

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 \geq C20/25 and \leq C50/60



Suitable in conjunction with FIS VS and FIS EM:

- Concrete \geq 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 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

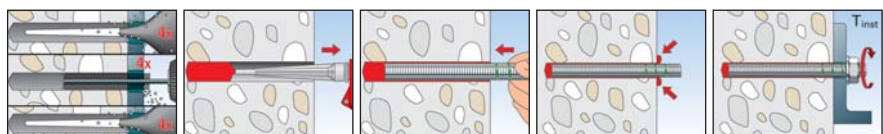
Type of installation

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

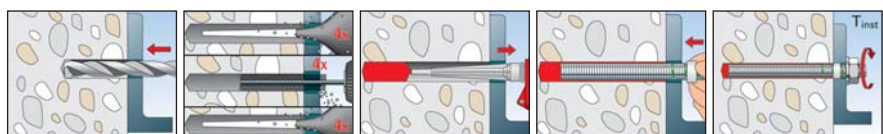
Installation tips

- 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) \geq 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.

Pre-positioned installation



Push-through installation

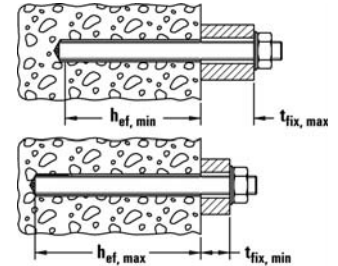


- Bear in mind the curing time of the injection mortar.
- Install the building component. Observe the installation torque indicated in the technical data sheet. Brushes BS see page 84.

TECHNICAL DATA

Threaded rod **FIS A**, zinc plated steelThreaded rod **FIS A A4**, stainless steel

Type	zinc plated steel	stainless steel A4	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 length $t_{fix1} - h_{ef, max}$ [mm]
	Art.-No.	Art.-No.								
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

FIRE PREVENTION

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

CORROSION

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

Injection technique for concrete

TECHNICAL DATA



Type	Art.No.	for thread	qty. per box
		M	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.

Anchor size		Non-cracked concrete																			
		M 6			M 8			M 10			M 12										
Kind of steel		gvz	A4	C	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										
Drill hole depth	h_0 [mm]	72			96			120			144										
Drill hole diameter	d_0 [mm]	8			10			12			14										
Mean ultimate loads N_U and V_U [kN]																					
Tensile	0° N_U	[kN]	9.1			15.4			17.1			22.4									
		$h_{ef, min}$	11.0*	16.0*	16.4	14.0*	19.0*	29.0*	36.9	26.0*	30.0*	46.0*	57.7	41.0*	44.0*	67.0*	79.3	59.0*			
Shear	90° V_U	[kN]	9.1			14.6*			15.4			19.2			26.4						
		$h_{ef, min}$	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]	3.8			6.1			7.1			9.3									
		$h_{ef, min}$	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]	4.0			7.4			8.5			11.2									
		$h_{ef, min}$	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
Recommended loads N_{rec} and V_{rec} [kN]																					
Tensile	0° N_{rec}	[kN]	2.7			4.4			5.1			6.7									
		$h_{ef, min}$	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]	2.9			5.3			6.1			8.0									
		$h_{ef, min}$	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
Recommended bending moment M_{rec} [Nm]																					
	M_{rec} [Nm]	4.6	6.9	8.1	5.0	6.3	11.4	17.1	17.6	11.9	14.9	22.3	34.3	35.7	23.8	29.7	38.9	60.0	62.4	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			78										
	h_{min} [mm]	$h_{ef, max}$			102			126			150										
Clearance hole in fixture to be attached for pre-positioned installation	$d_f \leq$ [mm]	7			9			12			14										
Clearance hole in fixture to be attached for push-through installation	$d_f \leq$ [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.

Anchor size		Non-cracked concrete																			
		M 16				M 20				M 24				M 30							
Kind of steel		gvz	8.8	10.9	A4	C	gvz	8.8	10.9	A4	C	gvz	10.9	A4	C	gvz	10.9	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							
Drill hole depth	h_o [mm]	192				240				288				360							
Drill hole diameter	d_o [mm]	18				24				28				35							
Mean ultimate loads N_U and V_U [kN]		69.1				96.6				127.0				177.5							
Tensile	$0^\circ N_U$ [kN]	$h_{ef, min}$	69.1				96.6				127.0				177.5						
		$h_{ef, max}$	82.0*	126.0*	130.3*	110.0*	127.0*	191.5	171.0*	183.0*	262.7	247.0*	292.0*	386.8							
Shear	$90^\circ V_U$ [kN]	$h_{ef, min}$	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*	257.9*	196.2*			
		$h_{ef, max}$	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]		14.4				20.1				26.4				36.9							
Tensile	$0^\circ N_{Rd}$ [kN]	$h_{ef, min}$	14.4				20.1				26.4				36.9						
		$h_{ef, max}$	53.6				79.6				108.6				160.2						
Shear	$90^\circ V_{Rd}$ [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
Recommended loads N_{rec} and V_{rec} [kN]		10.3				14.3				18.8				26.3							
Tensile	$0^\circ N_{rec}$ [kN]	$h_{ef, min}$	10.3				14.3				18.8				26.3						
		$h_{ef, max}$	38.3				56.8				77.6				114.4						
Shear	$90^\circ V_{rec}$ [kN]	$h_{ef, min}$	22.4	24.6				34.4				45.2				63.2					
		$h_{ef, max}$	22.4	35.6	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
Recommended bending moment M_{rec} [Nm]		98.9				133.1				183.1				254.4							
	M_{rec} [Nm]	98.9	152.0	158.1	106.7	133.1	193.1	296.6	308.6	207.9	259.4	333.1	512.0	533.3	359.4	448.6	668.0	1026.9	1070.0	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						
		$h_{ef, max}$	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 $\gamma_L = 1.4$ 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.

Injection technique for concrete

OVERVIEW



Internal-threaded anchor **RG MI**, M5 - M20 zinc-plated steel



Internal-threaded anchor **RG MI**, M8 - M20 stainless steel of the corrosion resistance class III e.g. A4



Approved for:

- Non-cracked concrete $\geq C20/25$

Suitable for:

- Natural stone with dense structure

For fixing of:

- Detachable connections with metrical screws in the steel, metal and plant construction.



DESCRIPTION

- The fixing system consists of the Internal-threaded anchor RG MI and the Injection mortars FIS V, FIS VS and FIS VW.
- 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.

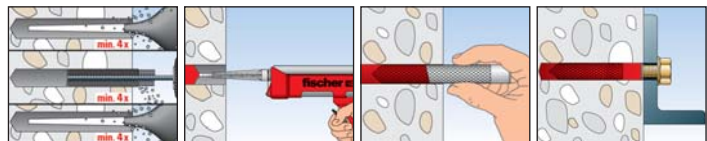
Advantages/Benefits

- 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

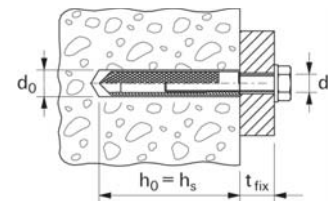
Type of installation

- Pre-positioned installation
- Brushes see page 84.



TECHNICAL DATA

Type	Art.-No.	Internal-threaded anchor RG MI , zinc-plated steel				Internal-threaded anchor RG MI , stainless steel A4			
		approval	drill-Ø	drill depth = mounting depth	min. bolt penetration	max. bolt penetration	scale units	fits brushes	Qty. per box
		ETA	d_0 [mm]	$h_0 = h_s$ [mm]	e_2 [mm]	e_1 [mm]			pcs.
RG 8 x 75 M 5 I	048221		10	75	8	14	5	78178 BS 10	10
RG 10 x 75 M 6 I	048222		12	75	10	16	5	78179 BS 12	10
RG 12 x 90 M 8 I	050552	■	14	90	12	18	5	78180 BS 14	10
RG 16 x 90 M10 I	050553	■	18	90	15	23	7	78181 BS 16/18	10
RG 16 x 125 M12 I	050562	■	20	125	18	26	11	52277 BS 20	10
RG 22 x 160 M16 I	050563	■	24	160	24	35	17	78182 BS 24	5
RG 28 x 200 M20 I	050564	■	32	200	30	45	48	78184 BS 35	5
RG 12 x 90 M 8 I A4	050565	■	14	90	12	18	5	78180 BS 14	10
RG 16 x 90 M10 I A4	050566	■	18	90	15	23	7	78181 BS 16/18	10
RG 18 x 125 M12 I A4	050567	■	20	125	18	26	11	52277 BS 20	10
RG 22 x 160 M16 I A4	050568	■	24	160	24	35	17	78182 BS 24	5
RG 28 x 200 M 20 I A4	050569	■	32	200	30	45	48	78184 BS 35	5



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	
Effektive anchorage depth	h_{ef}	[mm]	90					90					125					
Drill hole depth	h_o	[mm]						$h_o = h_{ef}$										
Drill hole diameter	d_o	[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*	57.6*	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 16					M 20					
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	
Effektive anchorage depth	h_{ef}	[mm]	160					200					
Drill hole depth	h_o	[mm]						$h_o = h_{ef}$					
Drill hole diameter	d_o	[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.

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 $\gamma_L = 1.4$ 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.