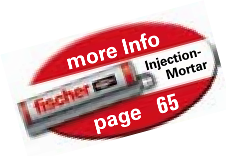
Injection technique for concrete

The expansion-free anchoring for the professional user.

OVERVIEW

Threaded rod
FIS A,
zinc-plated steel

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



Approved in conjunction with FIS V/FIS VS/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
- Suppor ts
- Rails
- High-r acks
- Consoles
- Railings
- Window elements
- Scaff olds
- Machines
- F acades

DESCRIPTION

- Specially for use with Injection mortars FIS V, FIS VS, FIS VW or FIS VT in non-cracked concrete.
- 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 largely seals the hole.
- Anchor rod made of stainless steel of the corrosion resistance class III e.g. A4 for outdoor use and in damp conditions.

Advantages/Benefits

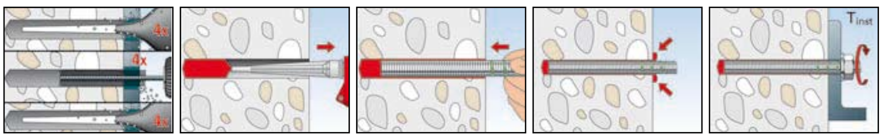
- High-performance mortars allow high loads in non-cracked concrete.
- Various setting depths for different load levels and useful lengths.
- Quick manual installation without a setting tool reduces the work involved.
- Simple and quick push-through installation reduces installation time.
- Steel grade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

INSTALLATION

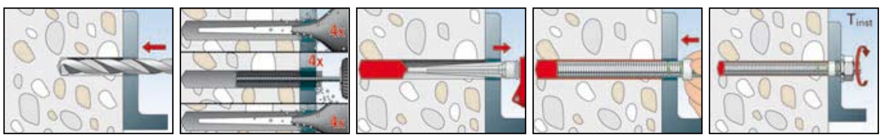
Type of installation

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

Pre-positioned installation



Push-through installation



Installation tips

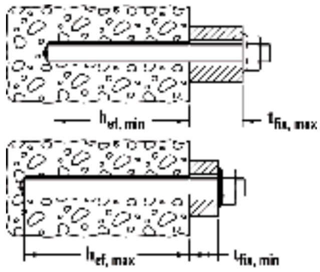
- Drill the hole. Observe the desired setting depth / usable length.
- Clean the drill-hole thoroughly (blow out 4 x, brush out 4 x, blow out 4 x) ≧18 mm with compressed air.
- Fill with the defined mortar quantity from the bottom of the drill-hole.
- If necessary screw the push-through element into 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.
- Bear in mind the curing time of the injection mortar.
- Install the building component. Observe the installation torque indicated in the technical data sheet.
  Brushes BS see page 84.

TECHNICAL DATA

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

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

Type	zinc plated steel Art.-No.	stainless steel A4 Art.-No.	approval ■ ETA	drill diameter d_0 [mm]	min. anchoring depth $h_{ef, min}$ [mm]	number of scale units	min. usable length $t_{fix1} - h_{ef, min}$ [mm]	max. anchoring depth $h_{ef, max}$ [mm]	number of scale units	max. usable lepth $t_{fix1} - h_{ef, max}$ [mm]
FIS A M 6 x 75	**090243**	**090437**	■	8	50	2	17	66	2	1
FIS A M 6 x 85	**090272**	**090438**	■	8	50	2	27	72	2	5
FIS A M 6 x 110	**090273**	**090439**	■	8	50	2	52	72	2	30
FIS A M 8 x 90	**090274**	**090440**	■	10	64	2	17	80	3	1
FIS A M 8 x 110	**090275**	**090441**	■	10	64	2	37	96	3	5
FIS A M 8 x 130	**090276**	**090442**	■	10	64	2	57	96	3	25
FIS A M 8 x 175	**090277**	**090443**	■	10	64	2	102	96	3	70
FIS A M 10 x 110	**090278**	**090444**	■	12	80	3	18	97	5	1
FIS A M 10 x 130	**090279**	**090447**	■	12	80	3	38	117	5	1
FIS A M 10 x 150	**090281**	**090448**	■	12	80	3	335	120	5	19
FIS A M 10 x 200	**090282**	**090449**	■	12	80	3	108	120	5	69
FIS A M 12 x 140	**090283**	**090450**	■	14	96	4	30	124	6	2
FIS A M 12 x 160	**090284**	**090451**	■	14	96	4	50	144	6	2
FIS A M 12 x 180	**090285**	**090452**	■	14	96	4	70	144	6	22
FIS A M 12 x 210	**090286**	**090453**	■	14	96	4	100	144	6	52
FIS A M 12 x 260	**090287**	**090454**	■	14	96	4	150	144	6	102
FIS A M 16 x 175	**090288**	**090455**	■	18	125	8	32	154	11	3
FIS A M 16 x 200	**090289**	**090456**	■	18	125	8	57	172	11	3
FIS A M 16 x 250	**090290**	**090457**	■	18	125	8	107	192	11	40
FIS A M 16 x 300	**090291**	**090458**	■	18	125	8	157	192	11	90
FIS A M 20 x 245	**090292**	**090459**	■	24	160	20	63	219	29	4
FIS A M 20 x 290	**090293**	**090460**	■	24	160	20	108	240	29	28
FIS A M 24 x 290	**090294**	**090461**	■	28	192	28	72	260	42	4
FIS A M 24 x 380	**090295**	**090462**	■	28	192	28	162	288	42	66
FIS A M 30 x 340	**090296**	**090463**	■	35	240	53	68	303	79	5
FIS A M 30 x 430	**090297**	**090464**	■	35	240	53	158	360	79	38

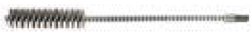


Push-through element,
stainless steel of the corrosion
resistance class III, e.g. A4

Type	Art.-No.	approval ■ ETA	min. - max. usable length t_{fix} [mm]	thread M	qty. per box pcs.
Push-through element M 8 x 3 A4	**078230**	■	3 - 6	M 8	10
Push-through element M 10 x 3 A4	**078231**	■	3 - 6	M 10	10
Push-through element M 10 x 8 A4	**078232**	■	8 - 16	M 10	10
Push-through element M 12 x 4 A4	**078233**	■	4 - 8	M 12	10
Push-through element M 12 x 10 A4	**078234**	■	10 - 20	M 12	10
Push-through element M 16 x 5 A4	**078235**	■	5 - 10	M 16	10
Push-through element M 16 x 10 A4	**078236**	■	10 - 20	M 16	10
Push-through element M 20 x 10 A4	**043906**	■	10 - 20	M 20	10

Injection technique for concrete

TECHNICAL DATA



Cleaning brush for concrete

Compressed-air cleaning gun **ABP**

Type	Art.-No.	for thread M	qty. per box pcs.
BS ø 8	**078177**	M 6	1
BS ø 10	**078178**	M 8	1
BS ø 12	**078179**	M 10	1
BS ø 14	**078180**	M 12	1
BS ø 18	**078181**	M 16	1
BS ø 25	**097806**	M 20	1
BS ø 28	**078183**	M 24	1
BS ø 35	**078184**	M 27 / M 30	1
ABP	**059456**	Compressed-air cleaning gun ABP	1

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 threaded rods FIS A with large spacing and edge distance.

				Non-cracked concrete																			
Anchor size				**M 6**					**M 8**					**M 10**					**M 12**				
Kind of steel				**gvz**			**A4**	**C**	**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**	**5.8**	**8.8**	**10.9**	**A4-70**	**1.4529**
Effektive anchorage depth	$h_{ef,\,min}$	[mm]		40					40					40					48				
	$h_{ef,\,max}$	[mm]		72					96					120					144				
Drill hole depth	h_0	[mm]		$h_0 = h_{ef}$																			
Drill hole diameter	d_0	[mm]		8					10					12					14				
Mean ultimate loads N_u and V_u [kN]																							
Tensile	0° N_u	[kN]	$h_{ef,\,min}$	9.0					14.7					17.1					22.4				
			$h_{ef,\,max}$	11.0*	16.0*	16.3	14.0*		19.0*	29.0*	35.4	26.0*		30.0*	46.0*	55.3	41.0*		44.0*	67.0*	79.6	59.0*	
Shear	90° V_u	[kN]	$h_{ef,\,min}$	5.0*	8.0*	9.0	7.0*		9.2*	14.6*	14.7	12.8*		14.5*	17.1				21.1*	22.4			
			$h_{ef,\,max}$	5.0*	8.0*	10.0*	7.0*		9.2*	14.6*	17.0*	12.8*		14.5*	23.2*	27.0*	20.3*		21.1*	33.7*	40.0*	29.5*	
Design resistant loads N_{Rd} and V_{Rd} [kN]																							
Tensile	0° N_{Rd}	[kN]	$h_{ef,\,min}$	3.8					6.1					7.1					9.3				
			$h_{ef,\,max}$	6.8					12.8	14.7		13.9	14.7	20.3	23.0		21.9	23.0	29.7	33.2		31.6	33.2
Shear	90° V_{Rd}	[kN]	$h_{ef,\,min}$	4.0	6.4	6.7	4.5	5.6	7.4	8.5		8.2	8.5	8.5					11.2				
			$h_{ef,\,max}$	4.0	6.4	6.7	4.5	5.6	7.4	11.7	11.3	8.2	10.2	11.6	18.6	18.0	13.0	16.2	16.9	27.0	26.7	18.9	23.6
Recommended loads N_{rec} and V_{rec} [kN]																							
Tensile	0° N_{rec}	[kN]	$h_{ef,\,min}$	2.7					4.4					5.1					6.7				
			$h_{ef,\,max}$	4.8					9.2	10.5		9.9	10.5	14.5	16.5		15.7	16.5	21.2	23.7		22.5	23.7
Shear	90° V_{rec}	[kN]	$h_{ef,\,min}$	2.9	4.6	4.8	3.2	4.0	5.3	6.1		5.9	6.1	6.1					8.0				
			$h_{ef,\,max}$	2.9	4.6	4.8	3.2	4.0	5.3	8.3	8.1	5.9	7.3	8.3	13.3	12.9	9.3	11.6	12.1	19.3	19.0	13.5	16.9
Recommended bending moment M_{rec} [Nm]																							
	M_{rec}	[Nm]		4.6	6.9	7.1	5.0	6.3	11.4	17.1	17.9	11.9	14.9	22.3	34.3	35.6	23.8	29.7	38.9	60.0	62.3	42.1	52.6
Component dimensions, minimum spacings and edge distances																							
Characteristic spacing	$s_{cr,\,Np}$	[mm]		135					195					245					290				
Characteristic edge distance	$c_{cr,\,Np}$	[mm]		70					100					125					145				
Minimum spacing [1)]	s_{min}	[mm]		40					40					45					55				
Minimum edge distance [1)]	c_{min}	[mm]		40					40					45					55				
Minimum structural component thickness	h_{min}	[mm]	$h_{ef,\,min}$	70					70					70					78				
		[mm]	$h_{ef,\,max}$	102					126					150					174				
Clearance hole in fixture to be attached for pre-positioned installation	$d_f \leqq$	[mm]		7					9					12					14				
Clearance hole in fixture to be attached for push-through installation	$d_f \leqq$	[mm]		9					11					14					16				
Required torque	T_{inst}	[Nm]		5					10					20					40				
Mortar filling quantity		[scale unit]	$h_{ef,\,min}$	1					2					2					3				
		[scale unit]	$h_{ef,\,max}$	2					3					5					6				

Continued next page.

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 threaded rods FIS A with large spacing and edge distance.

				Non-cracked concrete																			
Anchor size				M 16					M 20					M 24					M 30				
Kind of steel				gvz			A4	C	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	5.8	8.8	10.9	A4-70	1.4529
Effektive anchorage depth	$h_{ef, min}$	[mm]		64					80					96					120				
	$h_{ef, max}$	[mm]		192					240					288					360				
Drill hole depth	h_0	[mm]		$h_0 = h_{ef}$																			
Drill holöe diameter	d_0	[mm]		18					24					28					35				
Mean ultimate loads N_u and V_u [kN]																							
Tensile	0° N_u	[kN]	$h_{ef, min}$	34.6					48.3					63.5					88.7				
			$h_{ef, max}$	82.0*	126.0*	128.7	110.0*		127.0*	191.0		171.0*		183.0*	260.6		247.0*		292.0*	384.5			
Shear	90° V_u	[kN]	$h_{ef, min}$	39.2*	51.7		54.8*		61.2*	96.6		85.7*		88.2*	127.0		123.4*		140.2*	177.5			
			$h_{ef, max}$	39.2*	62.8*	74.0*	54.8*		61.2*	98.0*	115.0*	85.7*		88.2*	141.2*	166.0*	123.4*		140.2*	224.4*	264.0*	196.2*	
Design resistant loads N_{Rd} and V_{Rd} [kN]																							
Tensile	0° N_{Rd}	[kN]	$h_{ef, min}$	14.4					20.1					26.4					36.9				
			$h_{ef, max}$	53.6					79.6					108.6					160.2				
Shear	90° V_{Rd}	[kN]	$h_{ef, min}$	31.4	34.5				48.2					63.3					88.5				
			$h_{ef, max}$	31.4	50.2	49.3	35.1	43.8	49.0	78.4	76.7	54.9	68.6	70.6	113.0	110.7	79.1	98.7	112.2	179.5	176.0	125.8	157.0
Recommended loads N_{rec} and V_{rec} [kN]																							
Tensile	0° N_{rec}	[kN]	$h_{ef, min}$	10.3					14.3					18.8					26.3				
			$h_{ef, max}$	38.3					56.8					77.6					114.4				
Shear	90° V_{rec}	[kN]	$h_{ef, min}$	22.4	24.6				34.4					45.2					63.2				
			$h_{ef, max}$	22.4	35.9	35.2	25.1	31.3	35.0	56.0	54.8	39.2	49.0	50.4	80.7	79.0	56.5	70.5	80.1	128.2	125.7	89.8	112.1
Recommended bending moment M_{rec} [Nm]																							
	M_{rec}	[Nm]		98.9	151.7	158.0	106.7	133.1	193.1	296.3	308.7	207.9	259.4	333.1	512.1	533.4	359.4	448.6	668.0	1027.1	1069.9	720.7	899.4
Component dimensions, minimum spacings and edge distances																							
Characteristic spacing	$s_{cr, Np}$	[mm]		370					450					525					640				
Characteristic edge distance	$c_{cr, Np}$	[mm]		185					225					265					320				
Minimum spacing [1)]	s_{min}	[mm]		65					85					105					140				
Minimum edge distance [1)]	c_{min}	[mm]		65					85					105					140				
Minimum structural component thickness	h_{min}	[mm]	$h_{ef, min}$	96					120					144					180				
		[mm]	$h_{ef, max}$	224					280					336					420				
Clearance hole in fixture to be attached for pre-positioned installation	$d_f \leq$	[mm]		18					22					26					33				
Clearance hole in fixture to be attached for push-through installation	$d_f \leq$	[mm]		20					26					30					40				
Required torque	T_{inst}	[Nm]		60					120					150					300				
Mortar filling quantity		[scale unit]	$h_{ef, min}$	4					10					14					26				
		[scale unit]	$h_{ef, max}$	11					29					42					79				

* Steel failure

[1)] For minimum spacing and minimum edge distance the above described loads have to be reduced (see "fischer Technical Handbook" or "fischer Design software 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 influences.

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 53 for suitable threaded rods.