable for:

- Lightweight concrete
- Solid brick
- Solid sand-lime bricks
- Full pumice stone and other solid building materials
- Aircrete

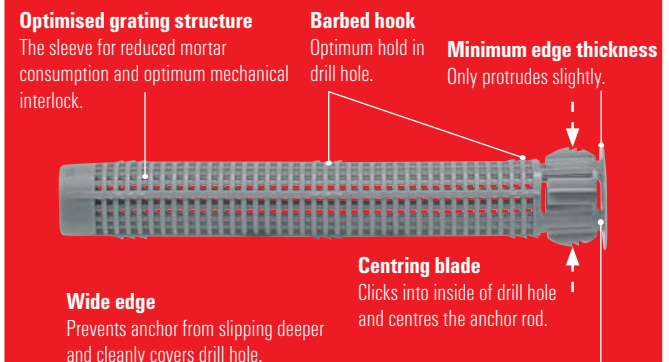
For fixing of:

- Machines
- Gratings
- Gates
- Hand-rails
- Consoles
- Pipelines
- Sanitary equipment
- Cable trays
- Facades
- Awnings
- Canopies
- Wooden constructions

DESCRIPTION

- Injection anchor sleeves, threaded rods and internal threaded sockets, specially for use with Injection mortars FIS V, FIS VS, FIS VT or FIS P in masonry materials.
- The anchor sleeve saves mortar in hollow materials and centres the anchor in the drill hole.
- In solid building materials the anchor sleeves are not required.
- In solid building materials, the injection mortar bonds the entire surface of the anchor rod / internal threaded sockets to the wall of the drilled hole.
- With hollow materials the mortar adapts to the anchoring substrate and bears the load primarily through a mechanical interlock.

FIS H K - ADVANTAGES AT A GLANCE



- Perfectly matched to the fischer injection mortar, the FIS H K anchor sleeve reduces the quantity of mortar you use and is more user-friendly.
- The optimised grating structure of the anchor sleeve leads to a reduced mortar consumption to 80% depending on dimensions.
- Handling is also simpler: the anchor sleeve centres itself and thus ensures the anchor rod is fixed securely in the drill hole.

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 26.

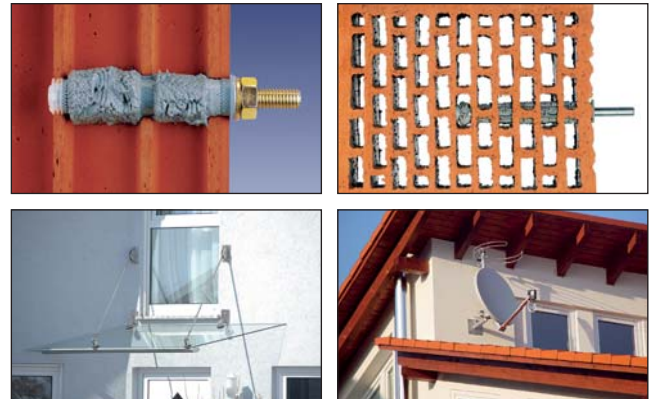
STANDARDS

You will find everything that has standards on page 34 under the keyword approvals.

DESCRIPTION

Advantages/Benefits

- High-performance mortars allow high loads in all building materials.
- Approval covers common masonry materials for maximum safety.
- Expansion-free fixing allows small spacings and edge distances.
- Extensive range for various cost-efficient applications.
- The mortar largely seals the drill hole.



INSTALLATION

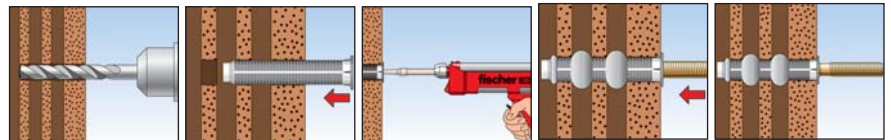
Type of Installation

- Pre-positioned installation

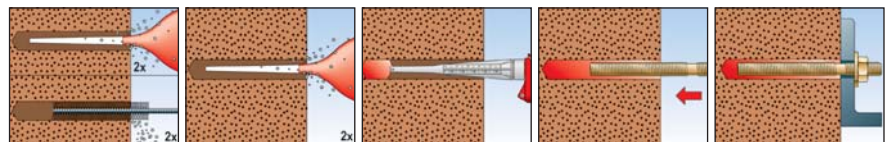
Installation information

- In solid building materials the drill-hole must be cleaned thoroughly (blow out 2 x, brush out 2x, blow out 2 x).

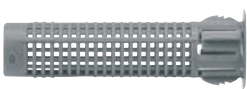
in perforated brick with anchor sleeve



in solid materials without anchor sleeve



TECHNICAL DATA



Injection anchor sleeve
FIS H 12 x 50 K



Injection anchor sleeve
FIS H 16 x 130 K

Type	Art.No.	drill-Ø		min. drill hole depth	effect. anchoring depth		Mortar filling quantity	fits	anchor per 360 ml-cartridge 1)	Qty. per box pcs.
		d ₀ [mm]	t [mm]		h _{ef} [mm]	h _{ef} [mm]				
FIS H 12 x 50 K	041900	12	60	60	50	5	FIS A M6-M8, FIS EK 5-6	34	50	
FIS H 12 x 85 K	041901	12	95	95	85	10	FIS A M6-M8, FIS EK 5-6	17	50	
FIS H 16 x 85 K	041902	16	95	95	85	12	FIS A M8-M10, FIS EK 8-10, FIS E M6-M8, threaded rod with graduated diameter M12	14	50	
FIS H 16 x 130 K	041903	16	140	140	130	15	FIS A M8-M10, FIS EK 8-10, FIS E M6-M8, threaded rod with graduated diameter M12	11	20	
FIS H 20 x 85 K	041904	20	95	95	85	15	FIS A M12-M16, FIS E M10-M12	11	20	
FIS H 20 x 130 K	046703	20	140	140	130	25	FIS A M12-M16, FIS E M10-M12	7	20	
FIS H 20 x 200 K	046704	20	210	210	200	40	FIS A M12-M16, FIS E M10-M12	4	20	

1) max. number by using 1 static mixer

FIRE PREVENTION

Red hot: You will find fire prevention information on page 31.

CORROSION

Rust prevention tips: Everything you need to know about corrosion and how to prevent it is on page 32.

Injection technique for masonry

TECHNICAL DATA

 Injection anchor sleeve, 1 m length **FIS H L**

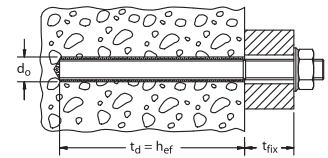
Type	Art.-No.	drill-Ø	total length	fits	mortar filling quantity per 10 cm	Qty. per box
		d_0 [mm]	l [mm]			pcs.
FIS H 12 x 1000 L	050598	12	1000	Ø6 / M 6 - Ø8 / M 8	12	10
FIS H 16 x 1000 L	050599	16	1000	Ø10/M10 / Ø12/M12	14	10
FIS H 22 x 1000 L	045301	22	1000	Ø12/M12 - Ø16/M16	20	6

 Injection anchor sleeve with net **FIS H N**

Type	Art.-No.	drill-Ø	min. drill hole depth	Min. anchorage depth anchor	Min. anchorage depth sleeve	Mortar filling quantity	anchor per 360 ml-cartridge	fits	Qty. per box
		d_0 [mm]	t [mm]	h_v [mm]	h_v [mm]				pcs.
FIS H 16 x 85 N	050470	16	95	90	85	15	11	Ø8/M8	20
FIS H 18 x 85 N	050472	18	95	90	85	17	10	Ø10/M10	20
FIS H 20 x 85 N	050474	20	95	90	85	19	9	Ø12/M12	20

 Threaded rod **FIS A**, zinc-plated steel

Type	Art.-No.	approval	drill-Ø	min. drill hole depth	min. anchorage depth in masonry	max. useful length in masonry	Mortar filling quantity without anchor sleeve	anchor per 360 ml-cartridge 1)	Qty. per box
		• DIBt	d_0 [mm]	t [mm]	[mm]	[mm]	[scale units]		pcs.
FIS A M 6 x 70	2) 046204	•	8	-	-	-	3	56	10
FIS A M 6 x 75	2) 090243	•	8	-	-	-	3	56	20
FIS A M 6 x 85	090272	•	8	80	75	2	3	56	20
FIS A M 6 x 110	090273	•	8	80	75	25	3	56	20
FIS A M 8 x 70	046206	•	10	80	75	-	3	56	10
FIS A M 8 x 90	090274	•	10	80	75	5	3	56	10
FIS A M 8 x 110	090275	•	10	80	75	25	3	56	10
FIS A M 8 x 130	090276	•	10	80	75	45	3	56	10
FIS A M 8 x 175	090277	•	10	80	75	90	3	56	10
FIS A M 10 x 110	090278	•	12	80	75	25	4	42	10
FIS A M 10 x 130	090279	•	12	80	75	45	4	42	10
FIS A M 10 x 150	090281	•	12	80	75	65	4	42	10
FIS A M 10 x 170	044969	•	12	80	75	85	4	42	10
FIS A M 10 x 200	090282	•	12	80	75	115	4	42	10
FIS A M 12 x 120	044971	•	14	80	75	30	5	34	10
FIS A M 12 x 140	090283	•	14	80	75	50	5	34	10
FIS A M 12 x 160	090284	•	14	80	75	70	5	34	10
FIS A M 12 x 180	090285	•	14	80	75	90	5	34	10
FIS A M 12 x 210	090286	•	14	80	75	120	5	34	10
FIS A M 12 x 260	090287	•	14	80	75	170	5	34	10
FIS A M 16 x 130	044972	•	18	80	75	40	7	24	10
FIS A M 16 x 175	090288	•	18	80	75	85	7	24	10
FIS A M 16 x 200	090289	•	18	80	75	110	7	24	10
FIS A M 16 x 250	090290	•	18	80	75	160	7	24	10
FIS A M 16 x 300	090291	•	18	80	75	210	7	24	10



1) max. number by using 1 static mixer
2) for use with FIS H 12 x 50 K

TECHNICAL DATA

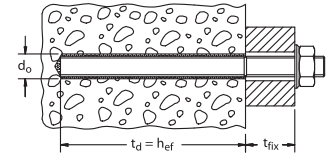


Threaded rod **FIS A**,
stainless steel of the corrosion
resistance class III e.g. A4

Type	Art.-No.	approval	drill-Ø	min. drill hole depth	min. anchorage depth in masonry	max. useful length in masonry	Mortar filling quantity without anchor sleeve	anchor per 360 ml-cartridge 1)	Qty. per box
		● DIBt	d_0 [mm]	t [mm]	[mm]	[mm]	[scale units]		pcs.
FIS A M 6 x 70 A4	2) 046205	●	8	-	-	-	3	56	10
FIS A M 6 x 75 A4	2) 090437	●	8	-	-	-	3	56	20
FIS A M 6 x 85 A4	090438	●	8	80	75	2	3	56	20
FIS A M 6 x 110 A4	090439	●	8	80	75	25	3	56	20
FIS A M 8 x 70 A4	046245	●	10	80	75	-	3	56	10
FIS A M 8 x 90 A4	090440	●	10	80	75	5	3	56	10
FIS A M 8 x 110 A4	090441	●	10	80	75	25	3	56	10
FIS A M 8 x 130 A4	090442	●	10	80	75	45	3	56	10
FIS A M 8 x 175 A4	090443	●	10	80	75	90	3	56	10
FIS A M 10 x 110 A4	090444	●	12	80	75	25	4	42	10
FIS A M 10 x 130 A4	090447	●	12	80	75	45	4	42	10
FIS A M 10 x 150 A4	090448	●	12	80	75	65	4	42	10
FIS A M 10 x 170 A4	044973	●	12	80	75	85	4	42	10
FIS A M 10 x 200 A4	090449	●	12	80	75	115	4	42	10
FIS A M 12 x 120 A4	044974	●	14	80	75	30	5	34	10
FIS A M 12 x 140 A4	090450	●	14	80	75	50	5	34	10
FIS A M 12 x 160 A4	090451	●	14	80	75	70	5	34	10
FIS A M 12 x 180 A4	090452	●	14	80	75	90	5	34	10
FIS A M 12 x 210 A4	090453	●	14	80	75	120	5	34	10
FIS A M 12 x 260 A4	090454	●	14	80	75	170	5	34	10
FIS A M 16 x 130 A4	044975	●	18	80	75	40	7	24	10
FIS A M 16 x 175 A4	090455	●	18	80	75	85	7	24	10
FIS A M 16 x 200 A4	090456	●	18	80	75	110	7	24	10
FIS A M 16 x 250 A4	090457	●	18	80	75	160	7	24	10
FIS A M 16 x 300 A4	090458	●	18	80	75	210	7	24	10

1) max. number by using 1 static mixer

2) for use with FIS H 12 x 50 K



Internal threaded sockets
FIS E

Type	Art.-No.	approval	effect. anchoring depth	min. bolt penetration	max. bolt penetration	internal thread	fits	Qty. per box
		● DIBt	h_{ef} [mm]	e_2 [mm]	e_1 [mm]	d_s		pcs.
FIS E 11 x 85 M6	043631	●	85	6	60	M 6	FIS H 16 x 85 K FIS H 20 x 85 K	10
FIS E 11 x 85 M8	043632	●	85	8	60	M 8	FIS H 16 x 85 K FIS H 20 x 85 K	10
FIS E 15 x 85 M10	043633	●	85	10	60	M 10	FIS H 20 x 85 K	10
FIS E 15 x 85 M12	043634	●	85	12	60	M 12	FIS H 20 x 85 K	10



Injection screw inserts
FIS E K

Type	Art.-No.	effect. anchoring depth	screw	bolt penetration	drill-Ø without anchor sleeve	drill hole depth	fits	Qty. per box
		h_{ef} [mm]	$d_s \times l_s$ [mm]	min. [mm] max. [mm]	[mm]	h_0 [mm]		pcs.
FIS E 5 x 45 K	058053	45	Ø 4-5/M5	20 35	10	50	FIS H 12 x 50 K FIS H 12 x 85 K	25
FIS E 6 x 75 K	058049	60	Ø 5-6/M6	35 65	10	80	FIS H 12 x 85 K	25
FIS E 8 x 80 K	043667	70	Ø 7-8/M8	20 65	14	90	FIS H 16 x 85 K FIS H 16 x 130 K	10
FIS E 10 x 95 K	058051	80	Ø 10/M10	45 85	14	105	FIS H 16 x 85 K FIS H 16 x 130 K	10

Injection technique for masonry

TECHNICAL DATA



Type	Art.No.	fits	Qty. per box
			pcs.
FIS-brush Ø14/20 mm	048980	8 - 16	1
FIS-brush Ø20/30 mm	048981	16 - 30	1

CORRECT USE WITHOUT ANCHOR SLEEVE

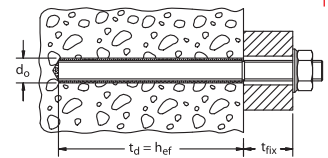
Correct use without anchor sleeve

Suitable for:

Lightweight concrete, solid brick, sand-lime solid brick, solid pumice and other solid materials

Approved for:

Solid bricks ≥ Mz 12, sand-lime solid bricks ≥ KS 12.



Product	Injection threaded rod FIS A M...																					
	6x110	8x90	8x110	8x130	8x175	10x110	10x130	10x150	10x170	10x200	12x120	12x140	12x160	12x180	12x210	12x260	16x130	16x175	16x200	16x250	16x300	
Approval	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Usable length t_{fix} [mm]	25	5	25	45	90	25	45	65	85	115	30	50	70	90	120	170	40	85	110	160	210	
Drill diameter d_0 [mm]	8	10	10	10	10	12	12	12	12	12	14	14	14	14	14	14	18	18	18	18	18	
Anchoring depth h_{ef} [mm]	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	
No. of scale units	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	5	5	7	7	7	7	
Anchor per cartridge 1)	56	56	56	56	56	42	42	42	42	42	34	34	34	34	34	34	24	24	24	24	24	

Correct use without anchor sleeve

Product	Internally threaded sockets FIS E...				Screw-inserts FIS E...K			
	11x85 M6	11x85 M8	15x85 M10	15x85 M12	5x45	6x75	8x80	10x95
Approval	●	●	●	●	-	-	-	-
Usable length t_{fix} [mm]	-	-	-	-	-	-	-	-
Drill diameter d_0 [mm]	14	14	18	18	10	10	14	14
Anchoring depth h_{ef} [mm]	85	85	85	85	45	75	80	95
No. of scale units	5	5	2	3	4	5	-	-
Anchor per cartridge 1)	34	34	85	56	42	34	-	-

1) Anchor with 1 static mixer per cartridge 360 ml

CORRECT USE WITH ANCHOR SLEEVE

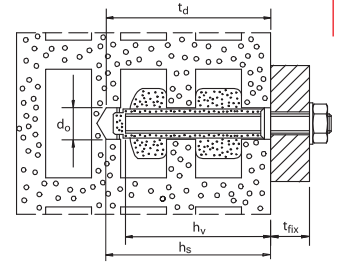
Correct use with anchor sleeve: combination options

Suitable for:

Vertically perforated bricks, sand-lime perforated bricks, hollow blocks, solid bricks, sand-lime solid bricks, pumice hollow blanks, hollow filler block floors, no-fines lightweight concrete and other perforated material.

Approved for:

Vertically perforated bricks \geq HLz 4, sand-lime perforated bricks \geq KSL 4, hollow blocks made from lightweight concrete \geq Hbl 2, hollow blocks made from concrete \geq Hbn 4, solid bricks \geq Mz 12, sand-lime solid bricks \geq KS 12 and no-fines lightweight concrete.



Product Installation details see Injection anchor sleeves	Injection anchor sleeve FIS H...K							Injection anchor sleeve, 1 m length FIS H...L			Injection anchor sleeve with net FIS H...N		
	12 x 50	12 x 85*	16 x 85*	16 x 130**	20 x 85*	20 x 130	20 x 200	12 x 1000	16 x 1000	22 x 1000	16 x 85	18 x 85	20 x 85
Type													
Art.-No.	41900	41901	41902	41903	41904	46703	46704	50958	50599	45301	50470	50472	50474
Drill- ϕ d_d [mm]	12	12	16	16	20	20	20	12	16	22	16	18	20
Drill depth t_d [mm]	\geq 60	\geq 95	\geq 95	\geq 140	\geq 95	\geq 135	\geq 205	\geq 90	\geq 90	\geq 90	\geq 95	\geq 95	\geq 95
No. of scale units	5	10	12	15	15	25	40	95/m	165/m	275/m	15	17	19
Anchor per 360 ml-cartridge	34	17	14	11	11	7	4				11	10	9
Anchoring depth h_{ef}	50	85	85	130	85	130	200	\geq 75	\geq 75	\geq 75	85	85	85

suitable for:

Injection threaded rod FIS A



gvz	A4	usable length t_{fix} [mm]										usable length t_{fix} [mm]				
FIS A M 6 x 70	046207	046205	10													
FIS A M 6 x 75	090243	090437	15													
FIS A M 6 x 85	090272	090438	25													
FIS A M 6 x 110	090273	090439	50	15												
FIS A M 8 x 70	046206	046245	10													
FIS A M 8 x 90	090274	090440	30													
FIS A M 8 x 110	090275	090441	50	15	15									15		
FIS A M 8 x 130	090276	090442	70	35	35									35		
FIS A M 8 x 175	090277	090443	115	80	80	35								80		
FIS A M 10 x 110	090278	090444			15										15	
FIS A M 10 x 130	090279	090447			35										35	
FIS A M 10 x 150	090281	090448			55	10									55	
FIS A M 10 x 170	044969	044973			75	30									75	
FIS A M 10 x 200	090282	090449			105	60									105	
FIS A M 12 x 120	044971	044974					20									20
FIS A M 12 x 140	090283	090450					40									40
FIS A M 12 x 160	090284	090451					60	15								60
FIS A M 12 x 180	090285	090452					80	35								80
FIS A M 12 x 210	090286	090453					110	65								110
FIS A M 12 x 260	090287	090454					160	115	45							160
FIS A M 12 (\emptyset 10)	1)	1)														
FIS A M 16 x 130	044972	044975					30									
FIS A M 16 x 175	090288	090455					75	30								
FIS A M 16 x 200	090289	090456					100	55								
FIS A M 16 x 250	090290	090457					150	105	35							
FIS A M 16 x 300	090291	090458					200	155	85							

Internal threaded sockets FIS E

gvz										
FIS E 11 x 85 M6	043631			●	■	●				
FIS E 11 x 85 M8	043632			●	■	●				
FIS E 15 x 85 M10	043633					●				
FIS E 15 x 85 M12	043634					●				

Injection screw inserts FIS E K

FIS E 5 x 45 K	058053	■	■							
FIS E 6 x 75 K	058049		■							
FIS E 8 x 80 K	043667			■	■					
FIS E 10 x 95 K	058051			■	■					

Red font resp. ● = Included in the German Approval. ■ Suitable but without approval.
 1) Threaded rod with graduated diameter M12 (to \emptyset 10 at anchoring base) on request.

* Plaster bridging possible up to 20 mm except perforated sand-lime brick (KSL).
 ** Plaster bridging possible up to 20mm.

Injection technique for masonry

LOADS

Permissible loads F_{perm} of a single anchor installed with FIS V, FIS VS or FIS VW in masonry and porous light-weight concrete (TGL) for tension, shear and combined tension and shear. For FIS VT and FIS P the below mentioned load values are valid as recommended loads only.

Anchor type			Threaded rod FIS A													
Application without anchor sleeve			M 6			M 8			M 10		M 12 (Ø10)		M 12			
Solid brick	≧ Mz 12	[kN]	1.0 ¹⁾			1.0 ¹⁾			1.7		1.7		1.7			
Sand-lime solid brick	≧ KS 12	[kN]	1.0 ¹⁾			1.0 ¹⁾			1.7		1.7		1.7			
Nominal drill diameter	Ø d ₀	[mm]	8			10			12		12		14			
Drill hole depth	min h ₀	[mm]	80			80			80		80		80			
Anchorage depth	min h _{ef}	[mm]	75			75			75		75		75			
Minimum structural component thickness	d	[mm]	110			110			110		110		110			
Required mortar volume FIS V, FIS VS, FIS VW, FIS VR, FIS P	[scale units]		2			3			3		3		4			
Application with anchor sleeve			M 6			M 8			M 10		M 12 (Ø10)		M 12			
Anchor sleeve type FIS H ... K			12x50	12x85	12x50	12x85	16x85	16x130	16x85	16x130	16x85	16x130	20x85	20x130	20x200	
Solid brick	≧ Mz 12	[kN]	1.0		1.0		1.7		1.7		1.7		1.7			
Sand-lime solid brick	≧ KS 12	[kN]	1.0		1.0		1.7		1.7		1.7		1.7			
Vertical perforated brick	≧ Hlz 4	[kN]	0.3/0.6 ²⁾		0.3/0.6 ²⁾		0.3/0.6 ²⁾		0.3/0.6 ²⁾		0.3/0.6 ²⁾		0.3/0.6 ²⁾			
	≧ Hlz 6	[kN]	0.4/0.8 ²⁾		0.4/0.8 ²⁾		0.4/0.8 ²⁾		0.4/0.8 ²⁾		0.4/0.8 ²⁾		0.4/0.8 ²⁾			
	≧ Hlz 12	[kN]	0.8/1.0 ²⁾	0.8/1.0 ²⁾	0.8/1.0 ^{2)/1.4³⁾}	0.8/1.0 ²⁾	0.8/1.0 ^{2)/1.6³⁾}	0.8/1.0 ^{2)/1.6³⁾}	0.8/1.0 ^{2)/1.8³⁾}	0.8/1.0 ^{2)/1.8³⁾}	0.8/1.0 ^{2)/1.8³⁾}		0.8/1.0 ^{2)/1.8³⁾}			
Perforated sand-lime brick	≧ KSL 4	[kN]	0.4/0.6 ²⁾		0.4/0.6 ²⁾		0.4/0.6 ²⁾		0.4/0.6 ²⁾		0.4/0.6 ²⁾		0.4/0.6 ²⁾			
	≧ KSL 6	[kN]	0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾			
	≧ KSL 12	[kN]	0.8/1.4 ²⁾		0.8/1.4 ²⁾		0.8/1.4 ²⁾		0.8/1.4 ²⁾		0.8/1.4 ²⁾		0.8/1.4 ²⁾			
Hollow block made of light-weight concrete	≧ Hbl 2	[kN]	0.3/0.5 ²⁾		0.3/0.5 ²⁾		0.3/0.5 ²⁾		0.3/0.5 ²⁾		0.3/0.5 ²⁾		0.3/0.5 ²⁾			
	≧ Hbl 4	[kN]	0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾			
Hollow block made of normal-weight concrete	≧ Hbn 4	[kN]	0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾			
Porous light-weight concrete	TGL	[kN]	-		-		1.3		1.3		1.3		2.0			
Aerated light-weight concret																
Nominal drill diameter	Ø d ₀	[mm]	12	12	12	16	16	16	16	16	16	20	20	20		
Drill hole depth	min h ₀	[mm]	55	90	55	90	135	90	135	90	135	90	135	205		
Embedment depth of the anchor sleeve	h _s	[mm]	50	85	50	85	85	130	85	130	85	130	85	130		
Anchorage depth	h _{ef}	[mm]	50	85 ⁴⁾	50	85 ⁴⁾	85 ⁴⁾	130 ⁴⁾	85 ⁴⁾	130 ⁴⁾	85 ⁴⁾	130 ⁴⁾	85 ⁴⁾	130 ⁴⁾		
Minimum structural component thickness	d	[mm]	90	110	90	110	110 (175) ⁵⁾	150 (175) ⁵⁾	110 (175) ⁵⁾	150 (175) ⁵⁾	110 (175) ⁵⁾	150 (175) ⁵⁾	110 (175) ⁵⁾	150 (175) ⁵⁾		
Required mortar volume FIS V, FIS VS, FIS VW, FIS VR, FIS P	[scale units]		5	10	5	10	12	15	12	15	12	15	15	40		
Permissible bedding moment M _{perm}																
M _{perm} for zinc-plated steel 5.8	gvz	[Nm]	4.4			10.7			21.4		21.4		37.4		37.4	
M _{perm} for stainless steel	A4	[Nm]	4.8			12.1			24.1		24.1		42.1		42.1	
Installation detail, spacings and edge distances																
Spacing (Group of anchors) ⁶⁾	≧ a	[mm]	100 (for Hbl and Hbn: 200) (for porous light-weight concrete TGL: 150)													
	min a	[mm]	50 (for Hbl and Hbn: 200) (for porous light-weight concrete TGL: 100)													
Minimum interspacing	a _z	[mm]	250 (for M8 and M10 in porous light-weight concrete TGL:200)													
Edge distance (only Mz, KS, Hlz, KSL, Hbl, Hbn)																
- for masonry with superimposed load or proof against tilting and without shear towards the free edge	≧ a _r	[mm]	50 (for Mz and KS: 60)													
- for masonry without superimposed load or proof against tilting or with shear towards the free edge	≧ a _r	[mm]	200 (for Mz and KS: 250)													
Edge distance (only porous light-weight concrete TGL)																
- without shear towards the free edge	≧ a _r	[mm]	150													
- with shear towards the free edge	≧ a _r	[mm]	200													
	min a _r	[mm]	100													
Clearance in fixture to be attached	d _f	[mm]	7			9			12		14		14			
Screw penetration depth of the screw/threaded rod	min s	[mm]	-			-			-		-		-			
	max s	[mm]	-			-			-		-		-			
Maximum installation torque	T _{inst}	[Nm]	4 ⁷⁾			4 ⁷⁾			4 ⁷⁾		4 ⁷⁾		4 ⁷⁾			

¹⁾ For masonry with superimposed load the permissible load be increased to 1.4 kN.

²⁾ Increased values are valid if the drill hole is drilled without hammer action but only rotary action. In KSL the outer brick walls have to have a thickness of at least 30 mm (old bricks).

³⁾ Increased values are valid for old masonry (before 1977) made of vertical perforated bricks ≧ HLz 12, if drilling was done without hammer action but only rotary action.

⁴⁾ For anchor sleeves with an embedment depth of h_s = 85 mm a non-bearing layer of up to 20 mm may be bridged; for h_s = 130 mm the non-bearing layer may not be more than 30 mm; and for h_s = 200 mm the non-bearing layer may not be more than 100 mm.
The bridging of non-bearing layers is permitted with threaded rods only."

⁵⁾ The value in bracket is valid for porous light-weight concrete TGL.

⁶⁾ The spacing "a" may be reduced down to the value of "min a", if the permissible loads are reduced at the same time. Not valid for masonry made of Hbl and Hbn.

⁷⁾ 2 Nm, if the fixture to be attached is not installed with a levelling mortar layer.

Continued next page.

LOADS

Permissible loads F_{perm} of a single anchor installed with FIS V, FIS VS or FIS VW in masonry and porous light-weight concrete (TGL) for tension, shear and combined tension and shear. For FIS VT and FIS P the below mentioned load values are valid as recommended loads only.

Anchor type			Threaded rod FIS A			Internal threaded sockets FIS E							
Application without anchor sleeve			M 16			M 6		M 8		M 10		M 12	
Solid brick	$\geq Mz 12$	[kN]	1.7			1.0 ¹⁾		1.0 ¹⁾		1.7		1.7	
Sand-lime solid brick	$\geq KS 12$	[kN]	1.7			1.0 ¹⁾		1.0 ¹⁾		1.7		1.7	
Nominal drill diameter	$\emptyset d_0$	[mm]	18			14		14		18		18	
Drill hole depth	min h_0	[mm]	80			90		90		90		90	
Anchorage depth	min h_{ef}	[mm]	75			85		85		85		85	
Minimum structural component thickness	d	[mm]	110			110		110		110		110	
Required mortar volume FIS V, FIS VS, FIS VW, FIS VR, FIS P	[scale units]		5			4		4		5		5	
Application with anchor sleeve			M 16			M 6		M 8		M 10		M 12	
Anchor sleeve type FIS H ... K			20x85			16x85		16x85		20x85		20x85	
Solid brick	$\geq Mz 12$	[kN]	1.7			1.0		1.7		1.7		1.7	
Sand-lime solid brick	$\geq KS 12$	[kN]	1.7			1.0		1.7		1.7		1.7	
Vertical perforated brick	$\geq Hlz 4$	[kN]	0.3/0.6 ²⁾			0.3/0.6 ²⁾		0.3/0.6 ²⁾		0.3/0.6 ²⁾		0.3/0.6 ²⁾	
	$\geq Hlz 6$	[kN]	0.4/0.8 ²⁾			0.4/0.8 ²⁾		0.4/0.8 ²⁾		0.4/0.8 ²⁾		0.4/0.8 ²⁾	
	$\geq Hlz 12$	[kN]	0.8/1.0 ²⁾ /1.8 ³⁾			0.8/1.0 ²⁾		0.8/1.0 ²⁾ /1.4 ³⁾		0.8/1.0 ²⁾		0.8/1.0 ²⁾	
Perforated sand-lime brick	$\geq KSL 4$	[kN]	0.4/0.6 ²⁾			0.4/0.6 ²⁾		0.4/0.6 ²⁾		0.4/0.6 ²⁾		0.4/0.6 ²⁾	
	$\geq KSL 6$	[kN]	0.6/0.8 ²⁾			0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾	
	$\geq KSL 12$	[kN]	0.8/1.4 ²⁾			0.8/1.4 ²⁾		0.8/1.4 ²⁾		0.8/1.4 ²⁾		0.8/1.4 ²⁾	
Hollow block made of light-weight concrete	$\geq Hbl 2$	[kN]	0.3/0.5 ²⁾			0.3/0.5 ²⁾		0.3/0.5 ²⁾		0.3/0.5 ²⁾		0.3/0.5 ²⁾	
	$\geq Hbl 4$	[kN]	0.6/0.8 ²⁾			0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾	
Hollow block made of normal-weight concrete	$\geq Hbn 4$	[kN]	0.6/0.8 ²⁾			0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾		0.6/0.8 ²⁾	
Porous light-weight concrete	TGL	[kN]	2.0			-		1.3		1.3		2.0	
Aerated light-weight concret													
Nominal drill diameter	$\emptyset d_0$	[mm]	20			16		16		20		20	
Drill hole depth	min h_0	[mm]	90			90		90		90		90	
Embedment depth of the anchor sleeve	h_s	[mm]	85			85		85		85		85	
Anchorage depth	h_{ef}	[mm]	85 ⁴⁾			85		85		85		85	
Minimum structural component thickness	d	[mm]	110 (175) ⁵⁾			110		110 (175) ⁵⁾		110 (175) ⁵⁾		110 (175) ⁵⁾	
Required mortar volume FIS V, FIS VS, FIS VW, FIS VR, FIS P	[scale units]		15			12		12		15		15	
Permissible bedding moment M_{perm}													
M_{perm} for zinc-plated steel 5.8	gvz	[Nm]	94.9			4.4		10.7		21.4		37.4	
M_{perm} for stainless steel	A4	[Nm]	104.2			4.8		12.1		24.1		42.1	
Installation detail, spacings and edge distances													
Spacing (Group of anchors) ⁶⁾	$\geq a$	[mm]				100 (for Hbl and Hbn: 200) (for porous light-weight concrete TGL: 150)							
	min a	[mm]				50 (for Hbl and Hbn: 200) (for porous light-weight concrete TGL: 100)							
Minimum interspacing	a_2	[mm]				250 (for M8 and M10 in porous light-weight concrete TGL:200)							
Edge distance (only Mz, KS, Hlz, KSL, Hbl, Hbn)													
- for masonry with superimposed load or proof against tilting and without shear towards the free edge	$\geq a_r$	[mm]				50 (for Mz and KS: 60)							
- for masonry without superimposed load or proof against tilting or with shear towards the free edge	$\geq a_r$	[mm]				200 (for Mz and KS: 250)							
Edge distance (only porous light-weight concrete TGL)													
- without shear towards the free edge	$\geq a_r$	[mm]				150							
- with shear towards the free edge	$\geq a_r$	[mm]				200							
	min a_r	[mm]				100							
Clearance in fixture to be attached	d_f	[mm]	18			7		9		12		14	
Screw penetration depth of the screw/threaded rod	min s	[mm]	-			6		8		10		12	
	max s	[mm]	-			60		60		60		60	
Maximum installation torque	T_{inst}	[Nm]	4 ⁷⁾			4 ⁷⁾		4 ⁷⁾		4 ⁷⁾		4 ⁷⁾	

¹⁾ For masonry with superimposed load the permissible load be increased to 1.4 kN.

²⁾ Increased values are valid if the drill hole is drilled without hammer action but only rotary action. In KSL the outer brick walls have to have a thickness of at least 30 mm (old bricks).

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⁴⁾ For anchor sleeves with an embedment depth of $h_s = 85$ mm a non-bearing layer of up to 20 mm may be bridged; for $h_s = 130$ mm the non-bearing layer may not be more than 30 mm; and for $h_s = 200$ mm the non-bearing layer may not be more than 100 mm.

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⁷⁾ 2 Nm, if the fixture to be attached is not installed with a levelling mortar layer.