Chemical fixings

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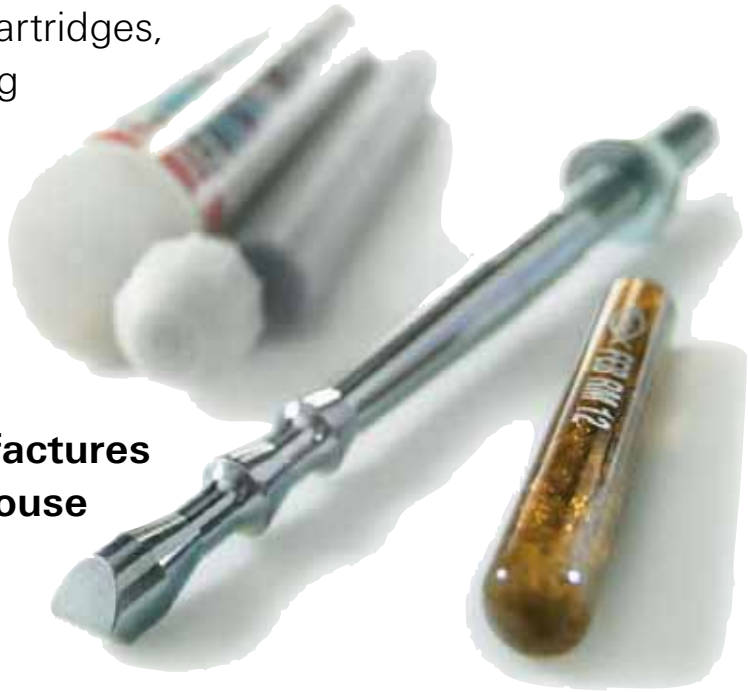
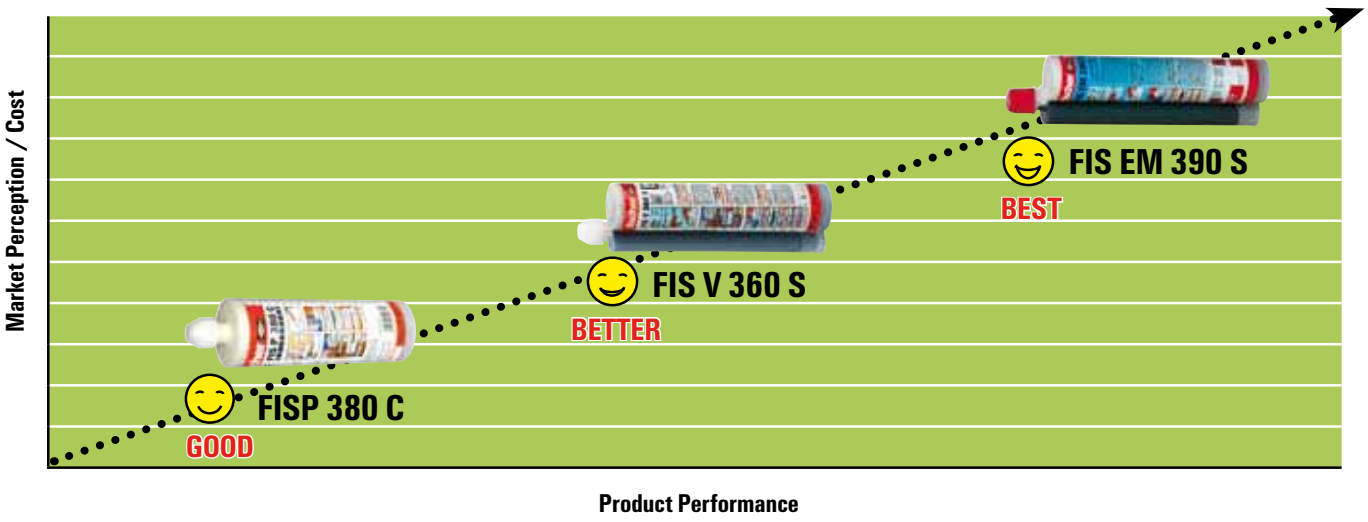
Chemical fixings, including resin capsules and injection systems in various cartridges, are experiencing an increasing demand worldwide.

They offer solutions where other commonly used methods don't work.

fischer **develops and manufactures** all of its chemical fixings **in-house** which guarantees highest quality and performance.



	The fischer epoxy resin **FIS EM 390 S** chemical fixing solution for applications where high loads are required. Suitable for use in diamond drill holes. It provides the absolute best bond strength of all chemical solutions, including water saturated concrete.
	The fischer hybrid resin **FIS V 360S** all-rounder. Safely anchors in to all substrate materials even if the installation proceedure is not perfect. It can be used in damp holes and has great performance at elevated temperatures like fire conditions.
	The fischer polyester resin **FIS P 380 C** economic solution for fixing in to masonry and dry concrete. The ultimate problem solver for trades.



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fischer Injection systems - Overview and application

Injection system	Non-cracked concrete	Masonry	Under water applcation	Diamond drilled hole	Recommended loads M8 - M30 (standard anchoring depth in concrete C20/25)
FIS V  (see page 58)	■ Loads for 3 different anchoring depths see page 54	■ Loads see page 51			7.2 – 56.6 kN
FIS VS  (see page 60)	■ Loads for 3 different anchoring depths see page 54	■ Loads see page 51			7.2 – 56.6 kN
FIS VW  (see page 60)	■ Loads for 3 different anchoring depths see page 54	■ Loads see page 51			7.2 – 56.6 kN
FIS VT  (see page 62)	■ Loads see page 56	■ Loads see page 51			6.5 – 50.9 kN
FIS P  (see page 63)	■ Loads see page 44				5 - 26.8 kN
FIS EM  (see page 65)	■ Loads for 3 different anchoring depths see page 55		■	■	8.4 – 109.9 kN

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Installation tips for fischer injection mortars

DETERMINATION OF MORTAR QUANTITY

For the determination of the required mortar quantity for the corresponding application you need
- the net quantity per cartridge in scale units
- the data tables for threaded rods and anchor sleeves, which refer to the required mortar quantity in scale units

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

E = ● = ETA-approval					Anchoring depth 1		
Type	zinc-plated steel Art.-Nr.	stainless steel A4 Art.-Nr.	E	d_0 drill diameter [mm]	$h_{ef1} = h_{01}$ anchorage depth = drill depth [mm]	t_{fix1} max. usable length [mm]	charge FIS V [scale units]
FIS A M 6 x 75	**90243**	**90437**	●	8	50	15	2
FIS A M 6 x 85	**90272**	**90438**	●	8	50	25	2
FIS A M 6 x 110	**90273**	**90439**	●	8	50	50	2
FIS A M 8 x 90	**90274**	**90440**	●	10	65	15	3
FIS A M 8 x 110	**90275**	**90441**	●	10	65	35	3
FIS A M 8 x 130	**90276**	**90442**	●	10	65	55	3
FIS A M 8 x 175	**90277**	**90443**	●	10	65	100	3

Scale

Example: 80 FIS A M 6 x 110 is 80 x 2 scale units = 160 net scale units is 1 cartridge FIS V 360 S is sufficient

CARTRIDGE SYSTEMS

Product	No. of scale units	Net quantity (reduced by 1 pc static mixer)
Injection mortar FIS HB		
FIS HB 345 S	180 scale units	170 scale units
FIS HB 150 C	70 scale units	60 scale units
Injection mortar FIS V		
FIS V 360 S	180 scale units	170 scale units
FIS VS 150 C	70 scale units	60 scale units
FIS VS 100 P	50 scale units	40 scale units

USE OF CARTRIDGES

While pressing out the mortar the piston movement can be followed on the scale and thus the required mortar quantity can be injected.

Important: Whenever using a new static mixer, the first few strokes have to be thrown away. The mortar cannot be injected into the hole until it is uniformly coloured and thus optimally mixed.
After the work is finished, you can store the remaining mortar in the cartridge with the static mixer attached and re-use it with a new static mixer later.
The above mentioned net data relates to the use of only one static mixer per cartridge and to optimal compliance with the specified hole depth and mortar requirement. You need to subtract ten scale units for each additional static mixer. The mortar requirement can be somewhat higher at the beginning with inexperienced users.

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Injection mortar FIS EM

The high-performance mortar for concrete.

OVERVIEW

Injection mortar
FIS EM 390 S

Static mixer
FIS SE

Suitable for::
- Non-cracked concrete
- Reinforcement bars

WRAS APPROVED PRODUCT

For fixing of:
- Steel constructions
- Consoles
- Machines
- Staircases
- High-racks
- Wooden constructions
- Reinforcement bars

For load data see page 55

DESCRIPTION

- Best performance mortar in the shuttle cartridge based on epoxy resin.
- Optimum solution for concrete (anchor rods and reinforcement bars).
- Resin and hardener are stored in two separate chambers and are not mixed and activated until pushed through the static mixer.
- Partially used cartridges can easily be reused by changing the static mixer.

Advantages/Benefits

- Excellent mortar bonding ensures highest loads in concrete.
- Suitable for underwater installations.
- Suitable for diamond drilled holes.
- Expansion-free anchoring allows low axial spacings and edge distances.
- Ergonomic injection guns for quick and easy installation.

Accessories/Recommended loads

- For fixing in concrete with FIS A / RG M
- Appropriate injection gun FIS AK

TECHNICAL DATA

Injection mortar **FIS EM 390 S**

Static mixer **FIS SE**

Type	Art.-No.	ID		contents	No. of scale divisions on cartridge	qty. per box pcs.
FIS EM 390 S	**93049**	6		1 cartridge 390 ml + 2 static mixer	180	6
FIS EM 1100 S	**96865**	9		1 cartridge 1100 ml + 2 static mixer	540	
FIS SE	**96448**	2	-	static mixer	180	10

CURING TIME

Gelling and curing time of fischer FIS EM 390 S

Cartridge temperature (mortar)	**Gelling time**	**temperature at anchoring base**	**Curing time**
		- 5°C – + 5°C	80 hrs.
+ 5°C – + 10°C	2 hrs.	+ 5°C – + 10°C	40 hrs.
+ 10°C – + 20°C	30 min.	+ 10°C – + 20°C	18 hrs.
+ 20°C – + 30°C	14 min.	+ 20°C – + 30°C	10 hrs.
+ 30°C – + 40°C	7 min.	+ 30°C – + 40°C	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. With temperatures above +30°C to +40°C the cartridges have to be cooled down to +15°C or +20°C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303

fischer Can System - FCS + FCS Liquid

The high-performance hybrid mortar in a can.

OVERVIEW

fischer can system FCS (trowelable), FCS-Liquid (pourable)

For fixing of:
- Steel constructions
- Consoles
- Machines
- Staircases
- High-racks
- Wooden constructions
- Reinforce porous concrete surfaces by coating
- Filling of holes and gaps in concrete surfaces
- Reconstruction of edges and corners
- Reinforcement bars

Suitable for:
- Non-cracked concrete

DESCRIPTION

- Resin and hardener are stored in two separate cans.
- The cans can be used for refurbishment, restructuring of concrete and for the fixing of steel elements, like rebars, in concrete. This means to strengthen porous surfaces by using a brush as a coating, to reconstruct corners and edges by a spatula or to fill holes and gaps by pouring in the resin.
- The stiff version **FCS** is used to fill in horizontal or overhead holes, using a spatula.
- The liquid version **FCS-Liquid** is poured into vertical holes or used with a brush.

Advantages/Benefits

- Long working time.
- Expansion-free anchoring allows low axial spacings and edge distances.
- The product can be used as an alternative for FIS EM for price sensitive markets with low labour costs.
- Can be used in diamond drill holes.
- 550ml for easy mixing by hand.

Accessories / Recommended loads

- For fixing in concrete
- For fixing in masonry
- For reinforcement bars

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

TECHNICAL DATA

fischer can system **FCS (trowelable)**, **FCS-Liquid (pourable)**
styrene free

Type	Art.-No.	ID	languages on the lable	shelf life	qty. per box
				months	pcs.
FCS	**43676**	-	GB, E, P	18	12
FCS Liquid	**43917**	-	GB, E, P	18	12

CURING TIME

Gelling and curing time of fischer can system FCS / FCS Liquid

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.

LOADS

Characteristic, design and recommended loads of single anchors with large spacing and edge distance[1)]

Characteristic Loads									
Anchor type		FCS Ø8	FCS Ø10	FCS Ø12	FCS Ø14	FCS Ø16	FCS Ø20	FCS Ø25	FCS Ø28
Non-cracked concrete temperature range -40°C to +50°C									
Tension load	C 20/25 NRk [kN]	27.0	37.9	55.7	73.8	84.3	128.5	214.7	280.5
	C 50/60 NRk [kN]	27.6	43.2	62.2	84.7	109.6	167.1	270	338.7
Shear load	≥ C 20/25 VRk [kN]	13.8	21.6	31.1	42.3	55.3	86.4	135.0	169.3
Design Loads									
Anchor type		FCS Ø8	FCS Ø10	FCS Ø12	FCS Ø14	FCS Ø16	FCS Ø20	FCS Ø25	FCS Ø28
Non-cracked concrete temperature range -40°C to +50°C									
Tension load	C 20/25 NRk [kN]	15.0	21.1	30.9	41.1	46.8	71.4	119.3	155.8
	C 50/60 NRk [kN]	19.5	27.4	40.2	53.3	60.9	92.8	155.1	202.6
Shear Load	≥ C 20/25 VRk [kN]	9.2	14.4	20.7	28.2	36.9	57.6	90.0	121.0
Recommended Loads[2)]									
Anchor type		FCS Ø8	FCS Ø10	FCS Ø12	FCS Ø14	FCS Ø16	FCS Ø20	FCS Ø25	FCS Ø28
Non-cracked concrete temperature range -40°C to +50°C									
Tension load	C 20/25 NRk [kN]	10.7	15.0	22.1	29.3	33.5	51.0	85.2	111.3
	C 50/60 NRk [kN]	13.9	19.6	28.7	38.1	43.5	66.3	110.8	144.7
Shear load	≥ C 20/25 VRk [kN]	6.6	10.6	14.8	20.2	26.3	41.1	64.3	86.4

1) Loads apply to reinforcing steel with fyk = 500N/mm², thoroughly cleaned and dry holes and temperatures in the anchoring base T ≤ + 50°C.
2) Material safety factors γ_M and safety factor for load γ_L = 1.4 are included. Material safety factor γ_M depends on type of anchor.

Anchor characteristics

Anchor type			FCS Ø8	FCS Ø10	FCS Ø12	FCS Ø14	FCS Ø16	FCS Ø20	FCS Ø25	FCS Ø28
Diameter of rebar		[mm]	8	10	12	14	16	20	25	28
Nominal drill hole diameter	d0	[mm]	12	14	16	18	20	25	30	35
Drill depth	h0	[mm]	80	90	110	125	125	170	240	280
Effective anchorage depth	hef	[mm]	80	90	110	125	125	170	240	280
Minimum thickness of concrete member	hmin	[mm]	120	130	150	165	165	210	280	350
Minimum spacing	smin	[mm]	50	60	70	80	85	110	140	170
Minimum edge distances	cmin	[mm]	50	60	70	80	85	110	140	170

Highbond anchor FHB II

Flexible installation and highest loads in the cracked tensile zone.

OVERVIEW

FHB II-A S (standard), zinc plated steel

FHB II-A L (performance optimised), zinc-plated steel

Resin capsule **FHB II-P**

Fast-cure Resin capsule **FHB II-P F** ! New

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

Injection mortar **FIS HB 150 C**

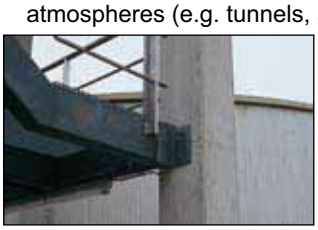
Approved for:
- Cracked and non-cracked concrete C20/25 to C50/60

Also suitable for:
- Concrete C12/15

For fixing of:
- Steel constructions
- Railings
- Consoles
- Ladders
- Wooden constructions
- Cable trays
- Machines
- Staircases
- Gates
- Facades
- Window elements
- Stand-off installations

DESCRIPTION

- The bonded anchor suitable for cracked concrete consists of the Anchor rod FHB II-A L (long version) or FHB II-A S (short version) and resin capsule FHB II P / P F or Injection mortar FIS HB.
- The capsule FHB II-P contains vinyl ester resin, the capsuale FHB II- PF contains special formulated vinyl ester resin for faster curing times.
- The FIS HB injection mortar is a high-strength 2-component vinyl ester mortar.
- When using the Injection mortar FIS HB 345 S a special injection gun is needed (see pages 35). By using the injection gun the two components are mixed together and activated in the static mixer.
- Partially used cartridges can be reused, simply by changing the static mixer.
- The mortar bonds the entire surface of the anchor rod to the wall of the drilled hole and largely seals the hole.
- Anchor rod FHB II-A made of A4 stainless steel for outdoor use and in damp conditions. Highly corrosion-resistant steel C (material no. 1.4529) for applications in aggressive atmospheres (e.g. tunnels, swimming baths).



FHB II - ADVANTAGES AT A GLANCE

FHB II-A S short version for standard applications with reduced anchorage depth for thinnest building components possible.

FHB II-A S:

Thread diameter corresponds to drill diameter for user-friendly push-through installation.

Edge oblique for use with resin capsule.

FHB II-A L

The geometry of the cones is specially developed for use in cracked concrete. This ensures uniform load distribution for small axial spacings and edge distances.

the performance optimised version with larger anchorage depth for highest loads.

Using a push-through element enables push-through installation.

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

DESCRIPTION

- Flexible system as both injection cartridge and resin capsule can be used.
- Suitable for use in cracked tensile zone guarantees highest safety.
- Low-expansion force allows cost-efficient fixing with small edge distances and axial spacings.
- Ergonomic injection gun guarantees fast and easy installation.
- Quick installation by hand without a setting tool reduces the work involved.

Advantages/Benefits

Anchor rod FHB II-A L

- Highest loads due to greater anchorage depth.
- Push-through installation by using a push-through element (when using Injection mortar FIS HB).

Anchor rod FHB II-A S

- Reduced anchorage depth for use in thin building components, therefore reduced drilling effort.
- Suitable for pre-positioned and push-through installation.

INSTALLATION

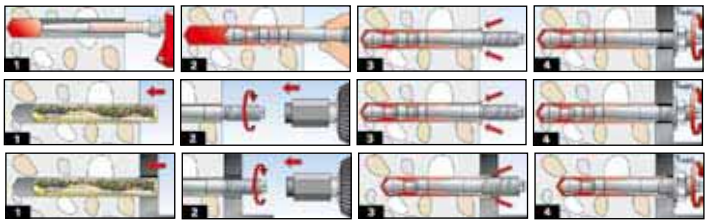
Type of installation

- Pre-positioned installation (A1/A2)
- Push-through installation (B)

Installation tips

- For sizes ≥ M20, blow out the drilled hole with compressed air (see page 32 for installation accessories).
- When over head installation for sizes ≥ M16 the use of centring wedges is recommended.

A1)
A2)
B)

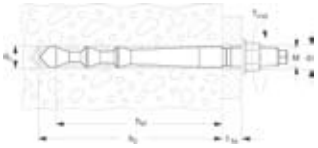


When installing capsules, ensure hammer action is used.

TECHNICAL DATA

Highbond anchor **FHB II-A S** (standard), zinc-plated steel

Highbond anchor **FHB II-A L** (performance optimised), zinc-plated steel



Type	Art.-No.	ID	approval	drill-Ø	drill hole depth	anchorage depth	usable length	thread	width across nut	element for through fixing	suitable elements	qty. per box
			■ ETA	d_0	h_0	h_{ef}	T_{fix}	M	SW	Art.-Nr.	pcs.	pcs.
				[mm]	[mm]	[mm]	[mm]					
FHB II-A S M10 x 60/10	**97072**	0	■	10	75	60	10	M 10	17	-	-	10
FHB II-A S M10 x 60/20	**97073**	7	■	10	75	60	20	M 10	17	-	-	10
FHB II-A S M10 x 60/60	**97074**	4	■	10	75	60	60	M 10	17	-	-	10
FHB II-A S M10 x 60/100	**97206**	9	■	10	75	60	100	M 10	17	-	-	10
FHB II-A S M12 x 75/10	**97257**	1	■	12	90	75	10	M 12	19	-	-	10
FHB II-A S M12 x 75/25	**97268**	7	■	12	90	75	25	M 12	19	-	-	10
FHB II-A S M12 x 75/60	**97274**	8	■	12	90	75	60	M 12	19	-	-	10
FHB II-A S M12 x 75/100	**97275**	5	■	12	90	75	100	M 12	19	-	-	10
FHB II-A S M12 x 75/165	**97280**	9	■	12	90	75	165	M 12	19	-	-	10
FHB II-A S M16 x 95/30	**97281**	6	■	16	110	95	30	M 16	24	-	-	10
FHB II-A S M16 x 95/60	**97286**	1	■	16	110	95	60	M 16	24	-	-	10
FHB II-A S M16 x 95/100	**97295**	3	■	16	110	95	100	M 16	24	-	-	10
FHB II-A S M16 x 95/165	**97296**	0	■	16	110	95	165	M 16	24	-	-	10
FHB II-A S M24 x 170/50	**97297**	7	■	25	190	170	50	M 24	36	-	-	4
FHB II-A L M8 x 60/10	**97032**	4	■	10	75	60	10	M 8	13	78230	2	10
FHB II-A L M8 x 60/30	**97033**	1	■	10	75	60	30	M 8	13	78230	5	10
FHB II-A L M8 x 60/50	**97034**	8	■	10	75	60	50	M 8	13	78230	9	10
FHB II-A L M10 x 95/10	**96907**	6	■	12	110	95	10	M 8	17	78232	1	10
FHB II-A L M10 x 95/20	**96940**	3	■	12	110	95	20	M 8	17	78232	2	10
FHB II-A L M10 x 95/60	**96941**	0	■	12	110	95	60	M 8	17	78232	4	10
FHB II-A L M10 x 95/100	**96942**	7	■	12	110	95	100	M 8	17	78232	7	10
FHB II-A L M12 x 120/10	**96943**	4	■	14	135	120	10	M 8	19	78233	2	10
FHB II-A L M12 x 120/25	**96944**	1	■	14	135	120	25	M 8	19	78234	2	10
FHB II-A L M12 x 120/60	**97014**	0	■	14	135	120	60	M 8	19	78234	3	10
FHB II-A L M12 x 120/100	**97031**	7	■	14	135	120	100	M 8	19	78234	5	10
FHB II-A L M16 x 160/30	**97035**	5	■	18	175	160	30	M 16	24	78236	2	10
FHB II-A L M16 x 160/60	**97038**	6	■	18	175	160	60	M 16	24	78236	3	10
FHB II-A L M16 x 160/100	**97070**	6	■	18	175	160	100	M 16	24	78236	5	10
FHB II-A L M20 x 210/50	**97071**	3	■	25	235	210	50	M 20	30	-	-	4

FIRE PREVENTION

Red hot: You will find fire prevention information on page 308

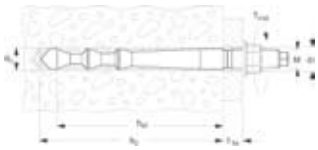
CORROSION

Rust prevention tips: Everything you need to know about corrosion and how to prevent it is on page 309

Highbond anchor FHB II

TECHNICAL DATA

Highbond anchor **FHB II-A S A4** (standard), stainless steel A4



Type	Art.-No.	ID	approval	drill-Ø	drill hole depth	anchorage depth	usable length	thread	width across nut	element for through fixing	suitable elements	qty. per box
			ETA	d_0	h_0	h_{ef}	d_a	M	SW	Art.-No.		
				[mm]	[mm]	[mm]	[mm]				pcs.	pcs.
FHB II-A S M10 x 60/10 A4	**97630**	2	■	10	75	60	10	M 10	17	-	-	10
FHB II-A S M10 x 60/20 A4	**97631**	9	■	10	75	60	20	M 10	17	-	-	10
FHB II-A S M10 x 60/40 A4	**97632**	6	■	10	75	60	40	M 10	17	-	-	10
FHB II-A S M10 x 60/60 A4	**97633**	3	■	10	75	60	60	M 10	17	-	-	10
FHB II-A S M10 x 60/100 A4	**97634**	0	■	10	75	60	100	M 10	17	-	-	10
FHB II-A S M12 x 75/25 A4	**97636**	4	■	12	90	75	25	M 12	19	-	-	10
FHB II-A S M12 x 75/40 A4	**97637**	1	■	12	90	75	40	M 12	19	-	-	10
FHB II-A S M12 x 75/60 A4	**97638**	8	■	12	90	75	60	M 12	19	-	-	10
FHB II-A S M12 x 75/10 A4	**97635**	7	■	12	90	75	10	M 12	19	-	-	10
FHB II-A S M12 x 75/100 A4	**97639**	5	■	12	90	75	100	M 12	19	-	-	10
FHB II-A S M12 x 75/165 A4	**97640**	1	■	12	90	75	165	M 12	19	-	-	10
FHB II-A S M16 x 95/30 A4	**97641**	8	■	16	110	95	30	M 16	24	-	-	10
FHB II-A S M16 x 95/60 A4	**97642**	5	■	16	110	95	60	M 16	24	-	-	10
FHB II-A S M16 x 95/100 A4	**97643**	2	■	16	110	95	100	M 16	24	-	-	10
FHB II-A S M24 x 170/50 A4	**97645**	-		25	190	170	50	M 24	36			4
FHB II-A L M8 x 60/10 A4	**97298**	4	■	10	75	60	10	M 8	13	78230	2	10
FHB II-A L M8 x 60/30 A4	**97299**	1	■	10	75	60	30	M 8	13	78230	5	10
FHB II-A L M8 x 60/50 A4	**97440**	7	■	10	75	60	50	M 8	13	78230	9	10
FHB II-A L M10 x 95/10 A4	**97616**	6	■	12	110	95	10	M 10	17	78232	1	10
FHB II-A L M10 x 95/20 A4	**97617**	3	■	12	110	95	20	M 10	17	78232	2	10
FHB II-A L M10 x 95/40 A4	**97618**	0	■	12	110	95	40	M 10	17	98232	3	10
FHB II-A L M10 x 95/60 A4	**97619**	7	■	12	110	95	60	M 10	17	78232	4	10
FHB II-A L M10 x 95/100 A4	**97620**	3	■	12	110	95	100	M 10	17	78232	7	10
FHB II-A L M12 x 120/10 A4	**97621**	0	■	14	135	120	10	M 12	19	78233	2	10
FHB II-A L M12 x 120/25 A4	**97622**	7	■	14	135	120	25	M 12	19	78234	2	10
FHB II-A L M12 x 120/40 A4	**97623**	4	■	14	135	120	40	M 12	19	98234	2	10
FHB II-A L M12 x 120/60 A4	**97624**	1	■	14	135	120	60	M 12	19	78234	3	10
FHB II-A L M12 x 120/100 A4	**97625**	8	■	14	135	120	100	M 12	19	78234	5	10
FHB II-A L M16 x 160/30 A4	**97626**	5	■	18	175	160	30	M 16	24	78236	2	10
FHB II-A L M16 x 160/60 A4	**97627**	2	■	18	175	160	60	M 16	24	78236	3	10
FHB II-A L M16 x 160/100 A4	**97628**	9	■	18	175	160	100	M 16	24	78236	5	10
FHB II-A L M20 x 210/50 A4	**97629**	6	■	25	235	210	50	M 20	30	-	-	4

Highbond anchor **FHB II-A S C** (standard), highly corrosion-resistant steel

Highbond anchor **FHB II-A L C** (performance optimised), highly corrosion-resistant steel

Type		Art.-No.	ID	approval	drill	drill hole depth	anchorage depth	usable length	thread	width across nut	qty. per box
				ETA	d_0	h_0	h_{ef}	d_a	M	SW	
					[mm]	[mm]	[mm]	[mm]			pcs.
FHB II-A S M10 x 60/10 C	1)	**97704**	0	■	10	75	60	10	M 10	17	10
FHB II-A S M10 x 60/20 C	1)	**97705**	7	■	10	75	60	20	M 10	17	10
FHB II-A S M12 x 75/40 C	1)	**97707**	4	■	12	90	75	40	M 12	19	10
FHB II-A S M12 x 75/25 C	1)	**97706**	1	■	12	90	75	25	M 12	19	10
FHB II-A S M16 x 95/30 C	1)	**97708**	8	■	16	110	95	30	M 16	24	10
FHB II-A S M16 x 95/60 C	1)	**97709**	5	■	16	110	95	60	M 16	24	10
FHB II-A S M24 x 170/50 C	1)	**97711**	8	■	25	190	170	50	M 24	36	4
FHB II-A L M8 x 60/10 C	1)	**97696**	6	■	10	75	60	10	M 8	13	10
FHB II-A L M8 x 60/30 C	1)	**97697**	3	■	10	75	60	30	M 8	13	10
FHB II-A L M10 x 95/10 C	1)	**97698**	8	■	12	110	95	10	M 8	17	10
FHB II-A L M10 x 95/20 C	1)	**97699**	5	■	12	110	95	20	M 8	17	10
FHB II-A L M12 x 120/25 C	1)	**97700**	2	■	14	135	120	25	M 8	19	10
FHB II-A L M12 x 120/40 C	1)	**97701**	9	■	14	135	120	40	M 12	19	10
FHB II-A L M16 x 160/30 C	1)	**97702**	2	■	18	175	160	30	M 16	24	10
FHB II-A L M20 x 210/50 C	1)	**97703**	9	■	25	235	210	50	M 20	30	4

1) Prices and delivery time on request.

TECHNICAL DATA

Resin capsule **FHB II-P**

Type	Art.-No.	ID	approval	drill-Ø	drill hole depth	anchorage depth	fits	qty. per box
			ETA	d_0	h_0	h_{ef}		
				[mm]	[mm]	[mm]		pcs.
FHB II-P 10 x 60	**96847**	5	■	10	75	60	FHB II-S M 10 x 60	10
FHB II-P 12 x 75	**96848**	2	■	12	90	75	FHB II-S M 12 x 75	10
FHB II-P 16 x 95	**96849**	9	■	16	110	95	FHB II-S M 16 x 95	10
FHB II-P 24 x 170	**96851**	2	■	25	190	170	FHB II-S M 24 x 170	4
FHB II-P 8 x 60	**96824**	6	■	10	75	60	FHB II-A L M 8 x 60	10
FHB II-P 10 x 95	**96843**	7	■	12	110	95	FHB II-A L M 10 x 95	10
FHB II-P 12 x 120	**96844**	4	■	14	135	120	FHB II-A L M 12 x 120	10
FHB II-P 16 x 160	**96845**	1	■	18	175	160	FHB II-A L M 16 x 160	10
FHB II-P 20 x 210	**96846**	8	■	25	235	210	FHB II-A L M 20 x 210	4

Resin capsule **FHB II- P F**

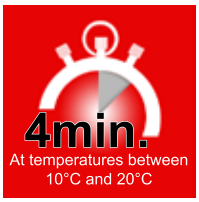
Type	Art.-No.	ID	approval	drill-Ø	drill hole depth	anchorage depth	fits	qty. per box
			ETA	d_0	h_0	h_{ef}		
				[mm]	[mm]	[mm]		pcs.
FHB II-P F 10 x 60	**500547**	5	■	10	75	60	FHB II-S M 10 x 60	10
FHB II-P F 12 x 75	**500548**	2	■	12	90	75	FHB II-S M 12 x 75	10
FHB II-P F 16 x 95	**500549**	9	■	16	110	95	FHB II-S M 16 x 95	10
FHB II-P F 24 x 170	**500550**	2	■	25	190	170	FHB II-S M 24 x 170	4
FHB II-P F 8 x 60	**500542**	6	■	10	75	60	FHB II-A L M 8 x 60	10
FHB II-P F 10 x 95	**500543**	7	■	12	110	95	FHB II-A L M 10 x 95	10
FHB II-P F 12 x 120	**500544**	4	■	14	135	120	FHB II-A L M 12 x 120	10
FHB II-P F 16 x 160	**500545**	1	■	18	175	160	FHB II-A L M 16 x 160	10
FHB II-P F 20 x 210	**500546**	8	■	25	235	210	FHB II-A L M 20 x 210	4

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

Injection mortar **FIS HB 150 C**

Type		Art.-No.	ID	approval	contents	languages on the lable	contents	qty. per box
				ETA				
					[ml]		[scale units]	pcs.
FIS HB 345 S	1)	**33211**	5	■	345	D, GB, F, E, NL, CZ	180	6
FIS HB 150 C	1)	**77529**	5	■	145	D, GB, F, E, NL, CZ	70	6
FIS S		**61223**	1	-	-		-	10

1) Incl. 2 static mixer per cartridge.



2 Min. Cure time at 21°C+

FILLING QUANTITIES AND CURING TIME

Filling quantities

Type	**Drill diameter** [mm]	**Drill-hole depth** [mm]	**Filling quantities in scale units on the cartidge lables' corresponding scale**
FHB II-A S M10 x 60	10	75	3
FHB II-A S M12 x 75	12	90	4
FHB II-A S M16 x 95	16	110	8
FHB II-A S M24 x 170	25	190	26
FHB II-A L M8 x 60	10	75	3
FHB II-A L M10 x 95	12	110	5
FHB II-A L M12 x 120	14	135	7
FHB II-A L M16 x 160	18	175	13
FHB II-A L M20 x 210	25	235	33

Highbond anchor FHB II

FILLING QUANTITIES AND CURING TIME

Curing time of the Injection mortar

Cartridge temperature (Mortar mind. + 5°C)	Gelling time	Temperature at anchoring base	Curing time
		- 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.

Curing time of the resin capsule FHB II-P

Temperature at anchoring base	Curing time
- 5°C - ± 0°C	240 min.
± 0°C - + 10°C	45 min.
+ 10°C - + 20°C	20 min.
≧ + 20°C	10 min.

Curing time of the resin capsule FHB II-P F

Temperature at anchoring base	Curing time
- 5°C - - 1°C	8 min.
0°C - + 9°C	6 min.
+ 10°C - + 20°C	4 min.
≧ + 20°C	2 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

Cleaning brush for concrete **BS**

Type	Art.-No.	ID	for drill-Ø [mm]	brush-Ø [mm]	fits	qty. per box pcs.
BS ø 8	**78177**	-	8	9	FHB II-A L M8 x 60	1
BS ø 10	**78178**	4	10	11	FHB II-A L M 80 x 60, FHB II-A S M 10 x 60	1
BS ø 12	**78179**	1	12	13	FHB II-A L M 10 x 95, FHB II-A S M 12 x 75	1
BS ø 14	**78180**	7	14	16	FHB II-A L M 12 x 120, FHB-A dyn M12	1
BS ø 16/18	**78181**	4	16/18	20	FHB II-A L M 16 x 160, FHB II-A S M 16 x 95, FHB-A dyn M20	1
BS ø 24	**78182**	1	24	26	FHB-A dyn M20	1
BS ø 25	**97806**	1	25	27	FHB II-A L M 20 x 210, FHB II-A S M 24 x 175	1
BS ø 28	**78183**	8	28	30	FHB-A dyn M24	1

Compressed-air cleaning gun **ABP**

Centring wedge

Type	Art.-No.	ID	qty. per box pcs.
ABP	**59456**	8	suitable for M 20 - M 24	1
Centring wedge	**93076**	2		10

Push-through element, stainless steel A4

Type	Art.-No.	ID	approval ■ ETA	min. - max. usable length t_{fix} [mm]	thread M	qty. per box pcs.
Push-through element M 8 x 3 A4	**78230**	9	■	3 - 6	M 8	10
Push-through element M 10 x 3 A4	**78231**	6	■	3 - 6	M 10	10
Push-through element M 10 x 8 A4	**78232**	3	■	8 - 16	M 10	10
Push-through element M 12 x 4 A4	**78233**	0	■	4 - 8	M 12	10
Push-through element M 12 x 10 A4	**78234**	7	■	10 - 20	M 12	10
Push-through element M 16 x 5 A4	**78235**	4	■	5 - 10	M 16	10
Push-through element M 16 x 10 A4	**78236**	1	■	10 - 20	M 16	10

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LOADS

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Highbond anchor FHB II with large axial spacing and edge distance

					Non-cracked concrete								
Anchor size					**M 8 x 60**	**M 10 x 60**	**M 10 x 95**	**M 12 x 75**	**M 12 x 120**	**M 16 x 95**	**M 16 x 160**	**M 20 x 210**	**M 24 x 170**
Type of anchor					**A L**	**A S**	**A L**	**A S**	**A L**	**A S**	**A L**	**A L**	**A S**
Effective anchorage depth		h_{ef}	[mm]		**60**	**60**	**95**	**75**	**120**	**95**	**160**	**210**	**170**
Drill hole depth		$h_0 \geq$	[mm]		75	75	110	90	135	110	175	235	190
Drill hole diameter		d_0	[mm]		10	10	12	12	14	16	18	25	25
Mean ultimate loads N_u and V_u [kN]													
Tensile	0°	N_u	[kN]	gvz/A4/C	21.9*	21.9*	34.4*	34.4*	49.8*	61.1*	96.6*	137.6*	128.5*
Shear	90°	V_u	[kN]	gvz	15.0*	21.3*	24.9*	29.8*	42.4*	61.6*	72.6*	116.1*	127.1*
			[kN]	A4	21.4*	26.9*	32.9*	39.1*	49.0*	77.9*	89.2*	133.4*	151.6*
			[kN]	C	20.5*	30.2*	33.9*	43.8*	48.8*	85.8*	91.7*	148.4*	175.7*
Design loads N_{Rd} and V_{Rd} [kN]													
Tensile	0°	N_u	[kN]	gvz/A4/C	14.6	14.6	22.9	21.8	33.2	31.1	64.4	91.7	74.5
Shear	90°	V_u	[kN]	gvz	10.6	15.0	16.6	21.8	24.2	40.6	45.0	70.3	91.4
			[kN]	A4	11.7	18.6	18.6	27.0	27.0	50.2	50.2	78.3	99.6
			[kN]	C	11.7	18.6	18.6	27.0	27.0	50.2	50.2	78.3	112.8
Recommended loads N_{rec} and V_{rec} [kN]													
Tensile	0°	N_{rec}	[kN]	gvz/A4/C	10.4	10.4	16.4	15.6	23.7	22.2	46.0	65.5	53.2
Shear	90°	V_{rec}	[kN]	gvz	7.5	10.7	11.9	15.6	17.3	29.0	32.2	50.2	65.3
			[kN]	A4	8.3	13.3	13.3	19.3	19.3	35.8	35.8	55.9	71.1
			[kN]	C	8.3	13.3	13.3	19.3	19.3	35.8	35.8	55.9	80.6
Recommended bending moment M_{rec} [Nm]													
		M_{rec}	[Nm]	gvz/A4/C	17.1	34.3	34.3	60.0	60.0	152.0	152.0	296.6	513.1
Component dimensions, minimum axial spacings and edge distances													
Min. axial spacing[1)]		s_{min}	[mm]		40	40	40	40	50	50	70	90	80
Min. edge distance[1)]		c_{min}	[mm]		40	40	40	40	50	50	70	90	80
Min. structural component thickness		h_{min}	[mm]		100	100	140	120	170	150	220	280	240
Clearance-hole in fixture to be attached		d_f	[mm]		9	12	12	14	14	18	18	22	26
Required torque		T_{inst}	[Nm]		15	15	20	30	40	50	60	100	100

					Cracked concrete								
Anchor size					**M 8 x 60**	**M 10 x 60**	**M 10 x 95**	**M 12 x 75**	**M 12 x 120**	**M 16 x 95**	**M 16 x 160**	**M 20 x 210**	**M 24 x 170**
Type of anchor					**A L**	**A S**	**A L**	**A S**	**A L**	**A S**	**A L**	**A L**	**A S**
Effective anchorage depth		h_{ef}	[mm]		**60**	**60**	**95**	**75**	**120**	**95**	**160**	**210**	**170**
Drill hole depth		$h_0 \geq$	[mm]		75	75	110	90	135	110	175	235	190
Drill hole diameter		d_0	[mm]		10	10	12	12	14	16	18	25	25
Mean ultimate loads N_u and V_u [kN]													
Tensile	0°	N_u	[kN]	gvz/A4/C	19.6	21.9*	34.4*	30.7	49.8*	43.8	95.6	137.6*	104.7
Shear	90°	V_u	[kN]	gvz	15.0*	21.3*	24.9*	29.8*	42.4*	61.6*	72.6*	116.1*	127.1*
			[kN]	A4	21.4*	26.9*	32.9*	39.1*	49.0*	77.9*	89.2*	133.4*	151.6*
			[kN]	C	20.5*	30.2*	33.9*	43.8*	48.8*	85.8*	91.7*	148.4*	175.7*
Design loads N_{Rd} and V_{Rd} [kN]													
Tensile	0°	N_u	[kN]	gvz/A4/C	11.2	11.2	22.2	15.6	31.5	22.2	48.6	73.0	53.2
Shear	90°	V_u	[kN]	gvz	10.6	15.0	16.6	21.8	24.2	40.6	45.0	70.3	91.4
			[kN]	A4	11.7	18.6	18.6	27.0	27.0	44.4	50.2	78.3	99.6
			[kN]	C	11.7	18.6	18.6	27.0	27.0	44.4	50.2	78.3	106.4
Recommended loads N_{rec} and V_{rec} [kN]													
Tensile	0°	N_{rec}	[kN]	gvz/A4/C	8.0	8.0	15.9	11.1	22.5	15.9	34.7	52.2	38.0
Shear	90°	V_{rec}	[kN]	gvz	7.5	10.7	11.9	15.6	17.3	29.0	32.2	50.2	65.3
			[kN]	A4	8.3	13.3	13.3	19.3	19.3	31.7	35.8	55.9	71.1
			[kN]	C	8.3	13.3	13.3	19.3	19.3	31.7	35.8	55.9	76.0
Recommended bending moment M_{rec} [Nm]													
		M_{rec}	[Nm]	gvz/A4/C	17.1	34.3	34.3	60.0	60.0	152.0	152.0	296.6	513.1
Component dimensions, minimum axial spacings and edge distances													
Min. axial spacing[1)]		s_{min}	[mm]		40	40	40	40	50	50	70	90	80
Min. edge distance[1)]		c_{min}	[mm]		40	40	40	40	50	50	70	90	80
Min. structural component thickness		h_{min}	[mm]		100	100	140	120	170	150	220	280	240
Clearance-hole in fixture to be attached		d_f	[mm]		9	12	12	14	14	18	18	22	26
Required torque		T_{inst}	[Nm]		15	15	20	30	40	50	60	100	100

* steel failure

[1)] For min. axial spacing and min. edge distance the above described loads have to be reduced! (See "Technical Handbook" or design software "CC-Compufix")

All values apply for concrete C 20/25 without edge or spacing influence.

Design loads: material safety factor γ_M is included. Material safety factor γ_M depends on type of anchor.

Recommended loads: material safety factor γ_M and safety factor for load γ_L = 1.4 are included.

Highbond anchor dynamic FHB dyn

The new performance class amongst dynamic anchors.

OVERVIEW

Highbond anchor dynamic **FHB-A dyn**

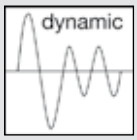
Highbond anchor dynamic **FHB-A dyn V**

Injection mortar **FIS HB 150 C**

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

Approved for:
- Cracked and non-cracked concrete ≥ C20/25 and maximum C50/60

For fixing of:
- Swinging cranes
- Rails for elevators
- Steel ventilators
- Bridges for traffic signs
- Antennas
- Machines e.g. welding robots, etc.

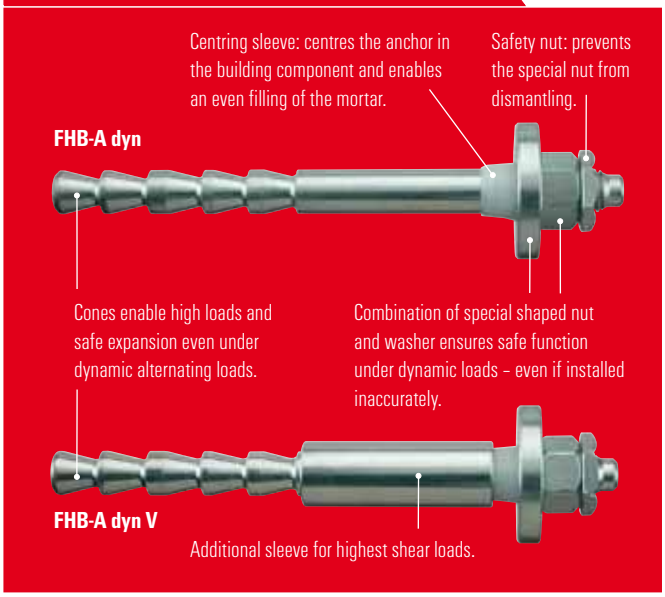


DESCRIPTION

- The injection system suitable for cracked concrete consists of a fischer Highbond dynamic anchor stud and Injection mortar FIS HB.
- The FIS HB injection mortar is a high-strength 2-component vinyl ester mortar.
- When ejected by using the special injection gun (see pages 45), the two components are mixed together and activated in the static mixer.
- Partially used cartridges can be re-used, simply by changing the static mixer.
- The mortar bonds the entire surface of the anchor rod to the wall of the drilled hole and largely seals the hole.
- Anchor rod FHB-C made of highly corrosion-resistant steel C (material no. 1.4529) for outdoor use, in damp conditions and in high chloride atmospheres, e.g. tunnels.

Advantages/Benefits
- Use in applications with dynamic alternating loads.
- Conventional setting method as with the Injection system FIS HB.
- Simple push-through installation for optimum handling.
- Reliable controlled expansion into cracked concrete due to conical shape of the anchor rod.
- Low-expansion function allows cost-efficient fixing with small axial spacings and edge distances.
- The FHB-A dyn V anchor rod has the same properties as the FHB-A dyn anchor rod but is optimised for shear forces.
- The FIS HB mortar fills in the annular gap in the attached item during setting, thereby ensuring optimal load distribution and the capability to take dynamic alternating loads.

FHB DYN - ADVANTAGES AT A GLANCE



FIXING PRINCIPLES
In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

STANDARDS
You will find everything that has standards on page 313 under the keyword approvals.

INSTALLATION

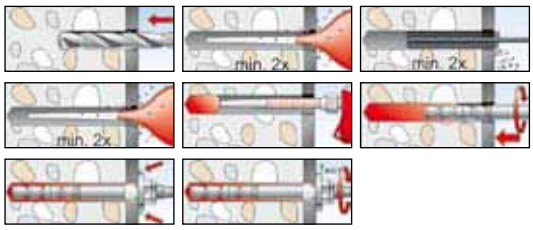
Type of installation

- Push-through installation

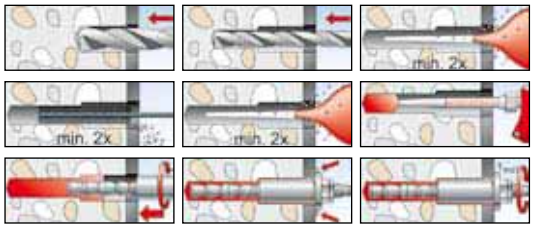
Installation tips

- With FHB-A dyn 20 and 24, blow out the drilled hole with compressed air (see page 32)
- Brush BS and Compressed-air cleaning gun ABP see page 32.

Highbond anchor dynamic FHB-A dyn



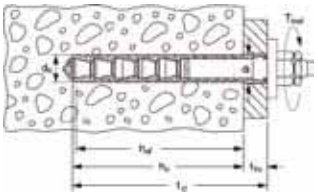
Highbond anchor dynamic FHB-A dyn V



TECHNICAL DATA

Highbond anchor dynamic
FHB-A dyn

Type	Art.-No.	ID	approval	drill-Ø	drill hole depth	anchorage depth	min. - max. usable length	drill-hole diameter in object	width across nut	qty. per box
			● DIBt	d_0		h_{ef}	t_{fix}	d_f	○ SW	
				[mm]	[mm]	[mm]	[mm]	[Ø mm]		pcs.
FHB-A dyn 12 x 100/25	**92018**	3	●	14	130	100	8 - 25	15	19	10
FHB-A dyn 12 x 100/50	**92019**	0	●	14	155	100	8 - 50	15	19	10
FHB-A dyn 16 x 125/25	**92020**	6	●	18	155	125	10 - 25	19	24	10
FHB-A dyn 16 x 125/50	**92036**	7	●	18	180	125	10 - 50	19	24	10
FHB-A dyn 20 x 170/50	**92037**	4	●	24	225	170	12 - 50	25	30	10
FHB-A dyn 24 x 220/50	**92038**	1	●	28	275	220	14 - 50	29	36	5



Highbond anchor dynamic
FHB-A dyn V

Type	Art.-No.	ID	approval	drill-Ø	drill hole depth	anchorage depth	min. - max. usable length	drill-hole diameter in object	width across nut	qty. per box
			● DIBt	d_0		h_{ef}	t_{fix}	d_f	○ SW	
				[mm]	[mm]	[mm]	[mm]	[Ø mm]		pcs.
FHB-A dyn 12 x 100/50 V	**92039**	8	●	20[1)] 14[2)]	85[1)] 160[2)]	105	8 - 50	21	19	10
FHB-A dyn 16 x 125/50 V	**92040**	4	●	28[1)] 18[2)]	100[1)] 185[2)]	130	10 - 50	29	24	10

1) Stepped drill hole 1
2) Stepped drill hole 2

Highbond anchor dynamic
FHB-A dyn C highly corrosion-resistant steel 1.4529

Type	Art.-No.	ID	approval	drill	drill hole depth	anchorage depth	min. - max. usable length	drill-hole diameter in object	width across nut	qty. per box
			● DIBt	d_0		h_{ef}	t_{fix}	d_f	○ SW	
				[mm]	[mm]	[mm]	[mm]	[Ø mm]		pcs.
FHB-A dyn 16 x 125/50 C	**93445**	6	●	18	180	125	10 - 25	19	24	10

FIRE PREVENTION

Red hot: You will find fire prevention information on page 308.

CORROSION

Rust prevention tips: Everything you need to know about corrosion and how to prevent it is on page 309.

Highbond anchor dynamic FHB dyn

TECHNICAL DATA

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

Injection mortar **FIS HB 150 C**

Type		Art.-No.	ID	approval DIBt	contents [ml]	languages on the lable	contents [scale units]	qty. per box pcs.
FIS HB 345 S	1)	**33211**	5	●	345	D, GB, F, E, NL, CZ	180	6
FIS HB 150 C	1)	**77529**	5	●	145	D, GB, F, E, NL, CZ	70	6
FIS S		**61223**	1		-		-	10

1) incl. 2 static mixer per cartridge.

FILLING QUANTITIES AND CURING TIME

Filling quantities

Type	Filling quantities in scale units on the cartridge labels ´ corresponding scale
FHB-A dyn 12 x 100 / 25	7
FHB-A dyn 12 x 100 / 50	8
FHB-A dyn 16 x 125 / 25	9
FHB-A dyn 16 x 125 / 50	10
FHB-A dyn 20 x 170 / 50	23
FHB-A dyn 24 x 220 / 50	38
FHB-A dyn 12 x 100 / 50 V	12
FHB-A dyn 16 x 125 / 50 V	20

Curing times see page 31.

LOADS

Mean ultimate loads and recommended loads for single anchors of fischer Highbond-Anchor dynamic FHB dyn with large axial spacing and edge distance.

					Non-cracked concrete						Cracked concrete					
Anchor size					**FHB dyn 12 x 100**	**FHB dyn 12 x 100 V**	**FHB dyn 16 x 125**	**FHB dyn 16 x 125 V**	**FHB dyn 20 x 170**	**FHB dyn 24 x 220**	**FHB dyn 12 x 100**	**FHB dyn 12 x 100 V**	**FHB dyn 16 x 125**	**FHB dyn 16 x 125 V**	**FHB dyn 20 x 170**	**FHB dyn 24 x 220**
Effektive anchorage depth		h_{ef}	[mm]		100	105	125	130	170	220	100	105	125	130	170	220
Drill hole depth		$h_0 \geqq$	[mm]		105	110	130	135	175	225	105	110	130	135	175	225
Drill hole diameter		d_0	[mm]		14	14	18	18	24	28	14	14	18	18	24	28
Mean ultimate loads N_u and V_u [kN]																
Tensile [1]	0°	N_u	[kN]	gvz	23.1	23.1	35.0	35.0	46.0	46.0	20.7	20.7	35.0	35.0	46.0	46.0
Shear [1]	90°	V_u	[kN]	gvz	10.8	15.0	21.0	26.0	26.5	36.5	10.8	15.0	21.0	26.0	26.5	36.5
Recommended loads ΔN_{rec} and ΔV_{rec} [kN] as a single fixing																
Tensile [1]	0°	N_{rec}	[kN]	gvz	13.6	13.6	19.8	19.8	23.5	28.9	11.7	11.7	19.8	19.8	23.5	28.9
			[kN]	C	–	–	15.6	–	–	–	–	–	15.6	–	–	–
Shear [1]	90°	V_{rec}	[kN]	gvz/C	6.7	9.6	11.9	17.0	17.0	22.2	6.7	9.6	11.9	17.0	17.0	22.2
Recommended loads ΔN_{rec} and ΔV_{rec} [kN] in a group																
Tensile	0°	N_{rec}	[kN]	gvz	10.9	10.9	15.8	15.8	18.8	23.1	9.4	9.4	15.8	15.8	18.8	23.1
			[kN]	C	–	–	12.4	–	–	–	–	–	12.4	–	–	–
Shear	90°	V_{rec}	[kN]	gvz/C	5.1	7.4	9.1	13.1	13.1	17.1	5.1	7.4	9.1	13.1	13.1	17.1
Component dimensions, minimum axial spacings and edge distances																
Min. axial spacing [2]		s_{min}	[mm]		100	100	100	100	150	180	100	100	100	100	150	180
Min. edge distance [2]		c_{min}	[mm]		100	100	100	100	150	180	100	100	100	100	150	180
Min. structural component thickness		h_{min}	[mm]		200	200	250	250	340	440	200	200	250	250	340	440
Clearance hole in fixture to be attached		d_f	[mm]		15	21	19	29	25	29	15	21	19	29	25	29
Required torque		T_{inst}	[Nm]		40	40	60	60	100	120	40	40	60	60	100	120

[1] The recommended loads are valid for the whole amplitude for more than 2 x 10^6 load cycles.

[2] For min. axial spacing and min. edge distance the above described loads have to be reduced! (see design software "CC-Compufix")

All load values apply for concrete C 20/25 without edge or spacing influence.

Recommended loads: material safety factor γ_M and safety factor for load γ_L = 1.0 for single fixings and 1.25 for groups under tension load and 1.3 for groups under shear load are included.

Material safety factor γ_M depends on type of anchor.

The conditions of application differ from those given in the German Approval. For further detailed information about the German Approval please contact the fischer technical service department.

FIRE PREVENTION

Red hot: You will find fire prevention information on page 308.

CORROSION

Rust prevention tips: Everything you need to know about corrosion and how to prevent it is on page 309.

Injection mortar FIS V

The high-performance hybrid mortar in the shuttle cartridge.

OVERVIEW

Injection mortar **FIS V 360 S**, styrene free

Static mixer **FIS S**

Injection mortar **FIS V 950 S**, styrene free

Approvals:

- European Technical Approval Option 7 in conjunction with Threaded rods FIS A resp. RG M for non-cracked concrete.
- German approval (DIBt) in conjunction with injection anchor sleeve FIS H M and injection anchor parts FIS G and FIS E for solid and hollow bricks (solid brick also without anchor sleeve).
- German approval (DIBt) for aerated cement in conjunction with cone drill PBB, centering sleeve PBZ and Threaded rod FIS G.
- German approval (DIBt) for reinforcement bars.
- German approval (DIBt) for Remedial wall tie VBS 8.
- German approval (DIBt) for Weather facing renovation system FWS.
- ICC-Approval for threaded rods and rebars

WRAS APPROVED PRODUCT

For fixing of:

- Steel constructions
- Railings
- Hand-rails
- Consoles
- Ladders
- Machines
- Cable trays
- Staircases
- Gates
- Facades
- Window elements
- High racks
- Canopies
- Stand-off installations

For load data see page 54

DESCRIPTION

- Styrene-free, quick-curing high-performance hybrid mortar (contains vinyl ester resin and cement).
- Resin and cement as well as water and hardener are stored in two separate chambers and are not mixed and activated until pushed through the static mixer.
- Partially-used cartridges can easily be reused by changing the static mixer.

Advantages/Benefits

- High-performance hybrid mortar for high loads in almost all building materials.
- Universal fixing system for a broad range of applications on building sites.
- Expansion-free anchoring allows low axial spacings and edge distances.
- Extensive range of accessories for a wide variety of applications.
- Ergonomic injection guns for quick and easy installation.
- A variety of approvals cover many applications in nearly all building material and guarantee maximum safety.
- First injection system world-wide with approvals for concrete, reinforcement bars, solid bricks, perforated bricks and aircrete.

Accessories / Recommended loads

- For fixing in concrete
- For fixing in masonry
- For fixing in aerated concrete
- For reinforcement bars
- Appropriate injection guns

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

STANDARDS

You will find everything that has standards on page 313 under the keyword approvals.

TECHNICAL DATA

Injection mortar **FIS V 360 S**, styrene free

Injection mortar **FIS V 950 S**, styrene free

Type	Art.-No.	ID	approvals ● DIBt ■ ETA		contents	languages on the lable	shelf life	qty. per box
							months	pcs.
FIS V 360 S	**94405**	9	●	■	1 cartridge 360 ml + 2 static mixer	-	18	6
FIS V 950 S	**17101**	1	●	■	1 cartridge 950 ml + 2 static mixer	D, GB, F, NL, I, E, P, JP, PRC	18	6
FIS S	**61223**	1			10 static mixer FIS V 360 S	-	-	10

FIS V 360 S HWK big

FIS V 360 S HWK small

Type	Art.-No.	ID	contents	languages on the lable	qty. per box
					pcs.
FIS V 360 S HWK big	**96554**	2	20 x FIS V 360 S cartridges + 360 ml/560 g, 40 x static mixers	D, GB, F, NL,	-
FIS V 360 S HWK small	**92430**	3	10 x FIS V 360 S cartridges + 360 ml/560 g, 20 x static mixers	D, GB, F, NL,	-

CURING TIME

Gelling and curing time of fischer FIS V

Cartridge temperature (mortar)	**Gelling time**	**Temperature at anchoring base**	**Curing time**
		- 5°C – ± 0°C	24 hrs.
		± 0°C – + 5°C	3 hrs.
+ 5°C – + 10°C	13 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.

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Injection mortar FIS VW - Winter Resin

The high-performance hybrid mortar in the shuttle cartridge.

OVERVIEW

Injection mortar
FIS VW,
styrene free

Express cure resin at very low temps ie. can be installed at -15°C!

Approvals:

European Technical Approval-
Option 7 for non-cracked concrete

For fixing of:

- Steel constructions
- Railings
- Hand-rails
- Consoles
- Ladders
- Machines
- Cable trays
- Staircases
- Gates
- Facades
- Window elements
- High racks
- Canopies
- Stand-off installations

For load data see page 54

DESCRIPTION

- Styrene-free, quick-curing high-performance hybrid mortar (contains vinyl ester resin and cement).
- Resin and cement as well as water and hardener are stored in two separate chambers and are not mixed and activated until pushed through the static mixer.
- Partially-used cartridges can easily be reused by changing the static mixer.

Advantages/Benefits

- High-performance hybrid mortar for high loads in almost all building materials.
- Universal fixing system for a broad range of applications on building sites.
- Expansion-free anchoring allows low axial spacings and edge distances.
- Extensive range of accessories for a wide variety of applications.
- Ergonomic injection guns for quick and easy installation.
- A variety of approvals cover many applications in nearly all building material and guarantee maximum safety.
- The mortar can be used up to a anchor temperature of -15°C and a cartridge temperature of 0°C.

TECHNICAL DATA

Injection mortar **FIS VW 360 S**,
styrene free

Type	Art.-No.	ID	approvals ● DIBt ■ ETA	contents	languages on the lable	shelf life months	qty. per box pcs.
FIS VW 360	**90753**			1 cartridge 360 ml + 2 static mixer	D, GB, I, F, NL, E	12	6
FIS S	**61223**	1		10 static mixer FIS V 360 S	-	-	10

CURING TIME

Gelling and curing time of fischer FIS VW

Cartridge temperature (mortar)	Curing time (FIS V comparison)	Setting time (FIS V comparison)
-15°C to -10°C	12 h (-)	
-10°C to -5°C	8 h (-)	
-5°C to 0°C	3 h (24 h)	
0°C to +5°C	90 min (3 h)	5 min (-)
+5°C to +10°C	45 min (90 min)	3 min (13 min)
+10°C to +20°C	30 min (60 min)	1 min (5 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 +0°C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

STANDARDS

You will find everything that has standards on page 313 under the keyword approvals.

Injection mortar FIS VS

The expansion-free resin anchorage for small applications.

OVERVIEW

Injection mortar **FIS VS** with static mixer

Power-Injection **FIS VS 100 P**

Suitable for:

- Non-cracked concrete
- Prestressed hollow-core concrete slabs
- Solid brick
- Solid sand-lime brick
- Solid block made from lightweight concrete
- Aerated concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Slabs made of bricks, concrete blocks, etc.
- Hollow blocks
- Porous lightweight concrete

European Technical Approval-Option 7 for non-cracked concrete

- Ladders
- Cable trays
- Machines
- Awnings
- Staircases
- High-racks
- Gates
- Facades
- Window elements
- high racks
- Canopies
- Stand-off installations

For fixing of:

- Steel constructions
- Railings
- Hand-rails
- Consoles

For load data see page 54

DESCRIPTION

- Styrene-free, quick-curing high-performance hybrid mortar (contains vinyl ester resin and cement) in a shuttle cartridge for concrete and masonry.
- FIS VS 100 P is fitted with a screw-in plunger and ejected by hand.
- FIS VS 150 C can be extruded by using an application gun for sealants.
- Specially designed with longer gelling time and lower application pressure.
- Resin and cement as well as water and hardener are stored in two separate chambers and are not mixed and activated until pushed through the static mixer.
- Partially-used cartridges can easily be re-used by changing the static mixer.

Accessories

- For fixing in concrete
- For fixing in masonry
- For fixing in aerated cement

Advantages/Benefits

- High-performance hybrid mortar for highest loads in almost all building materials.
- Suitable for use with reinforcement bars.Universal fixing system for a broad range of applications on building sites.
- Longer gelling time for simple installation and for high ambient temperatures.
- Expansion-free anchoring allows low axial spacings and edge distances.
- Extensive range of accessories for a wide variety of applications.
- Using application guns for sealants saves money (FIS VS 150 C and FIS VS 300 T)

INSTALLATION

Installation tips

- Before using the mortar, the instruction sheet needs to be read carefully.
- For fixings in solid building materials, the drill-hole needs to be cleaned thoroughly.
- If there is a damp drill-hole during installation, the load bearing capacity might be reduced.

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303

TECHNICAL DATA

Injection mortar
FIS VS 150 C

Power-Injection
FIS VS 100 P

Heavy-duty fixing set
SBS-Set

Type		Art.-No.	ID		languages on the lable	contents [scale units]	contents	qty. per box pcs.
FIS VS 150 C	1)	**45302**	5			70	1 Injection mortar cartridge FIS VS 150 C + 2 static mixer	6
FIS VS 100 P	1)	**72525**	2			50	1 cartridge FIS VS 100 P + 2 static mixer	6
FIS VS 300 T SBS	1)	**97807**	8		D	150	1 cartridge FIS VS 300 T + 6 threaded rods M 10 x 160 gvz + 6 injection anchor sleeve FIS H 16 x 130 + 2 static mixer	5
FIS S		**61223**	1		-	-	10 static mixer	10

1) styrene free

CURING TIME

Gelling and curring time of fischer FIS VS

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	120 min.
+ 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.

Injection mortar FIS VT 380 C

The expansion-free anchoring in the coaxial cartridge based on vinyl ester resin.

OVERVIEW

Injection mortar
FIS VT 380 C

European Technical Approval-
Option 7 for non-cracked concrete

Suitable for:
- Non-cracked concrete
- Prestressed hollow-core concrete slabs
- Solid brick
- Solid sand-lime brick
- Solid block made from lightweigth concrete
- Autoclaved lightweight concrete, aircrete
- Vertically perforated brick
- Perforated sand-lime brick
- Slabs made of bricks, concrete blocks, etc.
- Hollow blocks
- No fines lightweight concrete

For fixing of:
- Steel constructions
- Railings
- Hand-rails,
- Consoles,
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Facades
- Window elements
- High racks
- Canopies
- Stand-off installations

For load data see page 56

DESCRIPTION

- Styrene-free, quick-curing vinyl ester resin in the coaxial cartridge for concrete and masonry.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until pushed through the static mixer.
- Partially used cartridges can easily be reused by changing the static mixer.

Recommended loads

- for fixing in non-cracked concrete with the FIS A or RG M threaded rod, the loads are about 10% lower than with the FIS V injection mortar
- for fixing in masonry
- for fixing in aerated cement

Advantages/Benefits

- Good performance in almost all building materials.
- Universal fixing system for a broad range of applications on building sites.
- Expansion-free anchoring allows low axial spacing and edge distances.
- Extensive range of accessories for a wide variety of applications.

Accessories

- for fixing in concrete
- for fixing in masonry
- for fixing in aerated cement

TECHNICAL DATA

Injection mortar
FIS VT 380 C

Type	Art.-No.	ID	languages on the label	contents	qty. per box pcs.
FIS VT 380 C	**59118**	5	GB, I, P, E, PRC, JP	1 Injection mortar cartridge 380 ml + 1 static mixer	12
FIS S	**61223**	1	-	10 static mixer FIS V 360 S	10

CURING TIME

Gelling and curing time of fischer FIS VT 380 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 – + 10°C	13 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	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.

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303

Injection mortar FIS P

The expansion-free polyester resin anchoring sytem for masonry.

OVERVIEW

Injection mortar
FIP 300 SF
Styrene Free

Injection mortar
FIS P 380 C
Styrene Free

Injection mortar
FIP C 700
Styrene Free

Suitable for:
- Solid brick
- Solid sand-lime brick
- Solid block made from lightweight concrete
- Autoclaved lightweight concrete, aircrete
- Vertically perforated brick
- Perforated sand-lime brick
- Hollow blocks
- Concrete

For fixing of:
- Steel constructions
- Railings
- Hand-rails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Facades
- Window elements
- High racks
- Canopies
- Stand-off installations

* Non critical applications

DESCRIPTION

- Styrene-free polyester resins for fixings into masonry building materials.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until pushed through the static mixer.
- Partially-used cartridges can easily be reused by changing the static mixer.
- FIP 300 SF can be extruded by using a **conventional** application gun.
- FIS P 380 C in coaxial cartridge is extruded by using the **2 component FIPC applicator gun**.
- FIPC 700 F-bond can be extruded using the **2 component FIPC applicator gun**.

Advantages/Benefits

- Well performance in masonry building materials.
- Expansion-free anchoring. allows low axial spacing and edge distances.
- Extensive range of accessories for a wide variety of applications.

Accessories

- for fixing in masonry
- for fixing in aerated cement

Recommended loads

- for fixing in masonry
- for fixing in aerated cement

TECHNICAL DATA

Injection mortar
FIP 300 SF,
styrene free

Injection mortar
FIP C 700,
styrene free

Injection mortar
FIS P 380 C,
styrene free

Type	Art.-No.	ID	contents	qty. per box pcs.
FIP 300 SF	**98184**	2	1 cartridge 300 ml + 1 static mixer	6
FIS P 380 C	**59234**	2	1 cartridge 380 ml + 1 static mixer	6
FIP C 700	**98183**	-	1 cartridge 400 ml + 1 static mixer	12
FIS S	**61223**	1	10 static mixer	10

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303

Injection mortar FIS P

CURING TIME

Gelling and curing time of fischer FIP 300 SF

Cartridge temperature (mortar)	Gelling time	Temperature at anchor base	Curing time
5°C	15 - 30 min.	5°C	180 min.
10°C	10 - 20 min.	10°C	120 min.
20°C	5 - 10 min.	20°C	60 min.
30°C	3 - 6 min.	30°C	45 min.

Gelling and curing time of fischer FISP 380 C

Cartridge temperature (mortar)	Gelling time	Temperature at anchor base	Curing time
-	-	-5°C	360 min.
-	-	0°C	180 min.
5°C	13 min.	5°C	90 min.
10°C	9 min.	10°C	45 min.
20°C	5 min.	20°C	30 min.
30°C	4 min.	30°C	25 min.

Gelling and curing time of fischer FIP C 700

Cartridge temperature (mortar)	Gelling time	Temperature at anchor base	Curing time
5°C	15 - 30 min.	5°C	180 min.
10°C	10 - 20 min.	10°C	120 min.
20°C	5 - 10 min.	20°C	60 min.
25°C	3½ - 7 min.	25°C	28 min.
30°C	3 - 6 min.	30°C	45 min.

LOADS

Recommended loads for fischer FIP 300 SF

Description / Size		Concrete Strength	M8	M10	M12	M16	M20	M24
Recommended tensile load $N_{rec.}$ [1]	(kN)	30N/mm²	5.0	8.2	10.4	14.7	21.6	26.8
Characteristic axial spacing	$S_{cr} \geq$	mm	80	90	110	125	170	210
Characteristic edge spacing	$C_{cr} \geq$	mm	120	135	165	190	255	315
Maximum torque	T_{inst}	Nm	10	20	40	80	150	200

[1] Recommended N_{rec} applicable only when the specified edge and axial spacing are maintained.
[2] All tests were performed using grade 8.8 studs. All concrete was in dry condition and holes were thoroughly cleaned as per our installation recommendation.
Concrete strength were determined using 100mm cubes.

Recommended loads for fischer FIP 380 C

Description / Size		Concrete Strength	M8	M10	M12	M16	M20	M24
Recommended tensile load $N_{rec.}$ [1]	(kN)	25N/mm²	4.2	6.3	8.6	12.0	18.8	24.0
Characteristic axial spacing	$S_{cr} \geq$	mm	80	90	110	125	170	210
Characteristic edge spacing	$C_{cr} \geq$	mm	120	135	165	190	255	315
Maximum torque	T_{inst}	Nm	10	20	40	80	150	200

[1] Recommended N_{rec} applicable only when the specified edge and axial spacing are maintained.
[2] All tests were performed using grade 5.8 studs. All concrete was in dry condition and holes were thoroughly cleaned as per our installation recommendation.
Concrete strength were determined using 100mm cubes.

Recommended loads for fischer FIP C 700

			Non-cracked 30N/mm² concrete					
Anchor Size			M8	M10	M12	M16	M20	M24
Recommended load	N_{rec}	kN	4.15	7.70	7.96	12.30	17.81	22.00
Characteristic axial spacing	S_{cr}	mm	160	180	220	250	340	420
Characteristic edge spacing	C_{cr}	mm	80	90	110	125	170	210
Maximum torque	T_{inst}	Nm	10	20	40	80	150	200

The loading figures quoted are for concrete with compressive strength of 30 N/mm².

Application guns / general accessories

TECHNICAL DATA

Application gun **FIS AK**

Type	Art.-No.	ID		adapted for	qty. per box pcs.
FIS AK	**58026**	4		FIS V 360 S, FIS HB, FIS EM 390 S, FIS VS 150 C, FIS VW and Single-component PU foam	1

Application gun **FIS AM**

Type	Art.-No.	ID		adapted for	qty. per box pcs.
FIS AM	**56052**	4		FIS V 360 S, FIS HB, FIS VS 150 C and Single-component PU foam	1

Accu-press gun **FIS AA**

Type	Art.-No.	ID		adapted for	qty. per box pcs.
FIS AA	**30111**	1		incl. case, charger and battery pack adapted for: FIS V 360 S, FIS HB, FIS VS 150 C	1
Charger MSL 60	**37297**	5		-	1
Battery pack	**37296**	8		-	1

Pneumatic gun **FIS AP**

Type	Art.-No.	ID		adapted for	qty. per box pcs.
FIS AP	**58027**	1		FIS V 360 S, FIS HB, FIS VS 150 C and Single-component PU foam	1

Pneumatic gun **FIS AJ**

Pneumatic gun **FIS AJ+**

Type	Art.-No.	ID		adapted for	qty. per box pcs.
FIS AJ	**16251**	4		FIS V 950 S	1
FIS AJ+	**41730**	0		FIS EM 1100 S	1

Application gun **KPM 2**

Type	Art.-No.	ID		adapted for	qty. per box pcs.
KP M 2	**53117**	4		FIS VS 150 C, FIP 300 SF and Single-component PU foam	1

Application guns / general accessories

TECHNICAL DATA

Application gun **FIPC**

Type	Art.-No.	ID	adapted for	qty. per box pcs.
FIPC	**42741**	3	FIP 380 C, FIPC 700	1

Site box **FIS EM**

Site box **FIS**

Type	Art.-No.	ID	contents	qty. per box pcs.
FIPC Site Box 380ml	**42737**	6	1 x Toolbox, 1 x Brush set, 1 x ABK Blow out pump, 1 x **FIPC** Applicator gun, 5 x Static mixers	1
FISV Site Box 360ml	**42740**	4	1 x Toolbox, 1 x Brush set, 1 x ABK Blow out pump, 1 x **FIS AM** Applicator gun, 5 x Static mixers	1
FIS VS / FIP Site Box 150ml / 300ml	**42739**	0	1 x Toolbox, 1 x Brush set, 1 x ABK Blow out pump, 1 x **KPM2** Applicator gun, 5 x Static mixers	1
FIS EM Site Box 360ml	**42738**	-	1 x Toolbox, 1 x Brush set, 1 x ABK Blow out pump, 1 x **FIS AK** Applicator gun, 5 x Static mixers	1

Static mixer **FIS S**

Type	Art.-No.	ID	name	qty. per box pcs.
FIS S	**61223**	1	mixing nozzle	10

FIS Extension tube

Type	Art.-No.	ID	length L [mm]	qty. per box pcs.
FIS Extension tube	**48983**	3	1000	10

Blow-out pump **ABG**

Type	Art.-No.	ID	total length l [mm]	qty. per box pcs.
ABG big	**89300**	5	370	1

ibemo Kazakhstan - 090301 Republic of Kazakhstan, West Kazakhstan Oblast, Aksai, Pramzone, BKKS office complex
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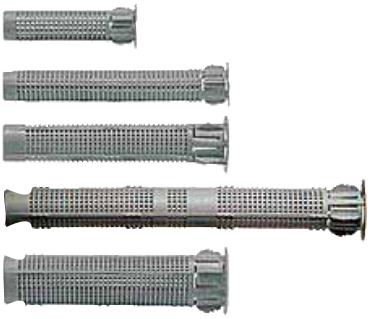
Injection technique for masonry

The expansion-free anchoring for the professional user.

OVERVIEW

Internally threaded sockets **FIS E**



Injection anchor sleeve, plastic **FIS H K**

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

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

Injection anchor sleeve, **FIS E K**

Approval:
- German approval (DIBt) in conjunction with Injection mortar FIS V, FIS H M and FIS G resp. FIS E for solid and hollow material

With anchor sleeve suitable for:
- Vertically 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 bick
- Solid sand-lime bricks
- Full pumice stone and other solid building materials
- Aerated concrete

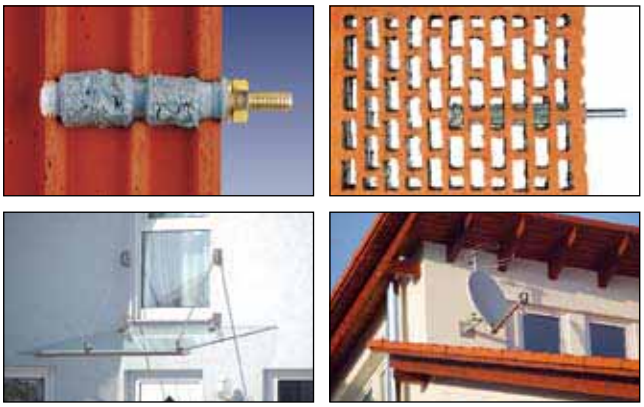
For fixing of:
- Machines
- Gratings
- Gates
- Hand-rails
- Consoles
- Pipelines
- Sanitary equipment
- Cable trays
- Facades
- Awnings
- Canopies
- Wooden constructions

DESCRIPTION

- Injection anchor sleeves, threaded rods and internally-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 / internally-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.
- Threaded rod FIS A made of A4 stainless steel for outdoor use and in damp conditions.

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 axial spacings and edge distances.
- Extensive range for various cost-efficient applications.
- The mortar largely seals the drill-hole.

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

Injection technique for masonry

INSTALLATION

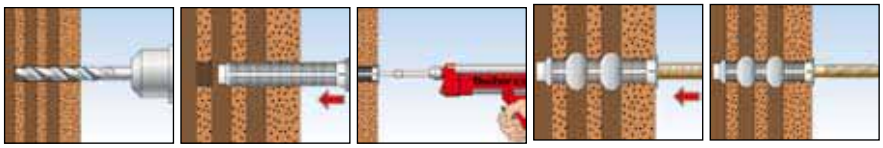
Type of Installation

- Pre-positioned installation

Installation information

- In solid building materials the drill hole must be cleaned thoroughly (blow out 4 x, brush out 4x, blow out 4 x).

in perforated brick with anchor sleeve



in solid materials without anchor sleeve

TECHNICAL DATA

Injection anchor sleeve with net
FIS H N

Type	Art.-No.	ID	drill-Ø d_0 [mm]	min. drill hole depth t [mm]	Min. anchorage depth anchor h_v [mm]	Min. anchorage depth sleeve h_v [mm]	No. of scale divisions on cartridge	fits	qty. per box pcs.
FIS H 16 x 85 N	**50470**	3	16	95	90	85	15	Ø8/M8	20
FIS H 18 x 85 N	**50472**	7	18	95	90	85	17	Ø10/M10/FIS 18/M8 I	20
FIS H 20 x 85 N	**50474**	1	20	95	90	85	19	Ø12/M12/FIS 20/M10 I	20

Injection anchor sleeve, plastic
FIS H K

Type	Art.-No.	ID	drill-Ø d_0 [mm]	min. drill hole depth t [mm]	Min. anchorage depth anchor h_v [mm]	Min. anchorage depth sleeve h_v [mm]	No. of scale divisions on cartridge	fits	qty. per box pcs.
FIS H 12 x 50 K	**41900**	7	12	60	-	-	5	M6 - M8	50
FIS H 12 x 85 K	**41901**	4	12	95	-	-	10	M6 - M8	50
FIS H 16 x 85 K	**41902**	1	16	95	-	-	12	M8 - M12	50
FIS H 16 x 130 K	**41903**	8	16	140	-	-	15	M8 - M12	50
FIS H 20 x 85 K	**41904**	5	20	95	-	-	15	M12 - M16	50
FIS H 20 x 130 K	**46703**	9	20	140	-	-	25	M12 - M16	
FIS H 20 x 200 K	**46704**	6	20	210	-	-	40	M12 - M16	

Injection anchor sleeve, 1 m length
FIS H L

Type	Art.-No.	ID	drill-Ø d_0 [mm]	total length l [mm]	fits	qty. per box pcs.
FIS H 12 x 1000 L	**50598**	4	12	1000	Ø6 / M 6 - Ø8 / M 8	10
FIS H 16 x 1000 L	**50599**	1	16	1000	Ø10/M10-M12	10
FIS H 22 x 1000 L	**45301**	8	22	1000	Ø12/M12 - Ø16/M16	6

TECHNICAL DATA

FIS brush Ø 14/20 mm

FIS brush Ø 20/30 mm

Type	Art.-No.	ID	qty. per box
FIS-brush Ø14/20 mm	**48980**	2	2
FIS-brush Ø20/30 mm	**48981**	9	2

Internally threaded sockets
FIS E

Type	Art.-No.	ID	approval	drill diameter	drill depth	effect. anchorage depth	min. bolt penetration	max. bolt penetration	internal thread	fits	qty. per box
			● DIBt	d_0	t_d	h_{ef}	e_2	e_1	d_s		
				[mm]	[mm]	[mm]	[mm]	[mm]			pcs.
FIS E 11 x 85 M6	**43631**	8	●	14	90	85	6	60	M 6	FIS H 16 x 85 K, FIS H 20 x 85 K	10
FIS E 11 x 85 M8	**43632**	5	●	14	90	85	8	60	M 8	FIS H 16 x 85 K, FIS H 20 x 85 K	10
FIS E 15 x 85 M10	**43633**	2	●	18	90	85	10	60	M 10	FIS H 20 x 85 K	10
FIS E 15 x 85 M12	**43634**	9	●	18	90	85	12	60	M 12	FIS H 20 x 85 K	10

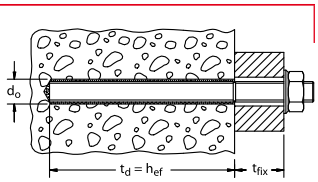
Internally threaded sockets
FIS E K

Type	Art.-No.	ID	approval	drill diameter	drill depth	effect. anchorage depth	screw ø	fits	qty. per box
			● DIBt	d_0	t_d	h_{ef}			
				[mm]	[mm]	[mm]			pcs.
FIS E 5 x 45 K	**58053**			10	45	45	4,5-5	FIS H 12 x 50 K, FIS H 12 x 85 K	10
FIS E 6 x 75 K	**58049**			10	60	60	5-6	FIS H 12 x 85 K	10
FIS E 10 x 95 K	**58051**			14	80	80	10	FIS H 16 x 85 K, FIS H 16 x 130 K	10

CORRECT USE WITHOUT ANCHOR SLEEVE

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

Approved for:
Solid bricks ≧ Mz 12, solid sand-lime bricks ≧ KS 12.

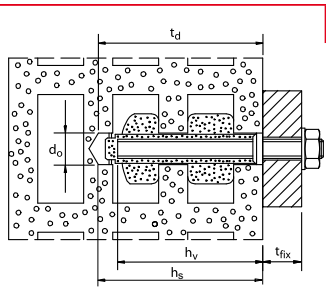


Type	**Injection threaded rod FIS G M...**									**Internally threaded sockets FIS E...**			**Screw-inserts FIS E...K**		
Dimension	8 x 100	8 x 125	8 x 125	10 x 95	10 x 110	10 x 145	12 x 105	12 x 130	12 x 150	11 x 85 M8	15 x 85 M10	15 x 85 M12	5 x 45	6 x 75 [1]	10 x 95 [1]
Approval	●	●		●	●		●	●		●	●	●			
Usable length t_{fix} [mm]	15	40	20	10	25	40	15	40	40	–	–	–	–	–	–
Drill diameter d_0 [mm]	10	10	10	12	12	12	14	14	14	14	18	18	10	10	14
Drill depth t_d [mm]	80	80	80	90	90	90	110	110	110	90	90	90	45	60	80
Suitable brush-Ø [mm]	14	14	14	14	14	14	20	20	20	20	20	20	14	14	20
Anchoring depth h_{ef} [mm]	75	75	95	75	75	95	75	75	95	75	75	75	45	60	80
No. of scale units	3	3	4	4	4	5	5	5	7	4	4	4	2	3	5

1) With detachable plaster bridging.
● Included in German approval.

Injection technique for masonry

CORRECT USE WITH ANCHOR SLEEVE: COMBINATION OPTIONS



Suitable for:
Vertically perforated bricks, perforated sand-lime bricks, hollow blocks, solid bricks, solid sand-lime bricks, pumice hollow blanks, hollow filler block floors, porous lightweight concrete and other perforated material.

Approved for:
Vertically perforated bricks ≧ HLz 4, perforated sand-lime bricks ≧ KSL 4, hollow blocks made from lightweight concrete ≧ Hbl 2, hollow blocks made from concrete ≧ Hbn 4, solid bricks ≧ Mz 12, solid sand-lime bricks ≧ KS 12 and porous lightweight concrete.

Type	Art. No.	Injection anchor sleeve FIS H...K					Injection anchor sleeve with net FIS H...N			Injection anchor sleeve FIS H...L		
		12 x 50	12 x 85	16 x 85	16 x 130	20 x 85	16 x 85	18 x 85	20 x 85	12 x 1000	16 x 1000	22 x 1000
Drill-Ø d_0 [mm]		12	12	16	16	20	16	18	20	12	16	22
Drill depth t_d [mm]		≧60	≧95	≧95	≧140	≧95	≧95	≧95	≧95	–	–	–
Threaded rod												
FIS A M 6 x 110	90273	50	15							for M6 - M8 threaded rods	for M10 - M12 threaded rods	for M12 - M16 threaded rods
FIS A M 8 x 90	90274	30										
FIS A M 8 x 130	90276	70	35	35			35					
FIS A M 8 x 175	90277	115	80	80	35		80					
FIS A M 10 x 110	90278			15				15				
FIS A M 10 x 150	90281			55	10			55				
FIS A M 12 x 140	90283					20			20			
FIS A M 16 x 175	90288					30						
Internally threaded sockets												
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				■							
Screw-inserts												
FIS E 5 x 45 K	58053	■	■									
FIS E 6 x 75 K	58049		■									
FIS E 10 x 95 K	58051			■	■							

■ Included in the German Approval
● Without Approval
[1] Plaster bridging possible up to 20mm
[2] For anchoring in KSL or plaster bridging up to 20mm
[3] Required in solid material

RG M threaded rods can be used as an alternative. Please refer to page 64 for suitable threaded rods.

Other sizes available - Please contact Technical Department 01491 827 920

LOADS

Permissible loads according to German Approval for FIS V, recommended loads for FIS VS, FIS VT and FIS P in masonry and porous lightweight concrete for tension, shear load and oblique tension at every angle.

Fixing type			**Threaded rod FIS A**						**Internally threaded sockets FIS E**					
Application without anchor sleeve			**FIS A M8**		**FIS A M10**		**FIS A M12**		**FIS E M8**		**FIS E M10**		**FIS E M12**	
Solid brick	≧ Mz 12	[kN]	1.0 [5]		1.7		1.7		1.0		1.7		1.7	
Solid sand-lime brick	≧ KS 12	[kN]	1.0 [5]		1.7		1.7		1.0		1.7		1.7	
Nominal drill diameter	d_0	[mm]	10		12		14		14		18		18	
Drill hole depth	t	[mm]	80		80		80		80		80		80	
Anchorage depth	h_v	[mm]	75		75		75		75		75		75	
Required quantity		[scale units]	3		4		5		4		4		4	
Application with anchor sleeve			**FIS A M8**		**FIS A M10**		**FIS A M12**		**FIS E M8**		**FIS E M10**		**FIS E M12**	
in conjunction with anchor FIS...			**H16/75M**	**H16/100M**	**H16/75M**	**H16/100M**	**H20/75M**	**H20/100M**	**H20/75M**	**H20/100M**	**H20/75M**	**H20/100M**	**H20/75M**	**H20/100M**
Solid brick	≧ Mz 12	[kN]	1.7		1.7		1.7		1.7		1.7		1.7	
Solid sand-lime brick	≧ KS 12	[kN]	1.7		1.7		1.7		1.7		1.7		1.7	
Vertically peforated brick	≧ HLz 4	[kN]	0.3/0.6 [1]		0.3/0.6 [1]		0.3/0.6 [1]		0.3/0.6 [1]		0.3/0.6 [1]		0.3/0.6 [1]	
	≧ HLz 6	[kN]	0.4/0.8 [1]		0.4/0.8 [1]		0.4/0.8 [1]		0.4/0.8 [1]		0.4/0.8 [1]		0.4/0.8 [1]	
	≧ HLz 12	[kN]	0.8/1.0 [1]		0.8/1.0 [1]		0.8/1.0 [1]		0.8/1.0 [1]		0.8/1.0 [1]		0.8/1.0 [1]	
Perforated sand-lime brick	≧ KSL 4	[kN]	-	0.4/0.6 [1]	-	0.4/0.6 [1]	-	0.4/0.6 [1]	-	0.4/0.6 [1]	-	0.4/0.6 [1]	-	0.4/0.6 [1]
	≧ KSL 6	[kN]	-	0.6/0.8 [1]	-	0.6/0.8 [1]	-	0.6/0.8 [1]	-	0.6/0.8 [1]	-	0.6/0.8 [1]	-	0.6/0.8 [1]
	≧ KSL 12	[kN]	-	0.8/1.4 [1]	-	0.8/1.4 [1]	-	0.8/1.4 [1]	-	0.8/1.4 [1]	-	0.8/1.4 [1]	-	0.8/1.4 [1]
Hollow blocks made of lightweight concrete	≧ Hbl 2	[kN]	0.3/0.5 [1]		0.3/0.5 [1]		0.3/0.5 [1]		0.3/0.5 [1]		0.3/0.5 [1]		0.3/0.5 [1]	
	≧ Hbl 4	[kN]	0.6/0.8 [1]		0.6/0.8 [1]		0.6/0.8 [1]		0.6/0.8 [1]		0.6/0.8 [1]		0.6/0.8 [1]	
Hollow blocks made of concrete	≧ Hbn 4	[kN]	0.6/0.8 [1]		0.6/0.8 [1]		0.6/0.8 [1]		0.6/0.8 [1]		0.6/0.8 [1]		0.6/0.8 [1]	
Porous lightweight concrete	TGL	[kN]	1.3		1.3		2.0		1.3		1.3		2.0	
Nominal drill diameter	d_0	[mm]	16	16	16	16	20	20	20	20	20	20	20	20
Drill hole depth	t	[mm]	90	105	90	105	90	105	90	105	90	105	90	105
Anchorage depth of perforated sleeve	h_s	[mm]	82	102	82	102	82	102	82	102	82	102	82	102
Anchorage depth of anchor part	h_v	[mm]	75	95	75	95	75	95	75	75	75	75	75	75
Required quantity		[scale units]	10	15	10	15	15	19	15	19	15	19	15	19
Component dimensions														
Axial spacing (fixing group) [2]	≧ a	[mm]	100, 200 (only Hbl and Hbn), 150 (only internally porous lightweight concrete)											
	min a	[mm]	50, 100 (only internally porous lightweight concrete)											
Min. spacing between single fixings	a_z	[mm]	250, 200 (only M8, M10 internally porous lightweight concrete)											
Edge distance in masonry														
• without shear load towards the free edge	≧ a_r	[mm]	200; with load or tilting proof; 50, 60 (only Mz and KS)											
• with shear load towards the free edge	≧ a_r	[mm]	200, 250 (only Mz and KS)											
Edge distance in porous lightweight concrete [3]														
• without shear load towards the free edge	≧ a_r	[mm]	150	150	150	150	150	150	150	150	150	150	150	150
	min a_r	[mm]	100	100	100	100	100	100	100	100	100	100	100	100
• with shear load towards the free edge	≧ a_r	[mm]	200	200	200	200	200	200	200	200	200	200	200	200
Minimum structural component thickness	d	[mm]	110, 175 [4]		110, 175 [4]		110, 175 [4]		110, 175 [4]		110, 175 [4]		110, 175 [4]	
Clearance hole in fixture to be attached	d_f	[mm]	9		12		14		9		12		14	
Required torque	T_{inst}	[Nm]	4		4		4		4		4		4	
Bending moment	gvz / A4	[Nm]	10.7 / 12.1		21.4 / 24.1		37.4 / 42.1		10.7 / 12.1		21.4 / 24.1		37.4 / 42.1	

[1] Rised value only applies if drilling is in rotary direction; it must also be proved in KSL bricks that the outer webs of the brick are at least 30 mm (old bricks).
[2] The axial spacing a may be fallen short of to min. a if the approved loads are reduced. This does not apply to made of Hbl and Hbn masonry.
[3] The edges distance a_r may be fallen short to min. a_r, if the approved loads are reduced and there is no shear load towards the free edge.
[4] Only porous lightweight concrete.
[5] For masonry with superimposed load: permissible load 1.4 kN

For evaluating load values of country specific masonry type bricks, we recommend pull-out tests. Please contact the fischer technical services department on 01491 827 920.

Injection technique for concrete

The expansion-free anchoring for the professional user.

OVERVIEW

Threaded rod
FIS A,
zinc-plated steel

Threaded rod
FIS A,
stainless steel A4

Approved in conjunction with FIS V and FIS VW:
- Concrete ≧ C20/25 and ≦ C50/60

Suitable in conjunction with FIS VS and FIS EM:
- Concrete ≧ C12/15

For fixing of:
- Steel constructions in general
- Supports
- Rails
- High-racks
- Consoles
- Railings
- Window elements
- Scaffolds
- Machines
- Facades

DESCRIPTION

- Specially for use with Injection mortars FIS V, FIS VS, FIS VW, FIS VT or FIS EM in non-cracked concrete.
- The three colour markings indicate the correct setting depth, according to the load-bearing capacity or the useful length required.
- The anchor rods are also suitable for push-through installation, using special push-through elements.
- The mortar bonds the entire surface of the anchor rod to the wall of the drilled hole and seals the hole.
- Anchor rod made of stainless steel A4 for outdoor use and in damp conditions.

Advantages/Benefits

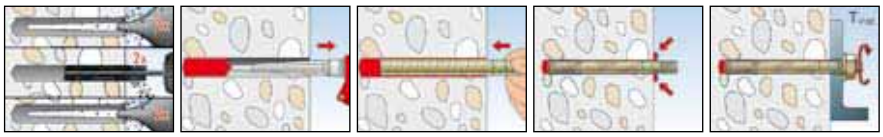
- High-performance mortars allow high loads in non-cracked concrete.
- Three possible setting depths for three different load levels and useful lengths.
- Quick manual installation without a setting tool reduces the work involved.
- Simple and quick push-through installation reduces installation time.
- Steel grade 5.8 or A4-70 guarantee the highest steel load-bearing strength and maximum permissible bending moments.

INSTALLATION

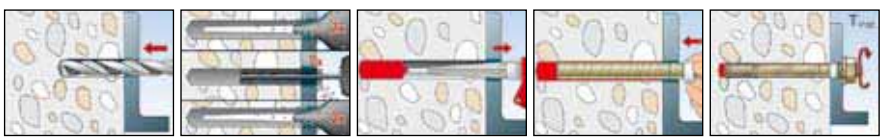
Type of installation

- Pre-positioned installation
- Push-through installation (with fischer push-through element)

Pre-positioned installation



Push-through installation



Installation tips

- Drill the hole. Observe the desired setting depth / usable length.
- Clean the drill-hole thoroughly (blow out 4 x, brush out 4 x, blow out 4 x).
- Fill with the defined mortar quantity from the bottom of the drill-hole.
- If necessary screw the push-through element into position up to the depth marking.
- Then press the threaded rod down to the bottom of the hole (without setting tool), turning it slightly while doing so.
- Observe the curing time of the injection mortar.
- Install the building component. Observe the installation torque indicated in the technical data sheet.

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303

TECHNICAL DATA

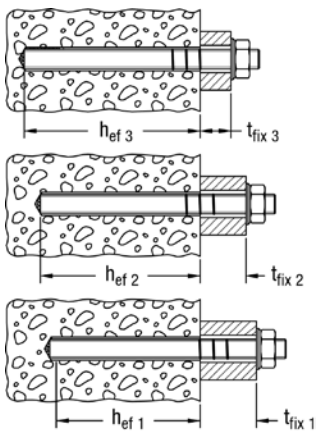
Threaded rod **FIS A**, zinc plated steel

Threaded rod **FIS A A4**, stainless steel

					Anchorage depth 1			Anchorage depth 2			Anchorage depth 3					
Type	zinc plated steel Art.-No.	stainless steel A4 Art.-No.	approval ETA	drill diameter d_0 [mm]	anchorage depth = drill hole depth $h_{ef1} = h_{01}$ [mm]	max. usable length t_{fix1} [mm]	charge FIS V [scale units]	anchorage depth = drill hole depth $h_{ef2} = h_{02}$ [mm]	max. usable length t_{fix2} [mm]	charge FIS V [scale units]	anchorage depth = drill hole depth $h_{ef3} = h_{03}$ [mm]	max. usable length t_{fix3} [mm]	charge FIS V [scale units]	total length L [mm]	Hexagon nut SW	qty. per box pcs.
FIS A M 6 x 75	**90243**	**90437**	■	8	50	15	2	60	5	2	-	-	-	75	10	20
FIS A M 6 x 85	**90272**	**90438**	■	8	50	25	2	60	15	2	-	-	-	85	10	20
FIS A M 6 x 110	**90273**	**90439**	■	8	50	50	2	60	40	2	75	25	3	110	10	20
FIS A M 8 x 90	**90274**	**90440**	■	10	65	15	3	-	-	-	-	-	-	90	13	10
FIS A M 8 x 110	**90275**	**90441**	■	10	65	35	3	80	20	4	95	5	4	110	13	10
FIS A M 8 x 130	**90276**	**90442**	■	10	65	55	3	80	40	4	95	25	4	130	13	10
FIS A M 8 x 175	**90277**	**90443**	■	10	65	100	3	80	85	4	95	70	4	175	13	10
FIS A M 10 x 110	**90278**	**90444**	■	12	80	15	4	90	5	5	-	-	-	110	17	10
FIS A M 10 x 130	**90279**	**90447**	■	12	80	35	4	90	25	5	110	5	6	130	17	10
FIS A M 10 x 150	**90281**	**90448**	■	12	80	55	4	90	45	5	110	25	6	150	17	10
FIS A M 10 x 200	**90282**	**90449**	■	12	80	105	4	90	95	5	110	75	6	200	17	10
FIS A M 12 x 140	**90283**	**90450**	■	14	95	30	5	110	15	6	120	5	6	140	19	10
FIS A M 12 x 160	**90284**	**90451**	■	14	95	50	5	110	35	6	120	25	6	160	19	10
FIS A M 12 x 180	**90285**	**90452**	■	14	95	70	5	110	55	6	120	45	6	180	19	10
FIS A M 12 x 210	**90286**	**90453**	■	14	95	100	5	110	85	6	120	75	6	210	19	10
FIS A M 12 x 260	**90287**	**90454**	■	14	95	150	5	110	135	6	120	125	6	260	19	10
FIS A M 16 x 175	**90288**	**90455**	■	18	125	30	9	140	15	10	-	-	-	175	24	10
FIS A M 16 x 200	**90289**	**90456**	■	18	125	55	9	140	40	10	170	10	12	200	24	10
FIS A M 16 x 250	**90290**	**90457**	■	18	125	105	9	140	90	10	170	60	12	250	24	10
FIS A M 16 x 300	**90291**	**90458**	■	18	125	155	9	140	140	10	170	110	12	300	24	10
FIS A M 20 x 245	**90292**	**90459**	■	24	160	60	20	170	50	21	210	10	26	245	30	10
FIS A M 20 x 290	**90293**	**90460**	■	24	160	105	20	170	95	21	210	55	26	290	30	10
FIS A M 24 x 290	**90294**	**90461**	■	28	190	65	40	240	20	51	-	-	-	290	36	5
FIS A M 24 x 380	**90295**	**90462**	■	28	190	155	40	240	110	51	285	65	60	380	36	5
FIS A M 30 x 340	**90296**	**90463**	■	35	240	65	55	280	25	64	-	-	-	340	46	5
FIS A M 30 x 430	**90297**	**90464**	■	35	240	155	55	280	115	64	340	55	78	430	46	5

Push-through element

Type	Art.-No.	ID	approval ■ ETA	min. - max. usable length t_{fix} [mm]	thread M	qty. per box pcs.
Push-through element M 8 x 3 A4	**78230**	9	■	3 - 6	M 8	10
Push-through element M 10 x 3 A4	**78231**	6	■	3 - 6	M 10	10
Push-through element M 10 x 8 A4	**78232**	3	■	8 - 16	M 10	10
Push-through element M 12 x 4 A4	**78233**	0	■	4 - 8	M 12	10
Push-through element M 12 x 10 A4	**78234**	7	■	10 - 20	M 12	10
Push-through element M 16 x 5 A4	**78235**	4	■	5 - 10	M 16	10
Push-through element M 16 x 10 A4	**78236**	1	■	10 - 20	M 16	10



Injection technique for concrete

TECHNICAL DATA

Cleaning brush for concrete

Compressed-air cleaning gun **ABP**

Type	Art.-No.	ID	for thread M	qty. per box pcs.
BS ø 8	**78177**	7	M 6	1
BS ø 10	**78178**	4	M 8	1
BS ø 12	**78179**	1	M 10	1
BS ø 14	**78180**	7	M 12	1
BS ø 18	**78181**	4	M 16	1
BS ø 24	**78182**	1	M 20	1
BS ø 28	**78183**	8	M 24	1
BS ø 35	**78184**	5	M 30	1
ABP	**59456**	8	-	1

LOADS - INJECTION MORTAR FIS V, FIS VS AND FIS VW

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Injection system FIS V and FIS VS, FIS VW used with fischer threaded rods with large axial spacing and edge distance.

					Non-cracked concrete															
Anchor size					**M 6**		**M 8**		**M 10**		**M 12**		**M 16**		**M 20**		**M 24**		**M30**	
Effektive anchorage depth = Drill hole depth	$h_{01} = h_{ef1}$	[mm]			50		65		80		95		125		160		190		240	
	$h_{02} = h_{ef2}$	[mm]			60		80		90		110		140		170		240		280	
	$h_{03} = h_{ef3}$	[mm]			75		95		110		120		170		210		285		340	
Drill hole diameter	d_0	[mm]			8		10		12		14		18		24		28		35	
Mean ultimate loads N_u and V_u [kN]																				
					gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Tensile	0°	N_u	[kN]	h_{ef1}	10.5*	14.1*	19.0*	25.6*	30.2*	40.6*	43.8*	58.4	81.6*	93.2	127.4	127.4	176.9	176.9	248.1	248.1
			[kN]	h_{ef2}	10.5*	14.1*	19.0*	25.6*	30.2*	40.6*	43.8*	59.0*	81.6*	104.4	127.4*	135.4	183.6*	223.5	289.5	289.5
			[kN]	h_{ef3}	10.5*	14.1*	19.0*	25.6*	30.2*	40.6*	43.8*	59.0*	81.6*	109.9*	127.4*	167.2	183.6*	247.1*	291.7*	351.5
Shear	90°	V_u	[kN]		6.3*	8.4*	11.4*	15.4*	18.1*	24.4*	26.3*	35.4*	49.0*	65.9*	76.4*	102.9*	110.1*	148.3*	175.0*	235.6*
Design resistant loads N_{Rd} and V_{Rd} [kN]																				
					gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Tensile	0°	N_{Rd}	[kN]	h_{ef1}	4.7	4.7	8.2	8.2	12.6	12.6	17.9	17.9	31.4	31.4	40.2	40.2	57.3	57.3	67.8	67.8
			[kN]	h_{ef2}	5.7	5.7	10.1	10.1	14.1	14.1	20.7	20.7	35.2	35.2	42.7	42.7	72.4	72.4	79.2	79.2
			[kN]	h_{ef3}	7.1	7.1	11.9	11.9	17.3	17.3	22.6	22.6	42.7	42.7	52.8	52.8	85.9	85.9	96.1	96.1
Shear	90°	V_{Rd}	[kN]		4.2	4.5	7.6	8.2	12.1	13.0	17.5	18.9	32.6	35.3	51.0	55.0	73.4	79.2	116.7	125.9
Recommended loads N_{rec} and V_{rec} [kN]																				
					gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Tensile	0°	N_{rec}	[kN]	h_{ef1}	3.4	3.4	5.9	5.9	9.0	9.0	12.8	12.8	22.4	22.4	28.7	28.7	40.9	40.9	48.4	48.4
			[kN]	h_{ef2}	4.1	4.1	7.2	7.2	10.1	10.1	14.8	14.8	25.1	25.1	30.5	30.5	51.7	51.7	56.6	56.6
			[kN]	h_{ef3}	5.1	5.1	8.5	8.5	12.4	12.4	16.1	16.1	30.5	30.5	37.7	37.7	61.4	61.4	68.6	68.6
Shear	90°	V_{rec}	[kN]		3.0	3.2	5.4	5.9	8.6	9.3	12.5	13.5	23.3	25.2	36.4	39.3	52.4	56.6	83.4	89.9
Recommended bending moment M_{rec} [Nm]																				
					gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
		M_{rec}	[Nm]		4.5	4.9	11.4	11.9	22.3	23.8	38.9	42.1	98.9	106.7	193.1	207.9	333.1	359.4	668.0	720.7
Component dimensions, minimum axial spacings and edge distances																				
Min. axial spacing [1]		s_{min}	[mm]		40		40		45		55		65		85		105		140	
Min. edge distance [1]		c_{min}	[mm]		40		40		45		55		65		85		105		140	
Min. structural component thickness		h_{min1}	[mm]		100		100		110		125		165		210		250		310	
		h_{min2}	[mm]		100		110		120		140		180		220		300		350	
		h_{min3}	[mm]		115		125		140		150		210		260		345		410	
Required torque		T_{inst}	[Nm]		5		10		20		40		60		120		150		300	

* Steel failure decisive.

[1] For minimum axial spacing and minimum edge distance the above described loads have to be reduced (see "fischer Technical Handbook" or design software "CC-Compufix")!

Values given above are valid under the following assumptions: - Sufficient mechanical cleaning of the drill hole using stainless steel brushes.
- Dry concrete, temperature range 50°C long term temperature and 80°C short term temperature.

All values apply for concrete C 20/25 without edge or spacing influence.

Design resistant loads: material safety factor γ_M is included. Material safety factor γ_M depends on the type of anchor.

Recommended loads: material safety factor γ_M and safety factor for load γ_L = 1.4 are included.

The condition of application differ from those given in the European Technical Approval (ETA). For further detailed information about the ETA please contact the fischer technical service department.
RG M threaded rods can be used as an alternative. Please refer to page 64 for suitable threaded rods.
Higher loads are available using Premium Cleaning methods. Please contact Technical Department for details on 01491 827920.

LOADS - INJECTION MORTAR FIS EM

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Injection system FIS EM used with fischers threaded rods with large axial spacing and edge distance.

					Non-cracked concrete													
Anchor size					**M 8**		**M 10**		**M 12**		**M 16**		**M 20**		**M 24**		**M30**	
Effektive anchorage depth = Drill hole depth	$h_{01} = h_{ef1}$	[mm]			65		80		95		125		160		190		240	
	$h_{02} = h_{ef2}$	[mm]			80		90		110		140		170		240		280	
	$h_{03} = h_{ef3}$	[mm]			95		110		120		170		210		285		340	
Drill hole diameter	d_0	[mm]			10		12		14		18		24		28		35	
Mean ultimate loads N_u and V_u [kN]																		
					gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Tensile	0°	N_u	[kN]	h_{ef1}	19.0*	25.6*	30.2*	40.6*	43.8*	59,0*	81.6*	98.6	127.4*	140.7	183.6*	197.7	291.7*	291.8
			[kN]	h_{ef2}	19.0*	25.6*	30.2*	40.6*	43.8*	59.0*	81.6*	109.9*	127.4*	149.5	183.6*	247.1*	291.7*	340.4
			[kN]	h_{ef3}	19.0*	25.6*	30.2*	40.6*	43.8*	59.0*	81.6*	109.9*	127.4*	171.5	183.6*	247.1*	291.7*	392.7*
Shear	90°	V_u	[kN]		11.4*	15.4*	18.1*	24.4*	26.3*	35.4*	49.0*	65.9*	76.4*	102.9*	110.1*	148.3*	175.0*	235.6*
Design resistant loads N_{Rd} and V_{Rd} [kN]																		
					gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Tensile	0°	N_{Rd}	[kN]	h_{ef1}	9.5	9.5	14.7	14.7	20.9	20.9	36.7	36.7	58.7	58.7	83.5	83.5	132.0	132.0
			[kN]	h_{ef2}	11.7	11.7	16.5	16.5	24.2	24.2	41.1	41.1	62.3	62.3	105.5	105.5	153.9	153.9
			[kN]	h_{ef3}	12.8	13.7	20.2	20.2	26.4	26.4	49.8	49.9	77.0	77.0	123.2	125.3	186.9	186.9
Shear	90°	V_{Rd}	[kN]		7.6	8.2	12.1	13.0	17.5	18.9	32.6	35.3	51.0	55.0	73.4	79.2	116.7	125.9
Recommended loads N_{rec} and V_{rec}[kN]																		
					gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Tensile	0°	N_{rec}	[kN]	h_{ef1}	6.8	6.8	10.5	10.5	14.9	14.9	26.2	26.2	41.9	41.9	59.6	59.6	94.3	94.3
			[kN]	h_{ef2}	8.4	8.4	11.8	11.8	17.3	17.3	29.4	29.4	44.5	44.5	75.4	75.4	109.9	109.9
			[kN]	h_{ef3}	9.1	9.8	14.4	14.4	18.9	18.9	35.6	35.6	55.0	55.0	88.0	89.5	133.5	133.5
Shear	90°	V_{rec}	[kN]		5.4	5.9	8.6	9.3	12.5	13.5	23.3	25.2	36.4	39.3	52.4	56.6	83.4	89.9
Recommended bending moment M_{rec} [Nm]																		
					gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
		M_{rec}	[Nm]		11.4	11.9	22.3	23.8	38.9	42.1	98.9	106.7	193.1	207.9	333.1	359.4	668.0	720.7
Component dimensions, minimum axial spacings and edge distances																		
Min. axial spacing [1]		s_{min}	[mm]		40		45		55		65		85		105		140	
Min. edge distance [1]		c_{min}	[mm]		40		45		55		65		85		105		140	
Min. structural component thickness		h_{min1}	[mm]		100		110		125		165		210		250		310	
		h_{min2}	[mm]		110		120		140		180		220		300		350	
		h_{min3}	[mm]		125		140		150		210		260		345		410	
Required torque		T_{inst}	[Nm]		10		20		40		60		120		150		300	

* Steel failure decisive.

[1] For minimum axial spacing and minimum edge distance the above described loads have to be reduced (see "fischer Technical Handbook" or design software "CC-Compufix")!

Values given above are valid under the following assumptions: - Sufficient mechanical cleaning of the drill hole using stainless steel brushes.
- Dry concrete, temperature range 50°C long term temperature and 80°C short term temperature.

All values apply for concrete C 20/25 without edge or spacing influence.

Design resistant loads: material safety factor γ_M is included. Material safety factor γ_M depends on the type of anchor.

Recommended loads: material safety factor γ_M and safety factor for load γ_L = 1.4 are included.

RG M threaded rods can be used as an alternative. Please refer to page 64 for suitable threaded rods.

Injection technique for concrete

LOADS - INJECTION MORTAR FIS VT

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Injection system FIS VT used with fischer threaded rods with large axial spacing and edge distance.

				Non-cracked concrete															
Anchor size				**M 6**		**M 8**		**M 10**		**M 12**		**M 16**		**M 20**		**M24**		**M30**	
Effektive anchorage depth		h_{ef}	[mm]	60		80		90		110		125		170		210		280	
Drill hole depth		$h_0 \geq$	[mm]	60		80		90		110		125		170		210		280	
Drill hole diameter		d_0	[mm]	8		10		12		14		18		24		28		35	
Mean ultimate loads N_u and V_u [kN]																			
				gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Tensile	0°	N_u	[kN]	10.5*	12.7	19.0*	23.0	30.2*	36.5	43.8*	53.1	79.9	79.9	121.9	121.9	176.0	176.0	261.0	261.0
Shear	90°	V_u	[kN]	6.3*	8.4*	11.4*	15.4*	18.1*	24.4*	26.3*	35.4*	49.0*	65.9*	76.4*	102.9*	110.1*	148.3*	175.0*	235.6*
Design resistant loads N_{Rd} and V_{Rd} [kN]																			
				gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Tensile	0°	N_{Rd}	[kN]	5.1	5.1	9.1	9.1	12.7	12.7	18.6	18.6	28.3	28.3	38.4	38.4	57.0	57.0	71.3	71.3
Shear	90°	V_{Rd}	[kN]	3.8	4.1	6.8	7.4	10.9	11.7	15.8	17.0	29.4	31.7	45.9	49.5	66.1	71.3	105.0	113.3
Recommended loads N_{rec} and V_{rec}[kN]																			
				gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Tensile	0°	N_{rec}	[kN]	3.7	3.7	6.5	6.5	9.1	9.1	13.3	13.3	20.2	20.2	27.5	27.5	40.7	40.7	50.9	50.9
Shear	90°	V_{rec}	[kN]	2.7	2.9	4.9	5.3	7.8	8.4	11.3	12.2	21.0	22.6	32.8	35.4	47.2	50.9	75.0	80.9
Recommended bending moment M_{rec} [Nm]																			
				gvz	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
		M_{rec}	[Nm]	4.5	4.9	11.4	11.9	22.3	23.8	38.9	42.1	98.9	106.7	193.1	207.9	333.1	359.4	668.0	720.7
Component dimensions, minimum axial spacings and edge distances																			
Min. axial spacing [1]		s_{min}	[mm]	40		45		45		55		65		85		105		140	
Min. edge distance [1]		c_{min}	[mm]	40		45		45		55		65		85		105		140	
Min. structural component thickness		h_{min}	[mm]	100		110		120		140		165		220		270		350	
Required torque		T_{inst}	[Nm]	5		10		20		40		60		120		150		300	

* Steel failure decisive.

[1] For minimum axial spacing and minimum edge distance the above described loads have to be reduced (see "fischer Technical Handbook" or design software "CC-Compufix")!

Values given above are valid under the following assumptions: - Sufficient mechanical cleaning of the drill hole using stainless steel brushes.
- Dry concrete, temperature range 50°C long term temperature and 80°C short term temperature.

All values apply for concrete C 20/25 without edge or spacing influence.

Design resistant loads: material safety factor γ_M is included. Material safety factor γ_M depends on the type of anchor.

Recommended loads: material safety factor γ_M and safety factor for load γ_L = 1.4 are included.

The condition of application differ from those given in the European Technical Approval (ETA). For further detailed information about the ETA please contact the fischer technical service department.
RG M threaded rods can be used as an alternative. Please refer to page 64 for suitable threaded rods.

Internal-threaded anchor RG MI

OVERVIEW

Resin capsule
R M

Internal-threaded anchor **RG MI**, stainless steel A4

Suitable for:
- Concrete ≧ C12/15
- Natural stone with dense structure

For fixing of:
- Detachable connections with metrical screws in the steel, metal and plant construction.

European Technical Approval-
Option 7 for non-cracked concrete

DESCRIPTION

- The fixing system consists of the Internal- threaded anchor RG MI and the Resin capsule R M.
- The Resin capsule R M contains quick-curing styrene-free vinylester resin.
- Suitable for commercially-available metric screws and threaded rods.
- During setting, the edges of the internal threaded anchor destroy the capsule in the drill hole, mix and activate the resin.
- The resin adheres to the entire surface of the internal threaded anchor, bonding it to the wall of the drilled hole.

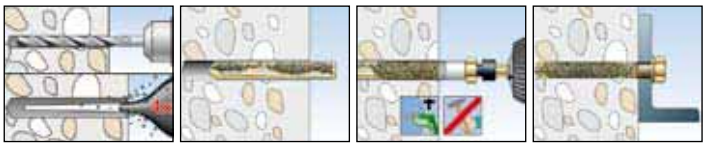
Advantages/Benefits

- High-performance resin guarantees high loads in non-cracked concrete.
- The resin anchoring is free of expansion forces and permits low axial spacings and edge distances.
- Flush finish, no projecting bolt after dismantling the fixture.

INSTALLATION

Type of installation

- Pre-positioned installation



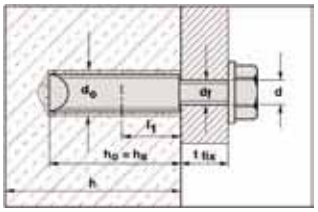
TECHNICAL DATA

Internal-threaded anchor
RG MI, zinc-plated steel

Internal-threaded anchor
RG MI A4, stainless steel

Type	Art.-No.	ID	drill-Ø d_0 [mm]	drill depth = mounting depth [mm]	min. bolt penetration e_2 [mm]	max. bolt penetration e_1 [mm]	Capsule	qty. per box pcs.
RG 8x75 M5 I	**48221**		10	75	8	14	RM 8	10
RG 10x75 M6 I	**48222**		12	75	10	16	RM 10	10
RG 12x90 M8 I	**50552**		14	90	12	18	RM 12	10
RG 16x90 M10 I	**50553**		18	90	15	23	RM 14	10
RG 18x125 M12 I	**50562**		20	125	18	26	RM 16 E	10
RG 22x160 M16 I	**50563**		24	160	24	35	RM 16 E	10
RG 28x200 M20 I	**50564**		32	200	30	45	RM 20	10
RG 12x90 M8 I A4	**50565**		14	90	12	18	RM 12	10
RG 16x90 M10 I A4	**50566**		18	90	15	23	RM 14	10
RG 18 x 125 M12 I A4	**50567**		20	125	18	26	RM 16 E	10
RG 22x160 M16 I A4	**50568**		24	160	24	35	RM 16 E	10
RG 28x200 M20 I A4	**50569**		32	200	30	45	RM 20	10

Setting tool is enclosed.



FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

CURING TIME

Curing time Resin capsule RM

Temperature at anchoring base	Curing time
- 5°C – ± 0°C	240 min.
± 0°C – + 10°C	45 min.
+ 10°C – + 20°C	20 min.
≧ + 20°C	10 min.

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

LOADS

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Internal-threaded anchor RG MI with large axial spacing and edge distance

					Non-cracked concrete				
Anchor size					**RG M 5 I**	**RG M 6 I**	**RG M 8 I**	**RG M 10 I**	**RG M 12 I**
Effective anchorage depth		h_{ef}	[mm]		**75**	**75**	**90**	**90**	**125**
Drill hole depth		h_0 >	[mm]		75	75	90	90	125
Drill hole diameter		d_0	[mm]		10	12	14	18	20
Mean ultimate loads N_u and V_u [kN]									
Tensile	0°	N_u	[kN]	gvz	11.4*	16.1*	29.3*	42.3*	45.3*
			[kN]	A4	-	-	25.6*	40.6*	59.0*
Shear	90°	V_u	[kN]	gvz	6.8*	9.7*	17.6*	25.4*	27.2*
			[kN]	A4	-	-	15.4*	24.4*	35.4*
Design resistant loads N_{Rd} and V_{Rd} [kN]									
Tensile	0°	N_{Rd}	[kN]	gvz	4.8	6.7	12.2	19.3	23.1
			[kN]	A4	-	-	12.2	19.3	23.1
Shear	90°	V_{Rd}	[kN]	gvz	4.6	6.4	11.8	16.9	15.1
			[kN]	A4	-	-	8.3	13.0	18.9
Recommended loads N_{rec} and V_{rec} [kN]									
Tensile	0°	N_{rec}	[kN]	gvz	3.4	4.8	8.7	13.8	16.5
			[kN]	A4	-	-	8.7	13.8	16.5
Shear	90°	V_{rec}	[kN]	gvz	3.3	4.6	8.4	12.1	10.8
			[kN]	A4	-	-	5.9	9.3	13.5
Recommended bending moment M_{rec} [Nm], valid for standard threaded rods with steel grade 5.8/8.8 and A4-70 (stainless steel)									
	5.8	M_{rec}	[Nm]	gvz	2.0	4.4	10.7	21.4	37.4
	8.8		[Nm]	gvz	4.1	7.0	17.1	34.2	59.8
			[Nm]	A4	-	-	12.0	24.0	42.0
Component dimensions, minimum axial spacings and edge distances									
Min. axial spacing[1)]		s_{min}	[mm]		40	45	55	60	65
Min. edge distance[1)]		c_{min}	[mm]		40	45	55	60	65
Min. structural component thickness		h_{min}	[mm]		100	110	140	140	170
Maximum torque		T_{inst}	[Nm]		2.5	6.0	8.5	13.0	17.0

* steel failure, valid for standard threaded rods of steel grade 5.8/8.8 and A4-70 (stainless steel).

[1)] For min. axial spacing and min. edge distance the above described loads have to be reduced!

All load values apply for concrete C20/25 without edge or spacing influence.

Design resistant loads: material safety factor γ_M is included. Material safety factor γ_M depends on type of anchor.

Recommended loads: material safety factor γ_M and safety factor for load γ_L = 1.4 are included.

The condition of application differ from those given in the European Technical Approval (ETA). For further detailed information about the ETA please contact the fischer technical service department. For detailed design method please contact the fischer technical service department.

Higher loads are available using Premium Cleaning methods. Please contact Technical Department for details on 01491 827920.

LOADS

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Injection system FIS V, FIS VS and FIS VW used with internal threaded anchors RG MI with large spacing and edge distance.

Anchor size				M 8					M 10					M 12				
Kind of steel					gvz		A4	C		gvz		A4	C		gvz		A4	C
Steel grade				5.8	8.8	10.9	A4-70	1.4529	5.8	8.8	10.9	A4-70	1.4529	5.8	8.8	10.9	A4-70	1.4529
Effective anchorage depth		h_{ef}	[mm]	90					90					125				
Drill hole depth		h_0	[mm]	$h_0 = h_{ef}$														
Drill hole diameter		d_0	[mm]	14					18					20				
Mean ultimate loads N_u and V_u [kN]																		
Tensile	0°	N_u	[kN]	19.0*	29.0*	36.6*	26.0*		30.0*	46.0*	57.8*	41.0*		44.0*	67.0*	84.1*	59.0*	
Shear	90°	V_u	[kN]	9.5*	14.6*	15.3*	12.8*		15.1*	23.2*	24.3*	20.3*		21.9*	33.7*	35.4*	29.5*	
Design resistant loads N_{Rd} and V_{Rd} [kN]																		
Tensile	0°	N_{Rd}	[kN]	12.8	16.7		13.9	16.7	20.3	22.2		21.9	22.2	27.8				
Shear	90°	V_{Rd}	[kN]	7.6	11.7	10.2	8.2	10.2	12.1	18.6	16.2	13.0	16.2	17.5	27.0	23.6	18.9	23.6
Recommended loads N_{rec} and V_{rec} [kN]																		
Tensile	0°	N_{rec}	[kN]	9.2	11.9		9.9	11.9	14.5	15.9		15.7	15.9	19.8				
Shear	90°	V_{rec}	[kN]	5.4	8.3	7.3	5.6	7.3	8.6	13.3	11.6	9.3	11.6	12.5	19.3	16.9	13.5	16.9
Recommended bending moment M_{rec} [Nm]																		
		M_{rec}	[Nm]	11.4	17.1	18.1	11.9	14.9	22.3	34.3	35.7	23.8	29.7	38.9	60.0	61.9	42.1	52.6
Component dimensions, minimum spacings and edge distances																		
Characteristic spacing		$s_{cr,N}$	[mm]	270					270					375				
Characteristic edge distance		$c_{cr,N}$	[mm]	135					135					187.5				
Minimum spacing [1]		s_{min}	[mm]	40					45					60				
Minimum edge distance [1]		c_{min}	[mm]	40					45					60				
Minimum structural component thickness		h_{min}	[mm]	120					125					165				
Minimum screw penetration depth		max l_s	[mm]	12					15					18				
Maximum screw penetration depth		min l_s	[mm]	18					23					26				
Clearance hole in fixture to be attached		$d_f \leq$	[mm]	9					12					14				
Required torque		T_{inst}	[Nm]	10					20					40				
Mortar filling quantity			[scale units]	5					7					11				

Anchor size				M 8					M 10				
Kind of steel					gvz		A4	C		gvz		A4	C
Steel grade				5.8	8.8	10.9	A4-70	1.4529	5.8	8.8	10.9	A4-70	1.4529
Effective anchorage depth		h_{ef}	[mm]	160					200				
Drill hole depth		h_0	[mm]	$h_0 = h_{ef}$									
Drill hole diameter		d_0	[mm]	24					32				
Mean ultimate loads N_u and V_u [kN]													
Tensile	0°	N_u	[kN]	82.0*	109.0*	109.3*	110.0*		127.0*	182.0*	182.2*	171.0*	
Shear	90°	V_u	[kN]	40.7*	62.7*	62.7*	54.8*		63.6*	91.1*	91.1*	85.7*	
Design resistant loads N_{Rd} and V_{Rd} [kN]													
Tensile	0°	N_{Rd}	[kN]	41.7					63.9				
Shear	90°	V_{Rd}	[kN]	32.6	50.2	41.8	35.1	43.9	50.9	60.7	60.7	54.9	68.6
Recommended loads N_{rec} and V_{rec} [kN]													
Tensile	0°	N_{rec}	[kN]	29.8					45.6				
Shear	90°	V_{rec}	[kN]	23.3	35.8	29.9	25.1	31.3	36.3	43.4	43.4	39.2	49.0
Recommended bending moment M_{rec} [Nm]													
		M_{rec}	[Nm]	98.9	152.0	158.1	106.2	132.6	192.6	296.6	308.6	207.9	259.4
Component dimensions, minimum spacings and edge distances													
Characteristic spacing		$s_{cr,N}$	[mm]	480					590				
Characteristic edge distance		$c_{cr,N}$	[mm]	240					295				
Minimum spacing [1]		s_{min}	[mm]	80					125				
Minimum edge distance [1]		c_{min}	[mm]	80					125				
Minimum structural component thickness		h_{min}	[mm]	205					260				
Minimum screw penetration depth		max l_s	[mm]	24					30				
Maximum screw penetration depth		min l_s	[mm]	35					45				
Clearance hole in fixture to be attached		$d_f \leq$	[mm]	18					22				
Required torque		T_{inst}	[Nm]	80					120				
Mortar filling quantity			[scale units]	17					48				

*Steel failure decisive.

1) for minimum spacing and minimum edge distance the above described loads and have to be reduced (see „fischer Technical Handbook" or „fischer Design software COMPUFIX")

Values given above are vaild under the following assumptions: - Sufficient mechanical cleaning of the drill hole using stainless steel brushes.
- Dry concrete, temperature range 50°c long tem temperature and 80°C short term temperature.
All values apply for concrete C20/25 without edge or spacing influences.

Design resistant loads: material safety factor γ_M is included. Material safety factor γ_M depends on the type of anchor.

Recommende loads: material safety factor γ_M and safety factor for load γ_L = 1.4 are included.

The condition of application differ from those given in the European Technical Approval (ETA). For further detailed information about the ETA please contact the fischer technical service department. Higher loads are available using Premium Cleaning methods. Please contact Technical Department for details on 01491 827920.

Injection Set FIS

The expansion-free anchoring for the professional user.

OVERVIEW

FIS Set 16x130 M10/20

FIS Set 20x200 M12/15

With anchor sleeve suitable for:

- Vertically 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

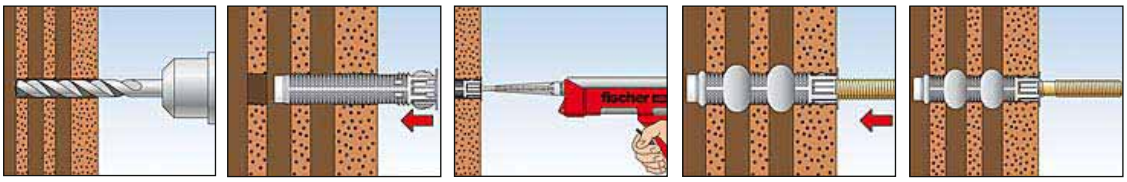
Without anchor sleeve suitable for:

- Lightweight concrete
- Solid bick
- Solid sand-lime bricks
- Full pumice stone and other solid building materials
- Aerated concrete

For fixing of:

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

INSTALLATION



TECHNICAL DATA

Injection sets **FIS**

Type	Art.-No.	ID	drill Ø	thread	min drill hole depth	min anchorage depth sleeve	min anchorage depth anchor	contents
			mm		mm	mm	mm	
FIS Set 16 x 130 M10/20	**41857**	-	16	M10	140	130	130	10 x Threaded rod M10x160 4.8, 10 x Plastic Sleeve, 10 x Nut and Washer
FIS Set 20 x 200 M12/15	**43681**	-	20	M12	210	200	200	10 x Threaded rod M12x225 5.8, 10 x FIS H, 10 x Nut and Washer

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Injection technique for aircrete

The expansion-free high-performance fixing for aircrete.

OVERVIEW

Cone drill **PBB**

Centring sleeve **PBZ**

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

Threaded rod **FIS A**, stainless steel A4

Approved for:

- Block- and plan bricks
- Roof- and ceiling tiles made of aerated cement

For fixing of:

- Facade and roof substructures made of wood and metal
- Canopies
- Gratings
- Hand-rails
- Consoles
- Pipelines
- Sanitary equipment
- Suspended ceilings
- Cable trays
- Steel and wooden constructions in general

(For F120 use FIS V Resins)

Approval:

- German approval (DIBt) and fire for aerated concrete in conjunction with Injection mortar FIS V, Cone drill PBB, Centring sleeve PBZ and threaded rod FIS A.

DESCRIPTION

- Centring sleeve and cone drill bit specially for use with Injection mortars FIS V, FIS VS, FIS VT and FIS P in aerated cement.
- The special undercut drill bit PBB produces a conical drill-hole in aerated cement.
- The centring sleeve fixes the threaded rod in the drilled hole and allows overhead installation.
- The injection mortar anchors by means of undercut technology in the conical hole. This provides better distribution of forces in aerated cement than in cylindrical drill holes.
- Can be used with threaded rods FIS A.
- Threaded rod FIS A made of A4 stainless steel for outdoor use and in damp conditions.

Advantages/Benefits

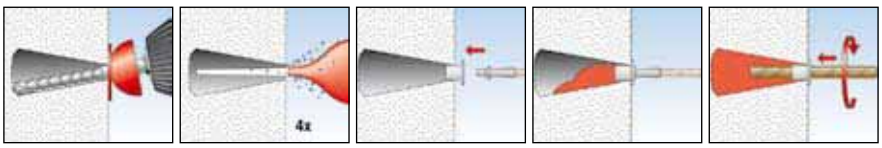
- Undercut technology of the mortar guarantees high loads in aerated cement.
- Sturdy, long-life drill bit for high cost-efficiency.
- Two adjustable drilling depths increase flexibility on site (e.g. higher loads, plaster covering).
- Small drill diameter enables economical use of mortar.

INSTALLATION

Type of installation

- Pre-positioned installation

in aerated cement with fischer cone drill



FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

TECHNICAL DATA

Cone drill **PBB**

Centring sleeve **PBZ**

Type	Art.-No.	ID	approval		qty. per box
			● DIBt		pcs.
Cone drill PBB	**90634**	7			1
Centring sleeve PBZ	**90671**	2	●	suitable for M8 - M12	10

LOADS

Recommended loads per fixing for tension, shear and oblique tension at any angle well as the associated fixing parameters and structural component dimensions.

Fixing type FIS A			**M8 / M10 / M12**	
Anchorage depth	h_v	[mm]	75	95
Recommended load [in kN] in aircrete				
Blocks P2 / P 4 / P6		[kN]	0.9 / 1.2 /1.6	1.3 / 1.7 / 2.1
Wall panels G 2.2 / G 3.3 / G 4.4		[kN]	0.9 / 1.2 / 1.4	1.4 / 1.6 / 1.9
Reinforced roof and ceiling plates [1] G 2.2 / G 3.3 / G 4.4		[kN]	0.9 / 1.2 / 1.4	1.4 / 1.6 / 1.9
Recommended load (fixing group)		[kN]	2.6	2.6
Minimum intermediate distance	a_z	[mm]	250	250
Axial spacing (fixing group) [1]	≧ a / min a	[mm]	200 / 50	250 / 50
Edge distance	≧ a_r	[mm]	200	300
Minimum structural component thickness	d	[mm]	110	110
No. of scale units on cartridge			approx. 15	approx. 20

1) With groups of two and four fixings, the axial distance a may be reduced down to min a if the permissible loads are reduced (except reinforced roofs and ceiling plates).

Resin anchor R (Eurobond)

The expansion-free anchoring in non-cracked concrete.

OVERVIEW

Resin capsule **R M**

Threaded rod **RG M**, zinc-plated steel

Threaded rod **RG M A4 / C** stainless steel A4 or highly corrosion-resistant steel

Approved for:
- Non-cracked concrete ≧ C12/15 and maximum C50/60

Also suitable for:
- Natural stone with dense structure

For fixing of:
- Steel constructions
- Railings
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Facades
- High racks
- Stand-off installations
- Wooden constructions

DESCRIPTION

- This tried and tested fixing system consists of the RG M threaded and resin capsule RM.
- The 2-component resin capsule RM contains quick-setting styrene-free vinyl ester resin and hardener.
- During setting, the tip of the threaded rod destroys the capsule in the drill hole, which mix and activate the mortar.
- The resin adheres to the entire surface of the threaded rod, bonding it to the wall of the drilled hole.

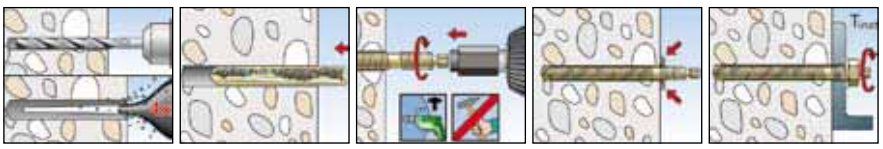
Advantages/Benefits

- Threaded rods are supplied with an easy to use hexagonal installation drive or can be installed with an adapter.
- High-performance resin guarantees high loads in non-cracked concrete.
- The resin anchoring is free of expansion forces and permits small axial spacings and edge distances.
- Wide range for many applications.
- New European design method enables optimum use of the anchor system for cost-efficient fixing.

INSTALLATION

Type of installation

- Pre-positioned installation



Installation information

- Suitable for use in wet concrete and under water.
- Threaded rod must be installed with an impact-rotational process by using an electric tool (percussion drill, hammer drill).

For brushes please see page 32

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

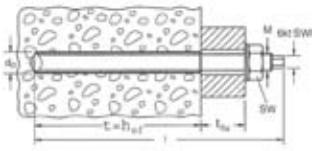
STANDARDS

You will find everything that has standards on page 313 under the keyword approvals.

Resin anchor R (Eurobond)

TECHNICAL DATA

Resin capsule **R M**



Type		Art.-No.	ID	approval ● DIBt ■ ETA		drill-Ø d_0 [mm]	min. drill hole depth t [mm]	effect. anchorage depth h_{ef} [mm]	fits	qty. per box pcs.
R M 8		**50270**	9	●	■	10	80	80	RG M 8	10
R M 10		**50271**	6	●	■	12	90	90	RG M 10	10
R M 12		**50272**	3	●	■	14	110	110	RG M 12	10
R M 14		**50278**	5			16	120	120	RG M 14	10
R M 16		**50273**	0	●	■	18	125	125	RG M 16	10
R M 16 E		**79838**	6		■	18	190	190	RG M 16 E	10
R M 20		**50274**	7	●	■	25	170	170	RG M 20	10
R M 20 E		**79840**	9		■	25	240	240	RG M 20 E	5
R M 24		**50275**	4	●	■	28	210	210	RG M 24	5
R M 24 E		**79842**	3		■	28	290	290	RG M 24 E	5
R M 27		**79843**	0		■	32	250	250	RG M 27	5
R M 30		**50276**	1	●	■	35	280	280	RG M 30	5

Threaded rod **RG M**, zinc-plated steel

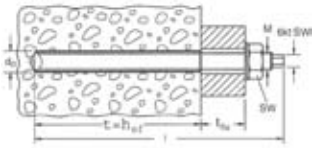
Type		Art.-No.	ID	approval ● DIBt ■ ETA		effect. anchorage depth h_{ef} [mm]	max. usable length t_{fix} [mm]	external hexagon head [mm]	width across nut ○ SW [mm]	fits capsules	qty. per box pcs.
RG M 8 x 110		**50256**	3	●	■	80	13	5	13	50270 RM 8	10
RG M 8 x 150		**95698**	4	●	■	80	60	5	13	50270 RM 8	10
RG M 8 x 250		**95699**	1	●	■	80	160	5	13	50270 RM 8	10
RG M 10 x 130		**50257**	0	●	■	90	20	7	17	50271 RM 10	10
RG M 10 x 165		**50280**	8	●	■	90	57	7	17	50271 RM 10	10
RG M 10 x 190		**50281**	5	●	■	90	82	7	17	50271 RM 10	10
RG M 10 x 250		**95703**	5	●	■	90	150	7	17	50271 RM 10	10
RG M 10 x 350		**95718**	9	●	■	90	250	7	17	50271 RM 10	10
RG M 12 x 160		**50258**	7	●	■	110	25	8	19	50272 RM 12	10
RG M 12 x 220		**50283**	9	●	■	110	90	8	19	50272 RM 12	10
RG M 12 x 250		**50284**	6	●	■	110	120	8	19	50272 RM 12	10
RG M 12 x 300		**50285**	3	●	■	110	170	8	19	50272 RM 12	10
RG M 12 x 380	2)	**95720**	2	●	■	110	255	-	19	50272 RM 12	10
RG M 14 x 170		**50286**	0			120	38	10	22	50278 RM 14	10
RG M 16 x 165		**50287**	7	●	■	125	13	12	24	50273 RM 16	10
RG M 16 x 190		**50259**	4	●	■	125	35	12	24	50273 RM 16	10
RG M 16 x 250		**50288**	4	●	■	125	98	12	24	50273 RM 16	10
RG M 16 x 300		**50289**	1	●	■	125	148	12	24	50273 RM 16	10
RG M 16 x 380	2)	**95722**	6	●	■	125	235	-	24	50273 RM 16	10
RG M 16 x 500	2)	**95723**	3	●	■	125	355	-	24	50273 RM 16	10
RG M 16 x 235 E		**90716**	0		■	190	20	12	24	79838 RM 16 E	10
RG M 16 x 275 E		**90717**	7		■	190	60	12	24	79838 RM 16 E	10
RG M 20 x 260		**50260**	0	●	■	170	65	12	30	50274 RM 20	10
RG M 20 x 350		**95707**	3	●	■	170	155	12	30	50274 RM 20	10
RG M 20 x 500	1)	**95725**	7	●	■	170	305	-	30	50274 RM 20	10
RG M 20 x 330 E		**90718**	4		■	240	60	12	30	79840 RM 20 E	10
RG M 24 x 300	1)	**50261**	7	●	■	210	65	-	36	50275 RM 24	10
RG M 24 x 400	1)	**95727**	1	●	■	210	165	-	36	50275 RM 24	10
RG M 24 x 600	1)	**95728**	8	●	■	210	365	-	36	50275 RM 24	5
RG M 24 x 380 E	1)	**90719**	1		■	290	60	-	36	79842 RM 24 E	5
RG M 27 x 340	1)	**90720**	7		■	250	60	-	41	79843 RM 27	5
RG M 30 x 380	1)	**50262**	4	●	■	280	65	-	46	50276 RM 30	5
RG M 30 x 500	1)	**95730**	1	●	■	280	185	-	46	50276 RM 30	5

1) Straight cut, additional setting tool required (see page 66).
2) Straight cut, setting tool is enclosed.

TECHNICAL DATA

Threaded rod **RG M**, stainless steel A4

Threaded rod **RG M**, high corrosion-resistant steel



Type		Art.-No.	ID	approval ● DIBt ■ ETA	effect. anchorage depth h_{ef} [mm]	max. usable length t_{fix} [mm]	external hexagon head [mm]	width across nut ○ SW [mm]	fits capsules	qty. per box pcs.
RG M 8 x 110 A4		**50263**	1	● ■	80	13	5	13	50270 RM 8	10
RG M 8 x 150 A4		**50293**	8	● ■	80	60	5	13	50270 RM 8	10
RG M 8 x 250 A4		**95700**	4	● ■	80	160	5	13	50270 RM 8	10
RG M 8 x 350 A4		**95708**	0	● ■	80	260	5	13	50270 RM 8	10
RG M 10 x 130 A4		**50264**	8	● ■	90	20	7	17	50271 RM 10	10
RG M 10 x 165 A4		**50294**	5	● ■	90	57	7	17	50271 RM 10	10
RG M 10 x 190 A4		**50296**	9	● ■	90	82	7	17	50271 RM 10	10
RG M 10 x 250 A4		**95701**	1	● ■	90	150	7	17	50271 RM 10	10
RG M 10 x 350 A4		**95709**	7	● ■	90	250	7	17	50271 RM 10	10
RG M 12 x 160 A4		**50265**	5	● ■	110	25	8	19	50272 RM 12	10
RG M 12 x 220 A4		**50297**	6	● ■	110	90	8	19	50272 RM 12	10
RG M 12 x 250 A4		**95702**	8	● ■	110	120	8	19	50272 RM 12	10
RG M 12 x 300 A4		**95705**	9	● ■	110	170	8	19	50272 RM 12	10
RG M 12 x 380 A4	2)	**95710**	3	● ■	110	255	-	19	50272 RM 12	10
RG M 12 x 600 A4	2)	**95711**	0	● ■	110	475	-	19	50272 RM 12	10
RG M 16 x 165 A4		**95704**	2	● ■	125	13	12	24	50273 RM 16	10
RG M 16 x 190 A4		**50266**	2	● ■	125	35	12	24	50273 RM 16	10
RG M 16 x 250 A4		**50298**	3	● ■	125	98	12	24	50273 RM 16	10
RG M 16 x 300 A4		**50299**	0	● ■	125	148	12	24	50273 RM 16	10
RG M 16 x 380 A4	2)	**95712**	7	● ■	125	235	-	24	50273 RM 16	10
RG M 16 x 500 A4	2)	**95713**	4	● ■	125	355	-	24	50273 RM 16	10
RG M 16 x 235 E A4		**90721**	4	■	190	20	12	24	79838 RM 16 E	10
RG M 16 x 275 E A4		**90722**	1	■	190	60	12	24	79838 RM 16 E	10
RG M 20 x 260 A4		**50267**	9	● ■	170	65	12	30	50274 RM 20	10
RG M 20 x 350 A4		**95706**	6	● ■	170	155	12	30	50274 RM 20	10
RG M 20 x 330 E A4		**90723**	8	■	240	60	12	30	79840 RM 20 E	10
RG M 24 x 300 A4	1)	**50268**	6	● ■	210	65	-	36	50275 RM 24	10
RG M 24 x 400 A4	1)	**95715**	8	● ■	210	165	-	36	50275 RM 24	10
RG M 24 x 380 E A4	1)	**90724**	5	■	290	60	-	36	79842 RM 24 E	5
RG M 27 x 340 A4	1)	**90725**	2	■	250	60	-	41	79843 RM 27	5
RG M 30 x 380 A4	1)	**90726**	9	● ■	280	65	-	46	50276 RM 30	5
RG M 8 x 110 C		**96316**	6	● ■	80	13	5	13	50270 RM 8	10
RG M 10 x 130 C		**96217**	6	● ■	90	20	7	17	50271 RM 10	10
RG M 12 x 160 C		**96218**	3	● ■	110	25	8	19	50272 RM 12	10
RG M 16 x 190 C		**96219**	0	● ■	125	35	12	24	50273 RM 16	10

1) Straight cut, additional setting tool required (see page 66).
2) Straight cut, setting tool is enclosed.

CURING TIME

Curing time Resin capsule RM

Temperature at anchoring base	Curing time
- 5°C – ± 0°C	240 min.
± 0°C – + 10°C	45 min.
+10°C – + 20°C	20 min.
≧ + 20°C	10 min.

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

Resin anchor R (Eurobond)

TECHNICAL DATA

included with each pack

RA-SDS

Adapter for installing anchor rods

Threaded rods without external hex-drive (special lengths).

Important: use locking nut!

SDS max 1/2" VK

SDS max 3/4" VK

SDS plus 1/2" VK

SK SW 8 1/2" VK

Type	Art.-No.	ID			qty. per box pcs.
RA-SDS	**62420**	3		Adapter suitable for set screw	1
SK SW 8 1/2" VK	**01536**	1		Adapter suitable fits threaded rods M8 - M22	1
SDS plus 1/2" VK	**01537**	8		Adapter suitable fits threaded rods M8 - M16	1
SDS max 1/2" VK	**01538**	5		Adapter suitable fits threaded rods M16 - M20	1
SDS max 3/4" VK	**01539**	2		Adapter suitable fits threaded rods M20-M30	1

LOADS

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Resin anchor R with large axial spacing and edge distance.

					Non-cracked concrete							
Anchor size					**M 8**	**M 10**	**M 12**	**M 16**	**M 20**	**M 24**	**M 27**	**M30**
Effektive anchorage depth		h_{ef}	[mm]		**80**	**90**	**110**	**125**	**170**	**210**	**250**	**280**
Drill hole depth		$h_0 \geqq$	[mm]		80	90	110	125	170	210	250	280
Drill hole diameter		d_0	[mm]		10	12	14	18	25	28	32	35
Mean ultimate loads N_u and V_u [kN]												
Tensile	0°	N_u	[kN]	gvz	19.0*	30.2*	43.8*	80.1	127.4*	183.6*	238.7*	271.6
			[kN]	A4/C	25.6*	40.6*	50.4	80.1	128.0	186.0	276.8	271.6
Shear	90°	V_u	[kN]	gvz	11.4*	18.1*	26.3*	49.0*	76.4*	110.1*	143.2*	175.0*
			[kN]	A4/C	15.4*	24.4*	35.4*	65.9*	102.9*	148.3*	192.8*	235.6*
Design resistant loads N_{Rd} and V_{Rd} [kN]												
Tensile	0°	N_{Rd}	[kN]	gvz	11.7	16.4	24.1	36.6	62.1	92.1	121.6	119.2
			[kN]	A4/C	11.7	16.4	24.1	36.6	62.1	92.1	121.6	119.2
Shear	90°	V_{Rd}	[kN]	gvz	7.6	12.1	17.5	32.7	51.0	73.4	95.5	116.7
			[kN]	A4	8.2	13.0	18.9	35.2	55.0	79.2	103.0	125.9
			[kN]	C	10.2	16.2	23.6	44.0	68.6	98.8	–	157.1
Recommended loads N_{rec} and V_{rec} [kN] as a single fixing												
Tensile	0°	N_{rec}	[kN]	gvz	8.3	11.7	17.2	26.1	44.4	65.8	86.9	85.2
			[kN]	A4/C	8.3	11.7	17.2	26.1	44.4	65.8	86.9	85.2
Shear	90°	V_{rec}	[kN]	gvz	5.4	8.6	12.5	23.3	36.4	52.4	68.2	83.3
			[kN]	A4	5.9	9.3	13.5	25.2	39.3	56.6	73.6	89.9
			[kN]	C	7.3	11.6	16.9	31.4	49.0	70.6	–	112.2
Recommended bending moment M_{rec} [Nm], valid for standard threaded rods with strength classification 5.8 and A4-70 and „C“												
		M_{rec}	[Nm]	gvz	10.9	22.3	39.4	98.9	193.1	333.7	496.0	668.0
			[Nm]	A4	11.9	23.8	42.1	106.7	207.9	359.9	533.9	720.7
			[Nm]	C	14.9	29.7	52.6	133.1	259.4	449.1	–	899.4
Component dimensions, minimum axial spacings and edge distances												
Min. axial spacing [1)]		s_{min}	[mm]		40	45	55	65	85	105	125	140
Min. edge distance [1)]		c_{min}	[mm]		40	45	55	65	85	105	125	140
Min. structural component thickness		h_{min}	[mm]		130	140	160	175	220	260	300	330
Required torque		T_{inst}	[Nm]		10	20	40	60	120	150	200	300

* Steel failure, valid for standard threaded rods RGM with strength classification 5.8 and A4-70 (stainless steel A4) and C (highly corrosion resistant).

1) For min. axial spacing and min. edge distance the above described loads have to be reduced! (see “Technical Handbook” or design software “CC-Compufix”)

All load values apply for concrete C 20/25 without edge or spacing influence.

Design resistant loads: material safety factor γ_M is included. Material safety factor γ_M depends on type of anchor.

Recommended loads: material safety factor γ_M and safety factor for load γ_L = 1.4 are included.

The conditions of application differ from those given in the European Technical Approval. For further detailed information about the ETA please contact the fischer technical service department.

Higher loads are available using Premium Cleaning methods. Please contact Technical Department for details on 01491 827920.

Hammer-set glass capsule FHP

For safe post-fixing of connection reinforcement.

OVERVIEW

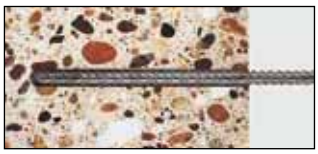
Hammer-set glass capsule **FHP**

Suitable for:
- Concrete ≧ C12/15
- Natural stone with dense structure

For fixing of:
- Reinforcement bars

DESCRIPTION

- The twin-chamber glass capsule contains styrene-free vinyl ester mortar and hardener.
- The glass capsule is destroyed when the reinforcement bar is hammered in so the special quick-curing mortar is activated.
- The mortar adheres to the entire surface of the reinforcement bar, bonding it to the wall of the drilled hole.



Advantages/Benefits

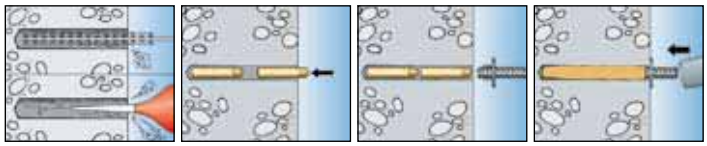
- Special resin for high-performance anchoring of reinforcement bars.
- Simple and quick installation of the reinforcement bar reduces the work involved.
- No special tools necessary.
- Defined resin quantity in the capsule for cost-efficient anchorage.
- Can be used in damp concrete.

INSTALLATION

Installation tip

- Larger anchorage depths are possible with the use of more than one capsule.

For the anchoring of reinforcement bars according to the approval of building authorities we recommend the fischer Injection system FIS V (see page 37).



TECHNICAL DATA

Hammer-set glass capsule **FHP**

Type	Art.-No.	ID	fits to bars [mm]	drill-Ø d_0 [mm]	drill hole depth h_0 [mm]	capsules per bar	qty. per box pcs.
FHP 10	**52520**	3	10	13	180/90	2/1	10
FHP 12	**52521**	0	12	15	220/110	2/1	10
FHP 16	**52522**	7	14 / 16	18 / 20	250/125 + 280/140	2/1	10
FHP 20	**52523**	4	20	24	360/180	2/1	10

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

CURING TIME

Curing time Hammer-set glass capsule FHP

Temperature at anchoring base	Curing time
- 5°C ± 0°C	300 min.
± 0°C +10°C	60 min.
+10°C +20°C	30 min.
≧20°C	20 min.

LOADS

Mean ultimate loads and recommended loads for single anchors of fischer Hammer-set glass capsule FHP with large axial spacing and edge distance

			Non-cracked concrete								
Capsule type			**FHP 10**		**FHP 12**		**FHP 16**	**FHP 16**		**FHP 20**	
Rebar diameter		[mm]	10		12		14	16		20	
Number of capsules			2	1	2	1	2	2	1	2	1
Drill hole depth	h_0	[mm]	180	90	220	110	250	280	140	360	180
Drill hole diameter	d_0	[mm]	13	13	15	15	18	20	20	24	24
Mean ultimate loads N_u [kN]											
Tensile	N_u	[kN]	39.2*	29.5	56.5*	42.5	77.0*	100.5*	71.0	157.0*	106.0
Design resistant loads N_{Rd} [kN]											
Tensile	N_{Rd}	[kN]	16.8	7.7	22.4	12.6	31.5	37.8	16.8	53.2	30.8
Recommended loads N_{rec} [kN]											
Tensile	N_{rec}	[kN]	12.0	5.5	16.0	9.0	22.5	27.0	12.0	38.0	22.0
Component dimensions, minimum axial spacings and edge distances											
Min. axial spacing[1)]	s_{min}	[mm]	60	60	70	70	90	100	100	130	130
Min. edge distance[1)]	c_{min}	[mm]	60	60	70	70	90	100	100	130	130
Min. structural component thickness	h_{min}	[mm]	230	140	270	160	310	340	200	440	270

* steel failure, values apply to reinforcement with a yield strength f_{yk} = 420 N/mm² and an ultimate strength f_{uk} = 500 N/mm².

1) For min. axial spacing and min. edge distance the above described loads have to be reduced!

All load values apply for concrete C20/25 without edge or spacing influence.

Design resistant loads: material safety factor γ_M is included. Material safety factor γ_M depends on type of anchor.

Recommended loads: material safety factor γ_M and safety factor for load γ_L = 1.4 are included.

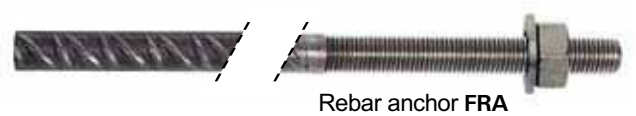
The loads have to be reduced by 30% if the rebars are set in damp holes.

For detailed design method please contact the fischer technical service department.

Rebar anchor FRA

Welded reinforcement bar with threaded part made of stainless steel.

OVERVIEW



Rebar anchor **FRA**

Suitable for:
- Concrete
  > C12/15 and
  < C50/60

For fixing of:
- Steel constructions
- Railings
- Consoles
- Canopies
- Machines
- Staircases

DESCRIPTION

- Suitable for cast-in and post-installed rebar connections.
- Thread diameters M12, M16, M20, M24 and M30.
- Suitable for end anchorage and overlap connections.
- Angled hooks, etc. can be used in cast-in installation.

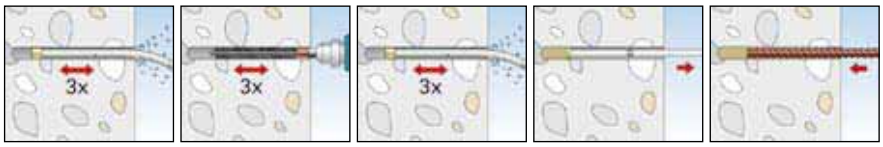
Advantages/benefits

- Overlap connections allow the highest recommended tensile loads with small axial spacings and edge distances.
- Post-installed rebar connection provide flexible planning.

INSTALLATION

Type of installation

- Pre-positioned installation



FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

STANDARDS

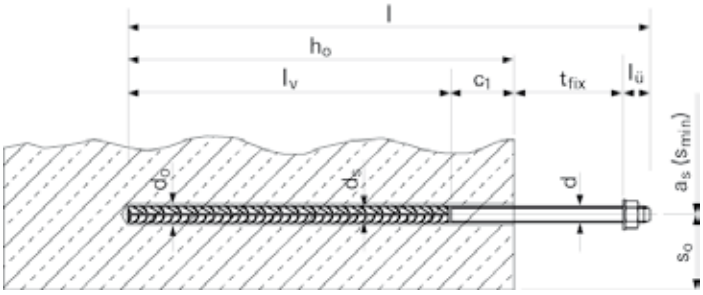
You will find everything that has standards on page 313 under the key word approvals.

TECHNICAL DATA

Rebar anchor **FRA**

Type		Art.-No.	ID		total length	max. usable length	drill-hole diameter	qty. per box
					l	t_{fix}	d_0	
					[mm]	[mm]	[Ø mm]	pcs.
FRA 12/600 M12-60	1)	**98328**	7		675	60	16	8
FRA 16/750 M16-60	1)	**98329**	4		830	60	20	8
FRA 20/900 M20-60	1)	**98330**	0		985	60	25	4
FRA 25/... M24-...	2)				variable	variable	30	-
FRA 28/... M30-...	2)				variable	variable	35	-

1) Further sizes on request.
2) On request.



LOADS

Design resistance

Type			**FRA 12/600 M12-60**	**FRA 16/750 M16-60**	**FRA 20/900 M20-60**	**FRA 25/1050* M24 - t_{fix}**	**FRA 28/1050* M30 - t_{fix}**
maximim tension load	$N_{Rd,s}$	[kN]	28.6	55.1	86.0	123.9	139.7
Thread diamater [1]	d		M 12	M 16	M 20	M 24	M 30
Rebar diameter	d_s	[mm]	12	16	20	25	28
Drill diameter	d_0	[mm]	16	20	25	30	35

[1] Other thead diamters are possible (M24 bzw. M30 on request).
* On request.

Characteristics for post-installed Rebar anchors FRA at maximum tension load

Type			**FRA 12/600 M12-60**	**FRA 16/750 M16-60**	**FRA 20/900 M20-60**	**FRA 25/1050* M24 - t_{fix}**	**FRA 28/1050* M30 - t_{fix}**
Bolt projection	$l_ü$	[mm]	15	20	25	30	35
Concrete cover	c_1	[mm]	50	50	50	50	50
Anchorage length [1]	l_v	[mm]	350	480	600	690	690
Lap length	l_s	[mm]	550	700	850	1000	1000
Drill hole depth $c_1 + l_v$ =	h_0	[mm]	600	750	900	1050	1050
Min. axial spacing	s_{min}	[mm]	60	80	100	125	140
Min. edge distance (with- / without drill guide)	s_0	[mm]	41 / 63	48 / 75	48 / 84	61 / 103	61 / 103
Scale units as per 10 cm drilling depth			approx. 6	approx. 8	approx. 11	approx. 14	approx. 22

[1] Anchorage length according to DIN V ENV 1992 (EC 2), concrete ≧ C12/15 for good bond conditions at maximum tension load $N_{Rd,s}$.
*) On request.

CORROSION

Rust prevention tips: Everything you need to know about corrosion and how to prevent it is on page 309.

Reinforcement bars

using the fischer Injection mortar FIS V.

OVERVIEW

For fixing of:
- Post-installed rebars

DESCRIPTION

- Resin system for post installation of reinforcement bar anchorages in concrete in conjunction with Injection mortar FIS V
- Defined load-bearing capacity as per approval and secure anchorage like cast-in reinforcement bars to European standard (EC 2) and DIN 1045-1.

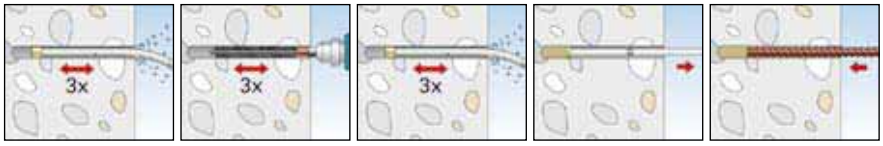
Advantages/benefits

- Subsequent and flexible planning enables changes to existing buildings.
- Simple installation procedure reduces work involved and thus costs.
- German official building supervisory approval (DIBt) for reinforcement connections guarantees safety.

INSTALLATION

Installation tips

Cleaning of the drill-hole



- Blow out the drill hole three times from the bottom with a suitable cleaning nozzle (oil-free compressed air at least 6 bar).
- Clamp the extension with a suitable steel brush in the drill.
- Brush out the drill hole three times.
- Blow out the drill hole three times from the bottom with a suitable cleaning nozzle (oil-free compressed air at least 6 bar).

Filling the drill hole

- Place the mortar cartridge in the injection gun.
- Fit the static mixer, extension tube and injection adapter.
- Slowly withdraw the injection gun - following the pressure - while filling.

Inserting the reinforcement bar

- Push the reinforcement bar into the filled hole up to the setting depth mark with considerable force, while rotating it.
- Wait for the duration of the curing time.

For the installation according to the approval, a special certification is necessary.

STANDARDS

You will find everything that has standards on page 313 under the key word approvals.

Reinforcement bars

TECHNICAL DATA

Chemical mortar System case
„reinforcement bars“

Type	Art.-No.	ID	approval DIBt	content	qty. per box pcs.
System case for reinforcement connection	**90173**	2	●	Cleaning brush	8
				Extensions for cleaning brushes à 40 cm	5
				SDS Chuck with internal thread M 8	1
				Injection adapter	8
				Cleaning hose complete	1
				Brush control template	1
				Hacksaw	1
				Cleaning nozzle for drill-Ø 12 - Ø 15	2
				Cleaning nozzle for drill-Ø 16 - Ø 19	2
				Cleaning nozzle for drill-Ø 20 - Ø 25	2
				Cleaning nozzle for drill-Ø 30 - Ø 35	2
				Marker tape (blue)	1
				Assembly instructions	1
				Setting protocol	10
				Flat spanner SW 7	2

Cleaning brush with thread M 8

Type	Art.-No.	ID	colour	qty. per box pcs.
Brush for drill-Ø 12 mm	**01490**	6	white	1
Brush for drill-Ø 14 mm	**01491**	3	blue	1
Brush for drill-Ø 16 mm	**01492**	0	red	1
Brush for drill-Ø 18 mm	**01493**	7	yellow	1
Brush for drill-Ø 20 mm	**01494**	4	green	1
Brush for drill-Ø 25 mm	**01495**	1	black	1
Brush for drill-Ø 30 mm	**90063**	6	grey	1
Brush for drill-Ø 35 mm	**90071**	1	brown	1

Injection adapter
for drill Ø 12 - 25 mm

Injection adapter for drill Ø 30
- 35 mm

Type	Art.-No.	ID	colour	qty. per box pcs.
Injection-adapter (Ø 9) for drill-Ø 12 mm	**01497**	5	white	10
Injection-adapter (Ø 9) for drill-Ø 14 mm	**01498**	2	blue	10
Injection-adapter (Ø 9) for drill-Ø 16 mm	**01499**	9	red	10
Injection-adapter (Ø 9) for drill-Ø 18 mm	**01483**	8	yellow	10
Injection-adapter (Ø 9) for drill-Ø 20 mm	**01506**	4	green	10
Injection-adapter (Ø 9) for drill-Ø 25 mm	**01507**	1	black	10
Injection-adapter (Ø 15) for drill-Ø 20 mm	**01508**	8	green	10
Injection-adapter (Ø 15) for drill-Ø 25 mm	**01509**	5	black	10
Injection-adapter (Ø 9) for drill-Ø 30 mm	**90689**	8	grey	10
Injection-adapter (Ø 9) for drill-Ø 35 mm	**90699**	7	brown	10
Injection-adapter (Ø 15) for drill-Ø 30 mm	**90700**	0	grey	10
Injection-adapter (Ø 15) for drill-Ø 35 mm	**90701**	7	brown	10

TECHNICAL DATA

Drill guide

Extension tube

Type	Art.-No.	ID	qty. per box pcs.
Drill guide 3 parts	**90819**	9	1
Extension tube Ø 9 (1 m)	**00472**	3	10
Extension tube Ø 15 (1,9 m)	**01489**	0	10

SDS-max scabbeling tool
to roughen the connection surface

Type	Art.-No.	ID	dimensions [mm]		qty. per box pcs.
Scabbeling tool	**01253**	7	45 x 240	SDS-Plus Adapter	1

LOADS

Permissible tension force of rebar and required anchorage lengths or lap lengths in accordance with German approval for ultimate strength of steel rebar BSt 500 S. According to Eurocode 2.

Anchor type				**Injection mortar FIS V**							
Reinforcement bar-Ø		**d_s**	**[mm]**	**8**	**10**	**12**	**14**	**16**	**20**	**25**	**28**
Max. permissible tension force of bar[1]		**F_S**	**[kN]**	**16.2**	**25.3**	**36.4**	**49.6**	**64.8**	**101.2**	**158.1**	**198.3**
Anchorage length [2) 3)]		l_v (l_b)	[mm]	378	473	567	662	756	945	1182	1323
Overlapping length [2)]	l_s [4)]	l_s	[mm]	529	662	794	926	1059	1323 [6)]	1654 [6)]	1853 [6)]
	l_s [5)]	l_s	[mm]	756	945	1134	1323	1512 [6)]	–	–	–
Factor for concrete strength class [7)]	C12/15	ψ_c	[–]	1.30							
	C16/20	ψ_c	[–]	1.17							
	C20/25	ψ_c	[–]	1.00							
	C25/30	ψ_c	[–]	0.87							
	C30/37	ψ_c	[–]	0.70							

[1] Max. $F_S = \frac{\pi \times d_s^2 \times f_{uk,s}}{4 \times \gamma_m \times \gamma_G}$ with $f_{uk,s}$ = 500 N/mm², γ_m = 1,15 und γ_G = 1.35

[2] The anchorage and lap lengths apply for good bond conditions. For poor bond conditions, the anchorage lengths should be multiplied by the factor 1.43

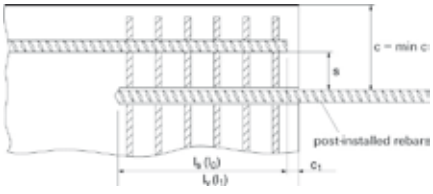
[3] Anchorage length $l_v = \frac{A_s \text{ req.}}{A_s \text{ prov}} \times l_b$ with $l_b = \alpha_b \times d_s$ and $\alpha_b = \frac{1}{4} \times \frac{f_{uk,s} / \gamma_m}{f_{bd}} = \frac{1}{4} \times \frac{500 / 1.15}{2.3} = 47.3$

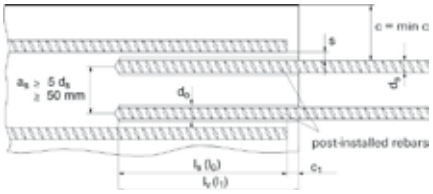
[4] Lap length $l_s = \alpha_1 \times l_b$ with α_1 = 1.4 for axial spacing < 10 × d_s or edge distance < 5 × d_s.

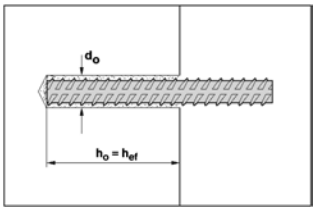
[5] Lap length $l_s = \alpha_1 \times l_b$ with α_1 = 2.0 for axial spacing < 10 × d_s and edge distance < 5 × d_s.

[6] No anchoring possible in poor bond conditions.

[7] For concrete strength classes C12/15, C16/20, C25/30 and C30/37 the anchorage and lap lengths should be multiplied by the factor ψ_c .
Max. anchorage and lap lengths for $d_s \leqq 20$ = 1800 mm and $d_s > 20$ = 2000 mm.







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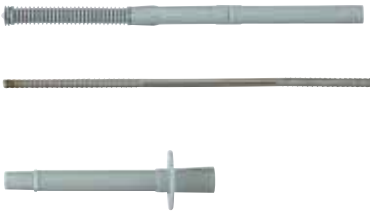
Remedial wall tie VBS 8

Professional **façade repairs** in two-leaf cavity walls.

OVERVIEW



Perforated plastic sleeve

A4 stainless steel profiled tie

Injection adapter

Suitability

For subsequent fixing of:

- Facing masonry with or without an air gap

DESCRIPTION

- Allows invisible ties to be retrofitted between two leafs of a cavity wall, as per DIN 1053-1.
- The anchor consists of a perforated plastic sleeve and an A4 stainless-steel profiled tie.
- FIS V injection mortar is used for anchoring.
- The anchor is inserted in the bed joint of the outer leaf.

Advantages/benefits

- Suitable for bridging air gaps and insulation layers up to 150 mm
- Bonded positive fit of the mortar ensures reliable anchoring in all substrates.
- Expansion-free anchorage enables use in old and fragile masonry.

- Installation permitted anywhere along the entire bed joint for maximum on-site flexibility.
- Small 8 mm drill ensures anchor points are not visible afterwards.
- Minimum mortar requirement per anchor point for economical anchorages.

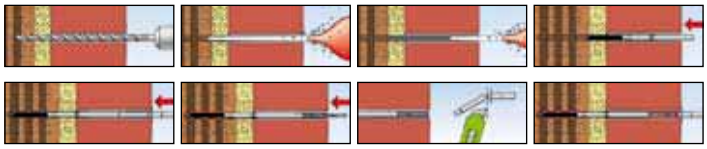
INSTALLATION

Type of installation

- Push-through installation

Installation tip

Please contact our technical service department for installation advice.



TECHNICAL DATA

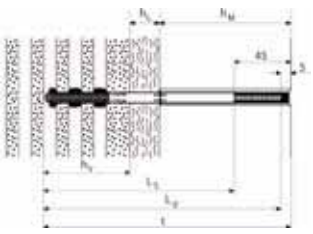
Perforated plastic sleeve

A4 stainless steel profiled tie

Injection adapter

Type		Art.-No.	ID	approval ● DIBt	air layer resp. insulation [mm]	drill-Ø d_0 [mm]	outer leaf [mm]	drill depth = mounting depth [mm]	length of profiled tie [mm]	anchorage depth h_{ef} [mm]	fixing length l [mm]	qty. per box pcs.
VBS 8/20	1)	**78763**	2	●	0 - 20	8	>90	195	188	>60	150	100
VBS 8/50	1)	**78799**	1	●	20 - 50	8	>90	225	218	>60	180	100
VBS 8/80	1)	**78800**	4	●	50 - 80	8	>90	255	248	>60	210	100
VBS 8/120	1)	**78801**	1	●	80 - 120	8	>90	295	288	>60	250	100
VBS 8/150	1)	**78802**	8	●	120 - 150	8	>90	325	318	>60	280	100
VBS 8 Cleaning set		**90241**	7		content: cleaning brush and extension tube for blow-out pump							1
Compressed-air cleaning gun		**93286**	5		for professionell cleaning of the drill hole							1

1) Product including perforated plastic sleeve, A4 stainless steel profiled tie and injection adapter.



FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 303.

STANDARDS

You will find everything that has standards on page 313 under the key word approvals.

Notes

NOTES PAGE

Please use this page to record your notes and remarks

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