High performance steel anchors

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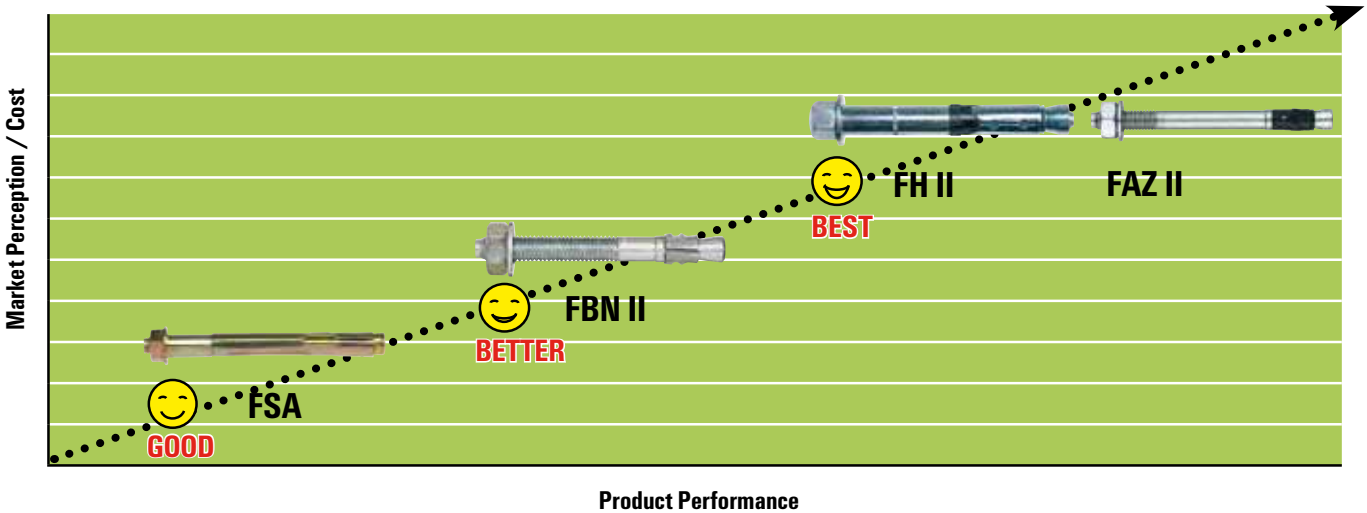
For heavy duty applications, fischer offers a wide range of technically advanced steel anchors.

For general, non safety-critical applications, anchors such as the FSA and TA M, expansion bolts like the FBN II and drop-in anchors such as the EAII Hammerset can be offered. The range also includes a choice of wallbolts - GM or FWB - for a reliable fix.

For structuraly demanding applications, we can offer a large range of products which carry the ETA Approval - Option 1 and can be used where safety and reliability are paramount.

	The fischer heavy duty sleeve anchor **FH II** is the solution for structurally demanding applications as it has the highest tensile and shear loads for push-through installations. European Technical Approval (Option 1) for cracked and non-cracked concrete.
	The fischer **FBN II** anchor offers maximum load-bearing capacity in non-cracked concrete. European Technical Approval (Option 7) for non-cracked concrete.
	The fischer **FSA** is a lightweight sleeve anchor for non structural and non safety critical push through applications.



Zykon anchor FZA

The powerful and safe undercut anchor bolt for the cracked or tension zone.

OVERVIEW

Zykon Bolt anchor **FZA**, zinc-plated steel

Zykon Internally-threaded anchor **FZA-I**, zinc-plated steel

Zykon Through anchor **FZA-D**, zinc-plated steel

Zykon Bolt anchor **FZA A4** resp. **FZA C**

Zykon Through anchor **FZA-D A4** resp. **FZA-D C**

Zykon Internally-threaded anchor **FZA-I A4** stainless steel resp. high corrosion-resistant steel (material 1.4529)

Approved for:
- Cracked and non-cracked concrete B25 to B55 resp. C20/25 to C50/60

Also suitable for:
- Concrete B15 resp. C12/15
- Natural stone with dense structure
- Solid brick
- Solid sand-lime brick

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

ETA CE
European Technical Approval-Option 1 for cracked concrete

VdS from size M8

FM APPROVED from M10

Shock approval by the Federal Office for Civil Defense, Bonn.

Fire resistance classification F 120

DESCRIPTION

- Undercut anchor for pre-positioned (FZA bolt version and internally-threaded anchor FZA-I) and push-through installation (FZA-D bolt version).
- A cylindrical conical hole with an undercut is produced with the Drill bit FZUB in one work process.
- When setting the anchor, the anchor sleeve is driven over the cone with a hammer (or setting tool) and fills the undercut hole with a positive fit.
- Also available: special version FZA ST A4 for man hole step irons according to DIN V 1211 GS / 1212 GS.
- A4 stainless steel version for outdoor use and in damp conditions, highly corrosion-resistant steel C (material no. 1.4529) for applications in aggressive atmospheres.

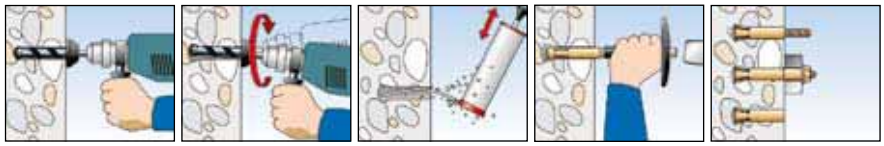
Advantages/benefits

- Positive fit in the undercut gives additional safety.
- Virtually expansion-free operation allows cost-efficient fixing with very small edge distances and axial spacings.
- Single-step drilling process simultaneously produces the undercut, saving installation time.
- Green ring becomes visable when correctly set.
- Immediate load-bearing capability avoids installation interruptions (no interruption for resin curing times, unlike chemical anchors).
- Anchor version with internal thread for high flexibility by using threaded rods or screws of different lengths and type.

INSTALLATION

Type of installation

- Pre-positioned installation (FZA and FZA-I)
- Push-through installation (FZA-D), please note: drill through the fixture



STANDARDS

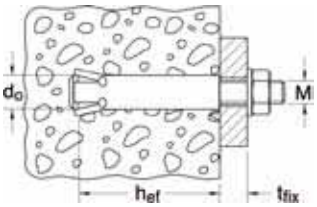
You will find everything that has standards on page 313 under the keyword approvals.

Zykon anchor FZA

TECHNICAL DATA

Zykon Bolt anchor **FZA**, zinc-plated steel

Type	Art.-No.	ID	approval ETA	drill-Ø d_0 [mm]	anchorage depth h_{ef} [mm]	max. usable length t_{fix} [mm]	thread M	width across nut SW	qty. per box pcs.
FZA 10 x 40 M 6/10	**60712**	1	■	10	40	10	M 6	10	25
FZA 12 x 40 M 8/15	**60715**	2	■	12	40	15	M 8	13	25
FZA 12 x 50 M 8/15	**60716**	9	■	12	50	15	M 8	13	20
FZA 14 x 40 M10/25	**60718**	3	■	14	40	25	M 10	17	25
FZA 14 x 60 M10/25	**60719**	0	■	14	60	25	M 10	17	10
FZA 18 x 80 M12/25	**60721**	3	■	18	80	25	M 12	19	10
FZA 22 x 100 M16/60	**60724**	4	■	22	100	60	M 16	24	10
FZA 22 x 125 M16/60	**60725**	1	■	22	125	60	M 16	24	6



Zykon Bolt anchor **FZA A4**, stainless steel A4

Type	Art.-No.	ID	approval ETA	drill-Ø d_0 [mm]	anchorage depth h_{ef} [mm]	max. usable length t_{fix} [mm]	thread M	width across nut SW	qty. per box pcs.
FZA 10 x 40 M 6/10 A4	**60772**	5	■	10	40	10	M 6	10	25
FZA 10 x 40 M 6/35 A4	**60771**	8	■	10	40	35	M 6	10	25
FZA 12 x 40 M 8/15 A4	**60775**	6	■	12	40	15	M 8	13	25
FZA 12 x 50 M 8/15 A4	**60776**	3	■	12	50	15	M 8	13	20
FZA 12 x 50 M 8/50 A4	**60774**	9	■	12	50	50	M 8	13	20
FZA 14 x 40 M10/25 A4	**60778**	7	■	14	40	25	M 10	17	20
FZA 14 x 60 M10/25 A4	**60779**	4	■	14	60	25	M 10	17	10
FZA 14 x 60 M10/50 A4	**60766**	4	■	14	60	50	M 10	17	10
FZA 18 x 80 M12/25 A4	**60781**	7	■	18	80	25	M 12	19	10
FZA 18 x 80 M12/55 A4	**60767**	1	■	18	80	55	M 12	19	10
FZA 22 x 100 M16/60 A4	**60782**	4	■	22	100	60	M 16	24	10
FZA 22 x 125 M16/60 A4	**60768**	8	■	22	125	60	M 16	24	6

Zykon Bolt Anchor **FZA C**, high corrosion-resistant steel 1.4529

Type	Art.-No.	ID	approval ETA	drill-Ø d_0 [mm]	anchorage depth h_{ef} [mm]	max. usable length t_{fix} [mm]	thread M	width across nut SW	qty. per box pcs.
FZA 10 x 40 M 6/10 C	**96214**	5	■	10	40	10	M 6	10	25
FZA 10 x 40 M 6/35 C	**96361**	6	■	10	40	35	M 6	10	25
FZA 12 x 40 M 8/15 C	**96215**	2	■	12	40	15	M 8	13	25
FZA 12 x 50 M 8/15 C	**96227**	5	■	12	50	15	M 8	13	20
FZA 12 x 50 M 8/50 C	**96362**	3	■	12	50	50	M 8	13	20
FZA 14 x 40 M10/25 C	**96228**	2	■	14	40	25	M 10	17	25
FZA 14 x 60 M10/25 C	**96216**	9	■	14	60	25	M 10	17	10
FZA 14 x 60 M10/50 C	**96358**	6	■	14	60	50	M 10	17	10
FZA 18 x 80 M12/25 C	**96315**	9	■	18	80	25	M 12	19	10
FZA 18 x 80 M12/55 C	**96359**	3	■	18	80	55	M 12	19	10
FZA 22 x 100 M16/25 C	**33800**	1	■	22	100	25	M 16	24	10
FZA 22 x 100 M16/30 C	**24523**	1	■	22	100	30	M 16	24	10
FZA 22 x 100 M16/60 C	**96364**	7	■	22	100	60	M 16	24	10
FZA 22 x 125 M16/60 C	**96360**	9	■	22	125	60	M 16	24	6

Other usable lengths available on request.

FIRE PROTECTION
Red hot: see page 308 for information about fire protection

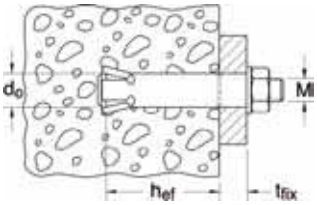
CORROSION
All about corrosion and how you can avoid it is written on page 309

TECHNICAL DATA

Zykon Through anchor **FZA-D**, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	anchorage depth	max. usable length	thread	width across nut	qty. per box
			■ ETA	d_0 [mm]	h_{ef} [mm]	t_{fix} [mm]	M	SW	pcs.
FZA 12 x 50 M 8 D/10	**60652**	0	■	12	40	10	M 8	13	25
FZA 12 x 60 M 8 D/10	**60653**	7	■	12	50	10	M 8	13	25
FZA 12 x 80 M 8 D/30	**60654**	4	■	12	50	30	M 8	13	25
FZA 14 x 80 M10 D/20	**60657**	5	■	14	60	20	M 10	17	10
FZA 14 x 100 M10 D/40	**60658**	2	■	14	60	40	M 10	17	10
FZA 18 x 100 M12 D/20	**60684**	1	■	18	80	20	M 12	19	10
FZA 18 x 130 M12 D/50	**60685**	8	■	18	80	50	M 12	19	10
FZA 22 x 125 M16 D/25	**60663**	6	■	22	100	25	M 16	24	10

Other usable lengths available on request.



Zykon Through anchor **FZA-D A4**, stainless steel A4

Type	Art.-No.	ID	approval	drill-Ø	anchorage depth	max. usable length	thread	width across nut	qty. per box
			■ ETA	d_0 [mm]	h_{ef} [mm]	t_{fix} [mm]	M	SW	pcs.
FZA 12 x 50 M 8 D/10 A4	**60664**	3	■	12	40	10	M 8	13	25
FZA 12 x 60 M 8 D/10 A4	**60665**	0	■	12	50	10	M 8	13	25
FZA 12 x 80 M 8 D/30 A4	**60666**	7	■	12	50	30	M 8	13	25
FZA 14 x 80 M10 D/20 A4	**60669**	8	■	14	60	20	M 10	17	10
FZA 14 x 100 M10 D/40 A4	**60670**	4	■	14	60	40	M 10	17	10
FZA 18 x 100 M12 D/20 A4	**60672**	8	■	18	80	20	M 12	19	10
FZA 18 x 130 M12 D/50 A4	**60673**	5	■	18	80	50	M 12	19	10
FZA 22 x 125 M16 D/25 A4	**60675**	9	■	22	100	25	M 16	24	10

Other usable lengths available on request.

Zykon Through anchor **FZA-D C**, high corrosion-resistant steel 1.4529

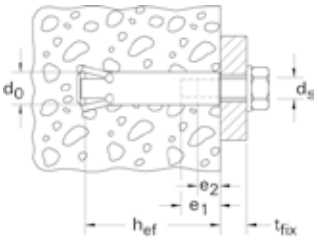
Type	Art.-No.	ID	approval	drill-Ø	anchorage depth	max. usable length	thread	width across nut	qty. per box
			■ ETA	d_0 [mm]	h_{ef} [mm]	t_{fix} [mm]	M	SW	pcs.
FZA 12 x 50 M 8 D/10 C	**96319**	7	■	12	40	10	M 8	13	20
FZA 12 x 60 M 8 D/10 C	**96353**	1	■	12	50	10	M 8	13	20
FZA 12 x 80 M 8 D/30 C	**96354**	8	■	12	50	30	M 8	13	20
FZA 14 x 80 M10 D/20 C	**96355**	5	■	14	60	20	M 10	17	10
FZA 18 x 100 M12 D/20 C	**96356**	2	■	18	80	20	M 12	19	10
FZA 18 x 130 M12 D/50 C	**96357**	9	■	18	80	50	M 12	19	10

Other usable lengths available on request.

TECHNICAL DATA ZYKON INTERNALLY-THREADED ANCHOR

Zykon Internally-threaded anchor **FZA-I**, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	anchorage depth	internal thread	min. bolt penetration	max. bolt penetration	qty. per box
			■ ETA	d_0 [mm]	h_{ef} [mm]	d_s	e_2 [mm]	e_1 [mm]	pcs.
FZA 12 x 40 M 6 I	**60758**	9	■	12	40	M 6	8	13	25
FZA 14 x 60 M 8 I	**60760**	2	■	14	60	M 8	11	17	20
FZA 18 x 80 M10 I	**60761**	9	■	18	80	M 10	13	21	10
FZA 22 x 100 M12 I	**60763**	3	■	22	100	M 12	15	25	10
FZA 22 x 125 M12 I	**60769**	5	■	22	125	M 12	15	25	10

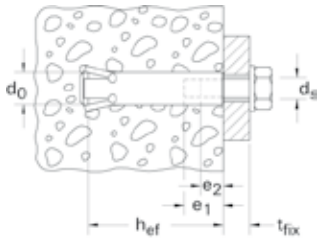


Zykon anchor FZA

TECHNICAL DATA ZYKON INTERNALLY-THREADED ANCHOR

Zykon internally-threaded anchor
FZA-I A4, stainless steel A4

Type	Art.-No.	ID	approval ■ ETA	drill-Ø d_0 [mm]	anchorage depth h_{ef} [mm]	internal thread d_s	min. bolt penetration e_2 [mm]	max. bolt penetration e_1 [mm]	qty. per box pcs.
FZA 12 x 40 M 6 I A4	**60783**	1	■	12	40	M 6	8	13	25
FZA 12 x 50 M 6 I A4	**60784**	8	■	12	50	M 6	8	13	25
FZA 14 x 60 M 8 I A4	**60786**	2	■	14	60	M 8	11	17	20
FZA 18 x 80 M10 I A4	**60787**	9	■	18	80	M 10	13	21	10
FZA 22 x 100 M12 I A4	**60788**	6	■	22	100	M 12	15	25	10
FZA 22 x 125 M12 I A4	**60770**	1	■	22	125	M 12	15	25	10



TECHNICAL DATA ZYKON ANCHOR FOR FIXING MAN HOLE STEP IRONS

Zykon anchor for fixing man hole step irons **FZA ST A4**

Type		Art.-No.	ID	drill-Ø d_0 [mm]	anchorage depth h_{ef} [mm]	max. usable length t_{fix} [mm]	thread M	width across nut SW	qty. per box pcs.
FZA 14 x 40 ST A4	1)	**60686**	5	14	40	30	M 10	16	20
FZA 14 x 60 ST A4	1)	**60687**	2	14	60	30	M 10	16	20

1) According to DIN V 1211GS/1212GS.

DRILLING AND SETTING TOOLS

Drill bit **FZUB** approved only for Zykon anchors and Zykon hammerset anchors

Machine setting tool **FZUE** for mounting on the drill bit

Setting tool **FZE** Including centring pin for internally-threaded anchors for assembly with hand hammer

Type	Art.-No.	ID	fits anchor Bolt anchor	Through anchor	Internally-threaded anchor	qty. per box pcs.
FZUB 10 x 40	**60622**	3	FZA 10 x 40 M6	-	-	1
FZUB 12 x 40	**60623**	0	FZA 12 x 40 M8	-	FZA 12 x 40 M6 I	1
FZUB 12 x 50	**60627**	8	FZA 12 x 50 M8	FZA 12 x 50 M8 D/10	FZA 12 x 50 M6 I	1
FZUB 12 x 60	**60625**	4	-	FZA 12 x 60 M8 D/10	-	1
FZUB 12 x 80	**60626**	1	-	FZA 12 x 80 M8 D/30	-	1
FZUB 14 x 40	**60624**	7	FZA 14 x 40 M10	-	-	
FZUB 14 x 60	**60628**	5	FZA 14 x 60 M10	-	FZA 14 x 60 M8 I	1
FZUB 14 x 80	**60629**	2	-	FZA 14 x 80 M10 D/20	-	1
FZUB 14 x 100	**60630**	8	-	FZA 14 x 100 M10 D/40	-	1
FZUB 18 x 80	**60634**	6	FZA 18 x 80 M12	-	FZA 18 x 80 M10 I	1
FZUB 18 x 100	**60632**	2	-	FZA 18 x 100 M12 D/20	-	1
FZUB 18 x 130	**60633**	9	-	FZA 18 x 130 M12 D/50	-	1
FZUB 22 x 100	**60636**	0	FZA 22 x 100 M16	-	FZA 22 x 100 M12 I	1
FZUB 22 x 125	**60638**	4	FZA 22 x 125 M16	FZA 22 x 125 M16 D/25	FZA 22 x 125 M12 I	1
FZUE 10	**60640**	7	FZA 10 x 40 M6/10	-	-	1
FZUE 12	**60641**	4	FZA 12 x ... M8	FZA 12 x ...M8 D	-	1
FZUE 14	**60642**	1	FZA 14 x ... M10	FZA 14 x ...M10 D	-	1
FZUE 18	**60643**	8	FZA 18 x ... M12	FZA 18 x ...M12 D	-	1
FZE 10	**60740**	4	FZA 10 x 40 M6/35	-	-	1
FZE 12 Plus	**44638**	1	FZA 12 x ... M8	FZA 12 x ... M8 D	FZA 12 x ... M6 I	1
FZE 14 Plus	**44639**	8	FZA 14 x ... M10	FZA 14 x ... M10 D	FZA 14 x ... M8 I	1
FZE 18 Plus	**44640**	5	FZA 18 x ... M12	FZA 18 x ... M12 D	FZA 18 x ... M10 I	1
FZE 22 Plus	**44641**	2	FZA 22 x ... M16	FZA 22 x ... M16 D	FZA 22 x ... M12 I	1

CORROSION
All about corrosion and how you can avoid it
is written on page 309.

LOADS - ZYKON BOLT ANCHOR

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Zykon bolt anchor FZA with large axial spacing and edge distance

				Non-cracked concrete								Cracked concrete							
Anchor size				**10 x 40 M6**	**12 x 40 M8**	**14 x 40 M10**	**12 x 50 M8**	**14 x 60 M10**	**18 x 80 M12**	**22 x 100 M16**	**22 x 125 M16**	**10 x 40 M6**	**12 x 40 M8**	**14 x 40 M10**	**12 x 50 M8**	**14 x 60 M10**	**18 x 80 M12**	**22 x 100 M16**	**22 x 125 M16**
Effective anchorage depth		h_{ef}	[mm]	**40**	**40**	**40**	**50**	**60**	**80**	**100**	**125**	**40**	**40**	**40**	**50**	**60**	**80**	**100**	**125**
Drill hole depth		h_0	[mm]	43	44	45	54	65	85	105	130	43	44	45	54	65	85	105	130
Drill hole diameter		d_0	[mm]	10	12	14	12	14	18	22	22	10	12	14	12	14	18	22	22
Mean ultimate loads N_u and V_u [kN]																			
Tensile	0°	N_u	[kN]	gvz	16.1*	17.1	17.1	23.9	31.4	48.3	67.5	94.3	12.0	12.0	12.0	16.7	22.0	33.8	47.2	66.0
				A4/C	14.1*	17.1	17.1	23.9	31.4	48.3	67.5	94.3	12.0	12.0	12.0	16.7	22.0	33.8	47.2	66.0
Shear	90°	V_u	[kN]	gvz	9.6*	17.6*	27.8*	17.6*	27.8*	40.5*	75.4*	75.4*	9.6*	15.5	15.5	17.6*	27.8*	40.5*	75.4*	75.4*
				A4/C	8.4*	15.4*	24.4*	15.4*	24.4*	35.4*	65.9*	65.9*	8.4*	15.4*	15.5	15.4*	24.4*	35.4*	65.9*	65.9*
Design resistant loads N_{Rd} and V_{Rd} [kN]																			
Tensile	0°	N_{Rd}	[kN]	gvz	9.4	9.4	9.4	13.1	17.2	26.4	37.0	51.7	6.1	6.1	6.1	8.5	11.2	17.2	24.0	33.5
				A4	7.5	9.4	9.4	13.1	17.2	26.4	37.0	51.7	6.1	6.1	6.1	8.5	11.2	17.2	24.0	33.5
				C	9.4	9.4	9.4	13.1	17.2	26.4	37.0	51.7	6.1	6.1	6.1	8.5	11.2	17.2	24.0	33.5
Shear	90°	V_{Rd}	[kN]	gvz	6.4	11.8	12.2	11.8	18.6	27.0	50.2	50.2	6.4	7.9	7.9	11.0	18.6	27.0	48.0	50.2
				A4	4.5	8.2	12.2	8.2	13.0	18.9	35.3	35.3	4.5	7.9	7.9	8.2	13.0	18.9	35.3	35.3
				C	5.6	10.2	12.2	10.2	16.2	23.6	44.0	44.0	5.6	7.9	7.9	10.2	16.2	23.6	44.0	44.0
Recommended loads N_{rec} and V_{rec} [kN]																			
Tensile	0°	N_{rec}	[kN]	gvz	6.7	6.7	6.7	9.3	12.3	18.9	26.4	36.9	4.3	4.3	4.3	6.1	8.0	12.3	17.1	24.0
				A4	5.4	6.7	6.7	9.3	12.3	18.9	26.4	36.9	4.3	4.3	4.3	6.1	8.0	12.3	17.1	24.0
				C	6.7	6.7	6.7	9.3	12.3	18.9	26.4	36.9	4.3	4.3	4.3	6.1	8.0	12.3	17.1	24.0
Shear	90°	V_{rec}	[kN]	gvz	4.6	7.2	7.2	8.4	13.3	19.3	35.9	35.9	4.6	5.6	5.6	7.9	13.3	19.3	34.3	35.9
				A4	3.2	5.9	7.2	5.9	9.3	13.5	25.2	25.2	3.2	5.6	5.6	5.9	9.3	13.5	25.2	25.2
				C	4.0	7.2	7.2	7.3	11.6	16.9	31.4	31.4	4.0	5.6	5.6	7.3	11.6	16.9	31.4	31.4
Recommended bending moment M_{rec} [Nm]																			
		M_{rec}	[Nm]	gvz	7.0	17.1	34.1	17.1	34.1	60.0	152.1	152.1	7.0	17.1	34.1	17.1	34.1	60.0	152.1	152.1
				A4	4.9	12.0	23.9	12.0	23.9	41.9	106.4	106.4	4.9	12.0	23.9	12.0	23.9	41.9	106.4	106.4
				C	6.1	15.0	29.9	15.0	29.9	52.4	132.9	132.9	6.1	15.0	29.9	15.0	29.9	52.4	132.9	132.9
Component dimensions, minimum axial spacings and edge distances																			
Min. axial spacing[1)]		s_{min}	[mm]	40	40	70	50	60	80	100	125	40	40	70	50	60	80	100	125
Min. edge distance[1)]		c_{min}	[mm]	35	40	70	45	55	70	100	125	35	40	70	45	55	70	100	125
Min. structural component thickness		h_{min}	[mm]	100	100	100	100	120	160	200	250	100	100	100	100	120	160	200	250
Required torque		T_{inst}	[Nm]	8.5	20	20	20	40	60	100	100	8.5	20	20	20	40	60	100	100

* steel failure decisive

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 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 conditions of application may differ from those given in the European Technical Approval.
For further detailed information about ETA please contact your local fischer representative.

Zykon anchor FZA

LOADS - ZYKON THROUGH ANCHOR

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Zykon Through-anchor FZA-D with large axial spacing and edge distance

				Non-cracked concrete								Cracked concrete							
Anchor size				**12 x 50 M8 D**	**12 x 60 M8 D**	**12 x 80 M8 D**	**14 x 80 M10 D**	**14 x 100 M10 D**	**18 x 100 M12 D**	**18 x 130 M12 D**	**22 x 125 M16 D**	**12 x 50 M8 D**	**12 x 60 M8 D**	**12 x 80 M8 D**	**14 x 80 M10 D**	**14 x 100 M10 D**	**18 x 100 M12 D**	**18 x 130 M12 D**	**22 x 125 M16 D**
Effective anchorage depth		h_{ef}	[mm]	**40**	**50**	**50**	**60**	**60**	**80**	**80**	**100**	**40**	**50**	**50**	**60**	**60**	**80**	**80**	**100**
Drill hole depth		h_0	[mm]	44	54	55	65	65	85	85	105	44	54	55	65	65	85	85	105
Drill hole diameter		d_0	[mm]	12	12	14	14	14	18	18	22	12	12	14	14	14	18	18	22
Mean ultimate loads N_u and V_u [kN]																			
Tensile	0°	N_u	[kN]	gvz	17.1	23.9	23.9	31.4	31.4	48.3	48.3	67.5	12.0	16.7	16.7	22.0	22.0	33.8	33.8	47.2
				A4/C	17.1	23.9	23.9	31.4	31.4	48.3	48.3	67.5	12.0	16.7	16.7	22.0	22.0	33.8	33.8	47.2
Shear	90°	V_u	[kN]	gvz	23.8*	23.8*	23.8*	33.6*	33.6*	53.1*	53.1*	85.3*	15.5	21.7	21.7	33.6*	33.6*	53.1*	53.1*	85.3*
				A4/C	25.4*	25.4*	25.4*	34.5*	34.5*	56.2*	56.2*	85.5*	15.5	21.7	21.7	34.5*	34.5*	56.2*	56.2*	85.5*
Design resistant loads N_{Rd} and V_{Rd} [kN]																			
Tensile	0°	N_{Rd}	[kN]	gvz	9.4	13.1	13.1	17.2	17.2	26.4	26.4	37.0	6.1	8.5	8.5	11.2	11.2	17.2	17.2	24.0
				A4	9.4	13.1	13.1	17.2	17.2	26.4	26.4	37.0	6.1	8.5	8.5	11.2	11.2	17.2	17.2	24.0
				C	9.4	13.1	13.1	17.2	–	26.4	26.4	–	6.1	8.5	8.5	11.2	–	17.2	17.2	–
Shear	90°	V_{Rd}	[kN]	gvz	12.2	17.0	17.0	23.8	23.8	37.0	37.0	60.2	7.9	11.0	11.0	22.3	22.3	34.3	34.3	60.2
				A4	11.4	11.4	11.4	16.3	16.3	24.8	24.8	41.1	7.9	11.0	11.0	16.3	16.3	24.8	24.8	41.1
				C	12.2	14.2	14.2	20.3	–	31.0	31.0	–	7.9	11.0	11.0	20.3	–	31.0	31.0	–
Recommended loads N_{rec} and V_{rec} [kN]																			
Tensile	0°	N_{rec}	[kN]	gvz	6.7	9.3	9.3	12.3	12.3	18.9	18.9	26.4	4.3	6.1	6.1	8.0	8.0	12.3	12.3	17.1
				A4	6.7	9.3	9.3	12.3	12.3	18.9	18.9	26.4	4.3	6.1	6.1	8.0	8.0	12.3	12.3	17.1
				C	6.7	9.3	9.3	12.3	–	18.9	18.9	–	4.3	6.1	6.1	8.0	–	12.3	12.3	–
Shear	90°	V_{rec}	[kN]	gvz	8.7	12.1	12.1	17.0	17.0	26.5	26.5	43.0	5.6	7.9	7.9	15.9	15.9	24.5	24.5	34.3
				A4	8.2	8.2	8.2	11.6	11.6	17.7	17.7	29.3	5.6	7.9	7.9	11.6	11.6	17.7	17.7	29.3
				C	8.7	10.2	10.2	14.5	–	22.1	22.1	–	5.6	7.9	7.9	14.5	–	22.1	22.1	–
Recommended bending moment M_{rec} [Nm]																			
		M_{rec}	[Nm]	gvz	52.8	52.8	52.8	85.7	85.7	174.3	174.3	332.1	52.8	52.8	52.8	85.7	85.7	174.3	174.3	332.1
				A4	28.1	28.1	28.1	45.9	45.9	92.9	92.9	178.6	28.1	28.1	28.1	45.9	45.9	92.9	92.9	178.6
				C	35.1	35.1	35.1	57.2	–	116.4	116.4	–	35.1	35.1	35.1	57.2	–	116.4	116.4	–
Component dimensions, minimum axial spacings and edge distances																			
Min. axial spacing[1)]		s_{min}	[mm]	40	50	50	60	60	80	80	100	40	50	50	60	60	80	80	100
Min. edge distance[1)]		c_{min}	[mm]	40	45	45	55	55	70	70	100	40	45	45	55	55	70	70	100
Min. structural component thickness		h_{min}	[mm]	100	100	100	120	120	160	160	200	100	100	100	120	120	160	160	200
Required torque		T_{inst}	[Nm]	20	20	20	40	40	60	60	100	20	20	20	40	40	60	60	100

* steel failure decisive

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 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 conditions of application may differ from those given in the European Technical Approval.
For further detailed information about ETA please contact your local representative.

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LOADS - ZYKON INTERNALLY-THREADED ANCHOR

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Zykon internally-threaded anchor FZA-I with large axial spacing and edge distance

					Non-cracked concrete						Cracked concrete					
Anchor size					**12 x 40 M6 I**	**12 x 50 M6 I**	**14 x 60 M8 I**	**18 x 80 M10 I**	**22 x 100 M 12 I**	**22 x 125 M12 I**	**12 x 40 M6 I**	**12 x 50 M6 I**	**14 x 60 M8 I**	**18 x 80 M10 I**	**22 x 100 M12 I**	**22 x 125 M12 I**
Effective anchorage depth		h_{ef}	[mm]		**40**	**50**	**60**	**80**	**100**	**125**	**40**	**50**	**60**	**80**	**100**	**125**
Drill hole depth		h_0 =	[mm]		44	54	65	85	105	130	44	54	65	85	105	130
Drill hole diameter		d_0	[mm]		12	12	14	18	22	22	12	12	14	18	22	22
Mean ultimate loads N_u and V_u [kN]																
Tensile	0°	N_u	[kN]	gvz	17.2*	–	23.0*	26.9*	63.0*	63.0*	12.0	–	23.0*	26.9*	47.2	63.0*
				A4	13.4*	13.4*	18.0*	22.7*	53.2*	53.2*	12.0	12.0	18.0*	22.7*	47.2	53.2*
Shear	90°	V_u	[kN]	gvz	9.6*	–	17.6*	27.8*	40.5*	40.5*	9.6*	–	17.6*	27.8*	40.5*	40.5*
				A4	8.4*	8.4*	15.4*	24.4*	35.4*	35.4*	8.4*	8.4*	15.4*	24.4*	35.4*	35.4*
Design resistant loads N_{Rd} and V_{Rd} [kN]																
Tensile	0°	N_{Rd}	[kN]	gvz	9.4	–	13.1	13.5	31.5	31.5	6.1	–	11.2	13.5	24.0	31.5
				A4	7.5	7.5	9.9	12.6	29.5	29.5	6.1	7.5	9.9	12.6	24.0	29.5
Shear	90°	V_{Rd}	[kN]	gvz	5.7	–	7.6	7.9	18.5	18.5	5.7	–	7.6	7.9	18.5	18.5
				A4	4.5	4.5	6.0	7.5	17.7	17.7	4.5	4.5	6.0	7.5	17.7	17.7
Recommended loads N_{rec} and V_{rec} [kN]																
Tensile	0°	N_{rec}	[kN]	gvz	6.7	–	9.3	9.6	22.5	22.5	4.3	–	8.0	9.6	17.1	22.5
				A4	5.4	5.4	7.1	9.0	21.1	21.1	4.3	5.4	7.1	9.0	17.1	21.1
Shear	90°	V_{rec}	[kN]	gvz	4.1	–	5.4	5.6	13.2	13.2	4.1	–	5.4	5.6	13.2	13.2
				A4	3.2	3.2	4.3	5.4	12.7	12.7	3.2	3.2	4.3	5.4	12.7	12.7
Recommended bending moment M_{rec} [Nm]																
		M_{rec}	[Nm]	gvz	5.8	–	14.3	25.1	44.1	44.1	5.8	–	14.3	25.1	44.1	44.1
				A4	5.1	5.1	12.5	24.9	43.6	43.6	5.1	5.1	12.5	24.9	43.6	43.6
Component dimensions, minimum axial spacings and edge distances																
Min. axial spacing[1)]		s_{min}	[mm]		40	50	60	80	100	125	40	50	60	80	100	125
Min. edge distance[1)]		c_{min}	[mm]		35	45	55	70	100	125	35	45	55	70	100	125
Min. structural component thickness		h_{min}	[mm]		100	100	120	160	200	250	100	100	120	160	200	250
Required torque		T_{inst}	[Nm]		8.5	8.5	15	30	60	60	8.5	8.5	15	30	60	60

* steel failure, values apply to screws with a strength classification 8.8 and A4-70 respectively.

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 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 conditions of application differ from those given in the European Technical Approval.
For further detailed information about ETA please contact your local representative.

Anchor bolt FAZ II

The strong, easy-to-install expansion bolt for cracked concrete.

OVERVIEW

Anchor bolt **FAZ II**, zinc-plated steel

Anchor bolt **FAZ A4**, stainless steel A4

Anchor bolt **FAZ C**, highly corrosion-resistant steel 1.4529

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

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

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

ETA CE European Technical Approval- Option 1 for cracked concrete

PROTEZIONE CIVILE PROTECTION CIVILE ZIVILSCHUTZ

VdS from size M8

FM APPROVED from M10

Shock approval by the Federal Office for Civil Defense, Bonn.

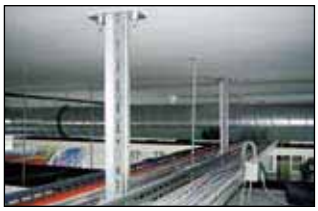
Fire resistance classification F 120 Anchor types see test report

DESCRIPTION

- Anchor bolt for push-through installation.
- When the hexagonal nut is tightened, the tapered bolt is pulled into the expansion clip and expands it against the drill hole wall.
- The FAZ II made of stainless steel A4 is for outdoor applications and for damp rooms. Highly corrosion-resistant steel (material number 1.4529) for applications in aggressive atmospheres.
- FAZ-GS with large pre-assembled washer for fixings through oblong holes.

Advantages/benefits

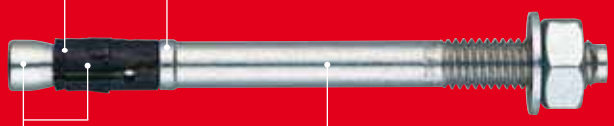
- Optimised expansion clip ensures uniform load distribution for high permissible loads and small edge distances and axial spacings with structural elements, as well as secure expansion, even in cracked concrete.
- Installation-friendly, since only a few revolutions are necessary to apply the torque.



FAZ II - ADVANTAGES AT A GLANCE

The black expansion clip
makes the FAZ II easily distinguishable from its predecessor.

The distinctive collar
ensures that the clip stays in its position even when reinforcements are hit or there are voids when it is driven in.



The unit of cone and expansion clip
increases the tensile strength by up to 38 % in comparison to its predecessor and provides small edge distances and axial spacings, easy driving-in and a short tightening distance.

The optimised shaft
allows shear forces that are up to 96 % higher than those of the predecessor product. With its optimised diameter, it can be driven in easily and if necessary can also be aligned afterwards.

- Highest tensile and shear loads, that means: more safety with fewer total fixing points and thus lower costs
- Can be used in extremely thin concrete panels, starting at 80 mm thickness
- Smallest edge distances and axial spacings for more application options
- Low driving-in energy, small tightening distance and thus extremely handy for installation work
- High steel ductility enables subsequent alignment using a hammer

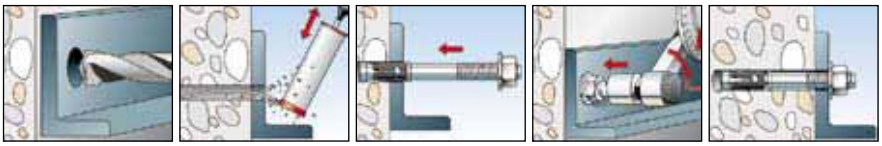
STANDARDS

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

INSTALLATION

Type of installation

- Push-through and pre-positioned installation



Installation tips

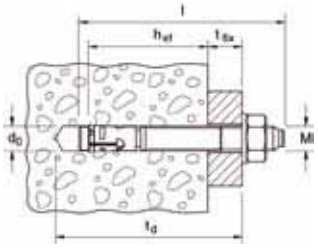
- For large number of installations we recommend the anchor bolt setting tool FABS (see page 90) to reduce installation time.
- Before driving in, the hexagon nut must be brought into the optimal installation position (the thread projects by 2 to 3 mm).

TECHNICAL DATA

Anchor bolt **FAZ II, zinc-plated steel**

Anchor bolt **FAZ II-GS (with large washer), zinc-plated steel**

Type		Art.-No.	ID	approval	drill-Ø	min. drill-hole depth for through fixings	effect. anchorage depth	anchor length	max. usable length	thread	width across nut	Washer (outer diameter x thickness)	qty. per box
				■ ETA	d_0	t_d	h_{ef}	l	t_{fix}	M	SW		
					[mm]	[mm]	[mm]	[mm]	[mm]			[mm]	pcs.
FAZ II 8/10		**94871**	2	■	8	75	45	77	10	M 8	13	16 x 1,6	50
FAZ II 8/30		**94877**	4	■	8	95	45	97	30	M 8	13	16 x 1,6	50
FAZ II 8/50		**94878**	1	■	8	115	45	117	50	M 8	13	16 x 1,6	50
FAZ II 8/100		**94879**	8	■	8	165	45	167	100	M 8	13	16 x 1,6	25
FAZ II 8/150		**94980**	1	■	8	215	45	217	150	M 8	13	16 x 1,6	20
FAZ II 10/10		**94981**	8	■	10	90	60	95	10	M 10	17	20 x 2	50
FAZ II 10/20		**94982**	5	■	10	100	60	105	20	M 10	17	20 x 2	25
FAZ II 10/30		**94983**	2	■	10	110	60	115	30	M 10	17	20 x 2	25
FAZ II 10/50		**94984**	9	■	10	130	60	135	50	M 10	17	20 x 2	20
FAZ II 10/80		**94985**	6	■	10	160	60	165	80	M 10	17	20 x 2	20
FAZ II 10/100		**94986**	3	■	10	180	60	185	100	M 10	17	20 x 2	20
FAZ II 10/150		**95141**	5	■	10	230	60	235	150	M 10	17	20 x 2	20
FAZ II 12/10		**95419**	5	■	12	105	70	110	10	M 12	19	24 x 2,5	20
FAZ II 12/20		**95420**	1	■	12	115	70	120	20	M 12	19	24 x 2,5	20
FAZ II 12/30		**95421**	8	■	12	125	70	130	30	M 12	19	24 x 2,5	20
FAZ II 12/50		**95446**	1	■	12	145	70	150	50	M 12	19	24 x 2,5	20
FAZ II 12/80		**95454**	6	■	12	175	70	180	80	M 12	19	24 x 2,5	20
FAZ II 12/100		**95470**	6	■	12	195	70	200	100	M 12	19	24 x 2,5	20
FAZ II 12/150		**95557**	4	■	12	245	70	250	150	M 12	19	24 x 2,5	20
FAZ II 12/200		**95605**	2	■	12	295	70	300	200	M 12	19	24 x 2,5	10
FAZ II 16/25		**95836**	0	■	16	140	85	150	25	M 16	24	30 x 3	10
FAZ II 16/50		**95864**	3	■	16	165	85	175	50	M 16	24	30 x 3	10
FAZ II 16/100		**95865**	0	■	16	215	85	225	100	M 16	24	30 x 3	10
FAZ II 16/150		**95875**	9	■	16	265	85	275	150	M 16	24	30 x 3	10
FAZ II 16/200		**95967**	1	■	16	315	85	325	200	M 16	24	30 x 3	10
FAZ II 16/250		**95968**	8	■	16	365	85	375	250	M 16	24	30 x 3	10
FAZ II 16/300		**96188**	9	■	16	415	85	425	300	M 16	24	30 x 3	10
FAZ II 8/10 GS	1)	**94872**	9	■	8	75	45	77	10	M 8	13	24 x 2	50
FAZ II 8/30 GS	1)	**96189**	6	■	8	95	45	97	30	M 8	13	24 x 2	50
FAZ II 10/10 GS	1)	**96291**	6	■	10	90	60	95	10	M 10	17	25 x 3	50
FAZ II 10/30 GS	1)	**96297**	8	■	10	110	60	115	30	M 10	17	25 x 3	25
FAZ II 12/10 GS	1)	**96303**	6	■	12	105	70	110	10	M 12	19	30 x 3	20
FAZ II 12/30 GS	1)	**96340**	1	■	12	125	70	130	30	M 12	19	30 x 3	20
FAZ II 12/120 GS	1)	**96367**	8	■	12	215	70	220	120	M 12	19	30 x 3	20
FAZ II 16/150 GS	1)	**96368**	5	■	16	265	85	275	150	M 16	24	56 x 5	10
FAZ II 16/200 GS	1)	**96370**	8	■	16	315	85	325	200	M 16	24	56 x 5	10



1) GS = large washer

FIRE PROTECTION

Red hot: see page 308 for information about fire protection.

CORROSION

All about corrosion and how you can avoid it is written on page 309.

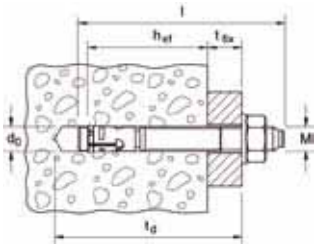
Anchor bolt FAZ

TECHNICAL DATA

Anchor bolt **FAZ**, zinc-plated steel

Anchor bolt **FAZ GS** (with large washer), zinc-plated steel

Type		Art.-No.	ID	approval	drill-Ø	min. drill-hole depth for through fixings	effect. anchorage depth	anchor length	max. usable length	thread	width across nut	qty. per box
				ETA	d_0	t_d	h_{ef}	l	t_{fix}	M	SW	
					[mm]	[mm]	[mm]	[mm]	[mm]			pcs.
FAZ II 20/30		**46632**	1	■	20	165	100	172	30	M 20	27	5
FAZ II 20/60		**46633**	8	■	20	195	100	202	60	M 20	27	5
FAZ II 20/150		**46634**	5	■	20	280	100	292	150	M 20	27	5
FAZ II 24/30		**46635**	2	■	24	190	125	204	30	M 24	32	5
FAZ II 24/60		**46636**	2	■	24	215	125	234	60	M 24	32	5



Anchor bolt **FAZ A4**, stainless steel A4

Anchor bolt **FAZ C**, highly corrosion-resistant steel 1.4529

Type		Art.-No.	ID	approval	drill-Ø	min. drill-hole depth for through fixings	effect. anchorage depth	anchor length	max. usable length	thread	width across nut	Washer (outer diameter x thickness)	qty. per box
				ETA	d_0	t_d	h_{ef}	l	t_{fix}	M	SW		
					[mm]	[mm]	[mm]	[mm]	[mm]			[mm]	pcs.
FAZ 8/10 A4		**68550**	1	■	8	75	45	74	10	M 8	13	16 x 1,6	50
FAZ 8/30 A4		**68552**	5	■	8	95	45	94	30	M 8	13	16 x 1,6	50
FAZ 8/50 A4		**68553**	2	■	8	115	45	114	50	M 8	13	16 x 1,6	50
FAZ 10/10 A4		**68555**	6	■	10	90	60	93	10	M 10	17	20 x 2	50
FAZ 10/20 A4		**93030**	4	■	10	100	60	103	20	M 10	17	20 x 2	25
FAZ 10/30 A4		**68556**	3	■	10	110	60	113	30	M 10	17	20 x 2	25
FAZ 10/50 A4		**68557**	0	■	10	130	60	133	50	M 10	17	20 x 2	20
FAZ 10/70 A4		**96796**	6	■	10	150	60	153	70	M 10	17	20 x 2	20
FAZ 10/100 A4		**68558**	7	■	10	180	60	183	100	M 10	17	20 x 2	20
FAZ 10/150 A4		**78245**	3	■	10	220	60	233	150	M 10	17	20 x 2	20
FAZ 12/10 A4		**68560**	0	■	12	115	70	108	10	M 12	19	24 x 2,5	20
FAZ 12/20 A4		**93031**	1	■	12	115	70	118	20	M 12	19	24 x 2,5	20
FAZ 12/30 A4		**68561**	7	■	12	125	70	128	30	M 12	19	24 x 2,5	20
FAZ 12/50 A4		**68562**	4	■	12	145	70	148	50	M 12	19	24 x 2,5	20
FAZ 12/100 A4		**68564**	8	■	12	195	70	198	100	M 12	19	24 x 2,5	20
FAZ 16/25 A4		**68565**	5	■	16	140	85	146	25	M 16	24	30 x 3	10
FAZ 16/50 A4		**68567**	9	■	16	165	85	171	50	M 16	24	30 x 3	10
FAZ 16/100 A4		**68568**	6	■	16	215	85	221	100	M 16	24	30 x 3	10
FAZ 20/30 A4		**90678**	1		24	160	100	172	30	M 20	30	37 x 3	5
FAZ 24/30 A4		**90679**	8		24	185	125	204	30	M 24	36	44 x 4	5
FAZ 8/10 GS	1)	**79854**	6	■	8	75	45	74	10	M 8	13	22 x 2,5	50
FAZ 8/30 GS A4	1)	**93034**	2	■	8	95	45	94	30	M 8	13	22 x 2,5	50
FAZ 10/10 GS A4	1)	**70450**	9	■	10	90	60	93	10	M 10	17	25 x 3	50
FAZ 10/30 GS A4	1)	**93035**	9	■	10	110	60	113	30	M 10	17	25 x 3	25
FAZ 12/10 GS A4	1)	**70456**	1	■	12	105	70	108	10	M 12	19	30 x 3	20
FAZ 12/30 GS A4	1)	**93036**	6	■	12	125	70	128	30	M 12	19	30 x 3	20
FAZ 8/10 C		**90198**	4	■	8	75	45	74	10	M 8	13	16 x 1,6	50
FAZ 8/30 C		**90200**	4	■	8	95	45	94	30	M 8	13	16 x 1,6	50
FAZ 8/50 C		**91069**	6	■	8	115	45	115	50	M 8	13	16 x 1,6	50
FAZ 10/10 C		**90201**	1	■	10	90	60	93	10	M 10	17	20 x 2	50
FAZ 10/30 C		**90203**	5	■	10	110	60	113	30	M 10	17	20 x 2	25
FAZ 12/10 C		**90204**	2	■	12	105	70	108	10	M 12	19	24 x 2,5	20
FAZ 12/30 C		**90206**	6	■	12	125	70	128	30	M 12	19	24 x 2,5	20
FAZ 16/25 C		**90207**	3	■	16	140	85	146	25	M 16	24	30 x 3	10
FAZ 16/50 C		**90208**	0	■	16	165	85	171	50	M 16	24	30 x 3	10
FAZ 8/10 GS C	1)	**90199**	1	■	8	75	45	74	10	M 8	13	22 x 3	50
FAZ 10/10 GS C	1)	**90202**	8	■	10	90	60	93	10	M 10	17	25 x 3	50
FAZ 12/10 GS C	1)	**90205**	9	■	12	105	70	108	10	M 12	19	30 x 3	20

1) GS = large washer

LOADS

Mean ultimate loads. design resistant and recommended loads for single anchors of fischer Anchor bolt FAZ with large axial spacing and edge distance

					Non-cracked concrete						Cracked concrete					
Anchor size					**M 8**	**M 10**	**M 12**	**M 16**	**M 20**	**M 24**	**M 8**	**M 10**	**M 12**	**M 16**	**M 20**	**M 24**
Effective anchorage depth		h_{ef}	[mm]		**45**	**60**	**70**	**85**	**100**	**125**	**45**	**60**	**70**	**85**	**100**	**125**
Drill hole depth		$h_1 \geq$	[mm]		55	75	90	110	130	155	55	75	90	110	130	155
Drill hole diameter		d_0	[mm]		8	10	12	16	20	24	8	10	12	16	20	24
Mean ultimate loads N_u and V_u [kN]																
Tensile	0°	N_u	[kN]	gvz	15.9	26.4	38.6	52.9	55.1	79.2	13.8	22.0	27.7	37.0	42.3	47.3
				A4	16.8	26.8	35.3	48.4	65.7	93.3	10.3*	18.1	24.6	37.0	47.3	66.0
				C	16.0*	25.4*	35.3	48.4	–	–	12.0	21.0	27.8	37.0	–	–
Shear	90°	V_u	[kN]	gvz	20.7	29.5	43.0	78.5	64.6	91.7	20.7	29.5	43.0	78.5	64.4	91.7
				A4	19.8*	31.2*	40.5*	54.2*	92.6*	148.3*	19.8*	31.2*	40.5*	54.2*	92.6*	148.3*
				C	15.4*	24.4*	35.4*	65.9*	–	–	15.4*	24.4*	35.4*	65.9*	–	–
Design resistant loads N_{Rd} and V_{Rd} [kN]																
Tensile	0°	N_{Rd}	[kN]	gvz	7.2	11.8	17.7	26.3	28.7	43.3	6.0	9.3	13.3	18.8	22.7	33.5
				A4	8.3	14.7	18.7	26.7	34.0	47.3	5.8	9.5	13.9	18.8	24.0	33.3
				C	8.3	14.7	18.7	26.7	–	–	5.8	9.5	14.1	18.8	–	–
Shear	90°	V_{Rd}	[kN]	gvz	(14.0) [2] 9.6	(22.4) [2] 16.0	(32.8) [2] 23.6	(57.2) [2] 44.0	41.6	57.3	(14.0) [2] 9.6	(22.4) [2] 16.0	(32.8) [2] 23.6	(52.7) [2] 44.0	41.6	57.3
				A4	8.8	14.4	20.8	36.0	61.1	78.8	8.8	14.4	20.8	36.0	48.0	67.1
				C	8.7	13.3	20.0	36.7	–	–	7.2	13.3	20.0	36.7	–	–
Recommended loads N_{rec} and V_{rec} [kN]																
Tensile	0°	N_{rec}	[kN]	gvz	5.1	8.4	12.7	18.8	20.5	31.0	4.3	6.7	9.5	13.4	16.2	24.0
				A4	6.0	10.5	13.3	19.0	24.3	33.8	4.1	6.8	10.0	13.4	17.1	23.8
				C	6.0	10.5	13.3	19.0	–	–	4.1	6.8	10.0	13.4	–	–
Shear	90°	V_{rec}	[kN]	gvz	(10.0) [2] 6.9	(16.0) [2] 11.4	(23.4) [2] 16.9	(40.9) [2] 31.4	29.7	41.0	(10.0) [2] 6.9	(16.0) [2] 11.4	(23.4) [2] 16.9	(37.6) [2] 31.4	29.7	41.0
				A4	6.3	10.3	14.9	25.7	43.7	56.3	6.3	10.3	14.9	25.7	34.3	47.9
				C	6.2	9.5	14.3	26.2	–	–	5.2	9.5	14.3	26.2	–	–
Recommended bending moment M_{rec} [Nm]																
		M_{rec}	[Nm]	gvz	14.9	33.1	52.6	133.1	222.3	288.6	14.9	33.1	52.6	133.1	222.3	288.6
				A4	13.1	26.8	46.8	109.0	232.0	360.0	13.1	26.8	46.8	109.0	232.0	360.0
				C	12.4	24.8	43.8	111.0	–	–	12.4	24.8	43.8	111.0	–	–
Component dimensions, minimum axial spacings and edge distances																
Standard structural component thickness ($\geq 2 \times h_{ef}$)		$h_{min,1}$	[mm]		100	120	140	170	200	250	100	120	140	170	200	250
Min. axial spacing [1]		s_{min}	[mm]	gvz	40	40	50	60	95	120	35	40	45	60	95	120
		for c ≧	[mm]	gvz	50	60	70	95	200	200	50	55	70	95	160	165
		s_{min}	[mm]	A4 / C	50	55	65	75	100	125	40	55	65	75	100	125
		for c ≧	[mm]	A4 / C	50	70	100	120	200	250	50	70	75	100	200	250
Min. edge distance [1]		c_{min}	[mm]	gvz	40	45	55	65	130	150	40	45	55	65	100	120
		for s ≧	[mm]	gvz	100	80	110	150	245	270	70	80	110	150	220	220
		c_{min}	[mm]	A4 / C	50	55	65	85	200	250	45	55	65	65	200	250
		for s ≧	[mm]	A4 / C	50	120	150	165	100	125	60	90	100	175	100	125
Reduced structural component thickness ($< 2 \times h_{ef}$)		$h_{min,2}$	[mm]		80	100	120	140	–	–	80	100	120	140	–	–
Min. axial spacing [1]		s_{min}	[mm]	gvz	35	40	50	80	–	–	35	40	50	80	–	–
		for c ≧	[mm]	gvz	70	100	90	130	–	–	70	100	90	130	–	–
		s_{min}	[mm]	A4 / C	–	–	–	–	–	–	–	–	–	–	–	–
		for c ≧	[mm]	A4 / C	–	–	–	–	–	–	–	–	–	–	–	–
Min. edge distance [1]		c_{min}	[mm]	gvz	40	60	60	65	–	–	40	60	60	65	–	–
		for s ≧	[mm]	gvz	100	90	120	180	–	–	100	90	120	180	–	–
		c_{min}	[mm]	A4 / C	–	–	–	–	–	–	–	–	–	–	–	–
		for s ≧	[mm]	A4 / C	–	–	–	–	–	–	–	–	–	–	–	–
Required torque		T_{inst}	[Nm]		20	45	60	110	200	270	20	45	60	110	200	270

* steel failure decisive

[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")

[2] In general the relevant kind of failure has to be defined by the designing engineer. Simplifying for a thickness of the fixture ≧ 15 mm (size M8), ≧ 20 mm (sizes M10 and M12) and respectively ≧ 25 mm (size M16) as well as a nominal useful length ($t_{fix,nom}$) of the used anchor type not exceeding 50 mm the values in brackets can be used.

All load 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 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 may differ from those given in the European Technical Approval.
For further detailed information about European Technical Approvals please contact the responsible fischer representation in your country.

Anchor bolt setting tool FABS

OVERVIEW

Anchor bolt setting tool **FABS**

Suitable for:
- The installation of all fischer and Upat anchor bolts (FAZ, FBN and EXA), diameter M 6 to M 12.

Areas of application
- Ceiling suspension
- Installation in series
- Painted railings
- Attachment points where access is difficult

DESCRIPTION

- Especially suitable for the efficient installation in series of larger numbers of fischer and Upat anchor bolts.
- The tool is simply fitted into a standard SDS Plus hammer drill and is perfect for hammering the anchor into the hole. This greatly simplifies the installation process when working overhead.
- FABS can also be used for fixing previously painted objects, (e.g. railings) because the recess at its tip prevents it from slipping and causing damage to the surface.

Advantages
- Efficient installation of all fischer and Upat anchor bolts.
- Ergonomic design, saves time and energy.
- Universally usable for M 6 to M 12.

fischer Anchor bolt setting tool
FABS

Type	Art.-No.	ID	fits anchor	qty. per box pcs.
FABS	**77937**	8	FAZ, FBN, EXA	1

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Torque Wrenches FTW

OVERVIEW

Torque Wrench
FTW 8 - 54

Torque Wrench
FTW 50 - 230

Torque Wrench
Socket **FDDP**

- Required for safe installation of all our hex headed fixings.

DESCRIPTION

FTW Torque Wrenches & FDDP Deep Drive Sockets



! New

Torque wrench ½" drive, socket ½"

Type	Art. No.	qty. per box pcs.	outer carton pcs.	width across nut [mm]	torque [Nm]	suitable for
FTW 8 - 54	503324	1	1	-	8-54	hex. head fixings
FTW 50 - 230	503325	1	1	-	50-230	hex. head fixings
Deep Drive Socket						
FDDP 10	503326	1	1	10 A/F	-	M6
FDDP 13	503327	1	1	13 A/F	-	M8
FDDP 17	503328	1	1	17 A/F	-	M10
FDDP 19	503329	1	1	19 A/F	-	M12

For further detailed information on this product range please contact our technical team of advisors on 01491 827920

Zykon hammerset anchor FZEA II

The low-cost undercut anchor bolt with internal thread for the cracked tension zone

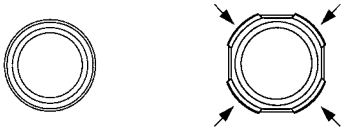
OVERVIEW

Zykon hammerset anchor **FZEA II**, zinc-plated steel

Zykon hammerset anchor **FZEA II**, stainless steel A4, resp. high corrosion-resistant steel 1.4529

Before expansion

After the correct expansion



4 imprints for visual check

The anchor ist set correctly if the anchor sleeve is flush with the surface of the concrete and the 4 imprints are visual, eliminating setting errors.

Approved for:
- Cracked and non-cracked concrete B25 to B55 resp. C20/25 to C50/60

Also suitable for:
- Concrete B15 resp. C12/15
- Natural stone with dense structure
- Solid brick
- Solid sand-lime brick

For fixing of:
- Pipes
- Ventilation systems
- Sprinkler systems
- Consoles
- Steel constructions
- Gratings
- Cable trays
- Gates
- Facades
- Suspended ceilings

ETA CE European Technical Approval- Option 1 for cracked concrete

Zulassung

FM APPROVED from M10

VdS M8 and M10

Shock approval by the Federal Office for Civil Defense, Bonn.

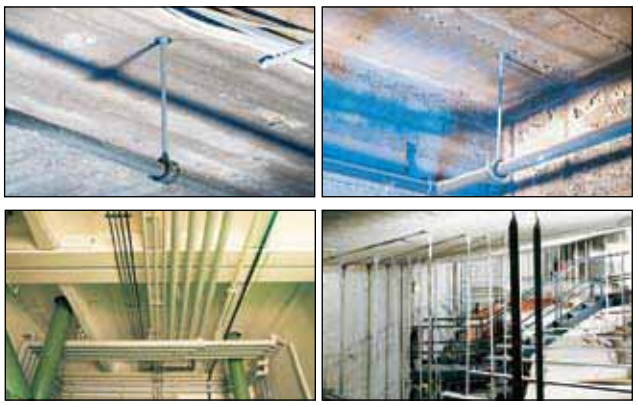
Fire resistance classification F 120

DESCRIPTION

- Undercut anchor with internal thread for pre-positioned installation.
- A cylindrical hole with an undercut is produced with the Drill bit FZUB in one work process.
- When the internal expansion pin is driven in with the setting tool, the anchor sleeve expands and fills the undercut hole with a positive fit.
- A4 stainless steel version for outdoor use and in damp conditions, Highly corrosion-resistant steel C (material no. 1.4529) for applications in aggressive atmospheres.

Advantages/benefits

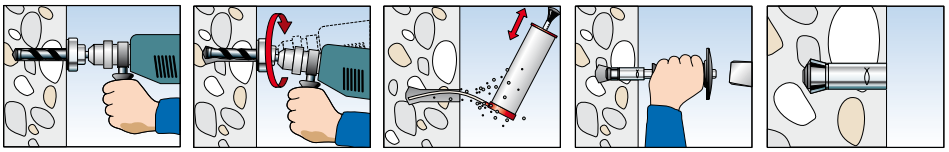
- Positive fit in the undercut gives additional safety.
- Virtually expansion-free operation allows cost-efficient fixing with small edge distances and axial spacings.
- Single-step drilling process simultaneously produces the undercut, saving installation time.
- Simple visual control reduces installation effort: no test loading necessary to check whether properly set.
- Internal thread for high flexibility using threaded rods or screws of different lengths and types.



INSTALLATION

Type of installation

- Pre-positioned installation



STANDARDS

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

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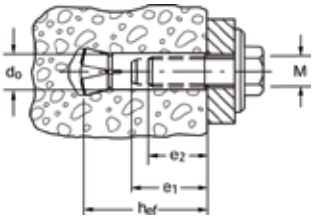
TECHNICAL DATA

Zykon hammerset anchor **FZEA**, zinc-plated steel

Zykon hammerset anchor **FZEA**, stainless steel A4

Type	Art.-No.	ID	approval	drill-Ø	anchorage depth	internal thread	min. bolt penetration	max. bolt penetration	qty. per box
			● DIBt	d_0	h_{ef}	d_s	e_2	e_1	
				[mm]	[mm]		[mm]	[mm]	pcs.
FZEA II 10 x 40 M 8	**47303**	0	●	10	40	M 8	11	17	100
FZEA II 12 x 40 M10	**47304**	7	●	12	40	M 10	13	19	100
FZEA II 14 x 40 M12	**47305**	4	●	14	40	M 12	15	21	50
FZEA II 10 x 40 M 8 A4	**47306**	1	●	10	40	M 8	11	17	100
FZEA II 12 x 40 M10 A4	**47307**	8	●	12	40	M 10	13	19	100
FZEA II 14 x 40 M12 A4	**47308**	5	●	14	40	M 12	15	21	50
FZEA II 10 x 40 M 8 C	**47309**	2	●	10	40	M 8	11	17	100
FZEA II 12 x 40 M10 C	**47310**	8	●	12	40	M 10	13	19	100
FZEA II 14 x 40 M12 C	**47311**	5	●	14	40	M 12	15	21	50



The correct installation of fischer Zykon hammerset anchors in accordance with the approval is possible only with the following original fischer Zykon tools.

Drilling and setting tools	Type	Art.-No.	fits fischer Zykon anchor	internal thread	name	qty. per box pcs.
	FZUB 10 x 40	**60622**	FZEA II 10 x 40	M 8	**Drill bit FZUB**	1
	FZUB 12 x 40	**60623**	FZEA II 12 x 40	M 10		1
	FZUB 14 x 40	**60624**	FZEA II 14 x 40	M 12		1
	FZEM 10 x 40	**60648**	FZEA II 10 x 40	M 8	**Machine setting tool FZEM** for installation with a hammer drill.	1
	FZEM 12 x 40	**60649**	FZEA II 12 x 40	M 10		1
	FZEM 14 x 40	**60650**	FZEA II 14 x 40	M 12		1
	FZED 10 Plus	**44642**	FZEA II 10 x 40	M 8	**Setting tool FZED Plus** for installation with a hand hammer	1
	FZED 12 Plus	**44643**	FZEA II 12 x 40	M 10		1
	FZED 14 Plus	**44644**	FZEA II 14 x 40	M 12		1

LOADS

Mean ultimate loads. design resistant and recommended loads for single anchors of fischer Zykon hammerset anchor FZEA II

Recommended loads[1] of single anchors in normal-weight concrete C20/25[2]. For the design the complete approval ETA-06/0271 is to be observed.

Anchor type			FZEA II 10 x 40 M8			FZEA II 12 x 40 M10			FZEA II 14 x 40 M12		
			gvz	A4	C	gvz	A4	C	gvz	A4	C
Effective anchorage depth	h_{ef}	[mm]	40			40			40		
Recommended tensile load N_{perm} of one single anchor without edge influence, i.e. edge distance $c \geq 1.5 \times h_{ef}$ and axial spacing $s \geq 3 \times h_{ef}$											
In cracked concrete C20/25[2]	N_{perm}	[kN]	4.0			4.3			4.6		
In non-cracked concrete C20/25[2]	N_{perm}	[kN]	4.6	5.7		5.7			5.7		
Recommended shear load V_{perm} of one single anchor without edge influence, i.e. edge distance $c \geq 10 \times h_{ef}$ and axial spacing $s \geq 3 \times h_{ef}$											
In cracked concrete C20/25[2]	V_{perm}	[kN]	4.7	5.8		5.6			5.6		
In non-cracked concrete C20/25[2]	V_{perm}	[kN]	4.7	5.7		7.8	8.6		8.7		
Anchor characteristics											
Characteristic axial spacing	$S_{cr,N}$	[mm]	120 (= 3 x h_{ef})								
Characteristic edge distance	$C_{cr,N}$	[mm]	60 (= 1.5 x h_{ef})								
Minimum axial spacing	s_{min}	[mm]	40			45			50		
Minimum edge distance	c_{min}	[mm]	40			45			50		
Minimum structural component thickness	h_{min}	[mm]	80			80			80		
Minimum screw penetration depth	min ℓ_s	[mm]	11			13			15		
Maximum screw penetration depth	max ℓ_s	[mm]	17			19			21		
Clearance-hole in fixture to be attached	d_f	[mm]	9			12			14		
Installation torque	T_{inst}	[Nm]	< 10	< 15	< 15	< 15	< 20	< 20	< 20	< 40	< 40
Universal drill bit FZUB[5]		[–]	FZUB 10 x 40			FZUB 12 x 40			FZUB 14 x 40		
Setting mandrel FZED[6]		[–]	FZED 10 x 40			FZED 12 x 40			FZED 14 x 40		
Machine setting tool FZEM[6]		[–]	FZEM 10 x 40			FZEM 12 x 40			FZEM 14 x 40		

Note: With the Design software COMPUFIX you can use the full performance of the fischer Zykon hammerset anchor FZEA II and you are able to do designs with individual surrounding conditions.

[1] The partial safety factors for resitance and the partial safety factor for load with $\gamma_F = 1,4$ are considered.
Please observe the design method A (ETAG, annex C) if combined tensile and shear loads, edge influences and influences of spacings of anchor groups are to consider.

[2] The concrete is considered to be normally reinforced or non-reinforced; For higher concrete strength classes an increase in performance of up to 55% is possible.

[3] Values in brackets apply to the use of a fixing screw resp. threaded rod of the minimum strength class 5.6.

[4] Values in brackets apply to the use of a fixing screw resp. threaded rod of the minimum strength class A50.

[5] For drilling obligatory

[6] For installation of FZEA II the setting mandrel FZED or alternatively the setting tool FZEM is obigatory.

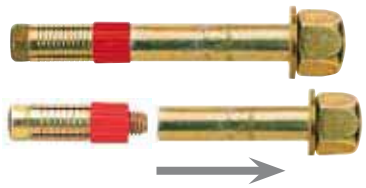
FIRE PROTECTION
Red hot: see page 308 for information about fire protection.

CORROSION
All about corrosion and how you can avoid it is written on page 309.

Through bolt FA

The economical, demountable through bolt, ideal for stadium seating

OVERVIEW



Through bolt
FA

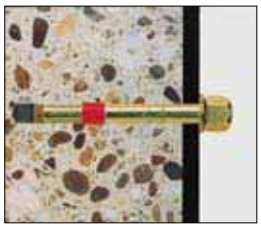
demountable

Suitable for:
- Concrete ≥ B15
- Dense natural stone

For fixing of:
- Ballastrading
- Stadium seating
- Railings
- Handrails
- Stock pens
- Supports
- Machines
- Consoles
- Metal constructions
- Metal profiles

DESCRIPTION

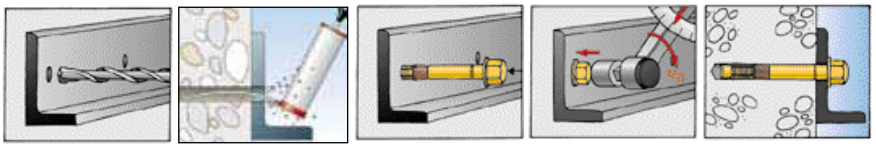
- Anchor bolt for push-through installation.
- When the hexagonal bolt is tightened, the tapered cone is pulled into the expansion sleeve and expands it against the hole wall guaranteeing an even calibrated hold in all compact materials.
- The red knurled collar prevents the anchor turning in the hole on installation.
- Demountable for leaving a flush surface



INSTALLATION

Type of installation

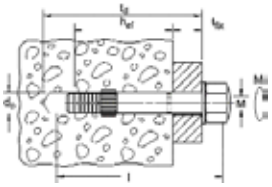
- Push-through installation



TECHNICAL DATA

fischer through bolt **FA**

Type	Art.-No.	ID	drill Ø d_0 [mm]	min. drill-hole depth for through fixings t_d [mm]	min. anchorage depth h_v [mm]	anchor length l [mm]	max. fixing thickness d_a [mm]	torque Md	width across nut SW	qty. per box pcs.
FA 8/15 (8x70)	**500511**		8	75	50	65	15	10	13	25
FA 8/25 (8 x 85)	**500512**		8	90	50	80	25	10	13	25
FA 10/15 (10 x 85)	**500515**		10	90	60	75	15	20	17	25
FA 10/50 (10 x 120)	**500516**		10	120	60	110	50	20	17	25
FA 12/15 (12 x 100)	**500522**		12	100	70	85	15	35	19	20
FA 12/50 (12 x 135)	**500523**		12	135	70	120	50	35	19	20
FA 14/20 (14 x 115)	**500526**		14	115	80	100	20	50	22	10



Ultimate loads $F_{u,\,m}$ [kN] (mean values) and recommended loads F_{rec} [kN] for single anchors of through bolt FA in non-cracked concrete.

Anchor type/thread		FA8	FA10	FA12	FA14
$F_{u,\,m}$	B25	12.8	15.4	20.3	25.4
F_{rec}	B25	2.5	3.5	4.5	6.0
Axial spacing	[mm]	160	240	260	400
Edgae distance	[mm]	80	100	130	150
Min. component thickness	[mm]	150	150	200	200

FIXING PRINCIPLES

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

High performance anchor FH II

The heavy-duty sleeve anchor for structurally demanding fixing.

OVERVIEW


High performance anchor **FH II-H**


High performance anchor **FH II-B**


High performance anchor **FH II-S**


High performance anchor **FH II-SK**


High performance anchor **FH A4**

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

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

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

ETA CE
European Technical Approval- Option 1 for cracked concrete

VdS
M8 to M16

Shock approval by the Federal Office for Civil Defense, Bonn.

Fire resistance classification F 90
Anchor types see test report

DESCRIPTION

- Heavy-duty sleeve anchor for push-through installation.
- When the hexagon nut or screw is tightened, the cone is pulled into the expansion sleeve and expands tensioning it against the hole wall.
- A4 stainless steel version for outdoor use and in damp conditions (not part of the approval).
- FH II-SK is not available in stainless steel

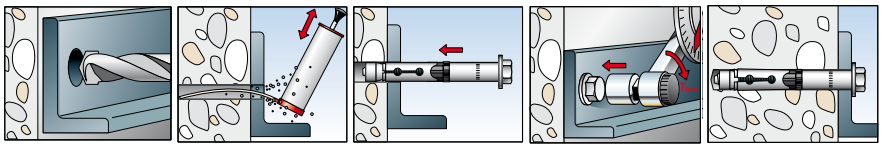

Advantages/benefits

- The half-moon-shaped recesses stamped in the sleeve allows for contraction in length when tightened. This clamps the item being attached firmly against the concrete surface.
- Anchor versions for fixings with sophisticated design: FH II-S (hexagon head screw), FH II-H (cap nut) and FH II-SK (countersunk screw)
- All anchors can be removed flush with the surface.

INSTALLATION

Type of installation

- Push-through installation

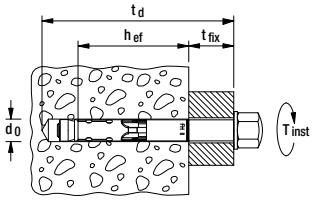


STANDARDS
You will find everything that has standards on page 313 under the keyword approvals.

TECHNICAL DATA

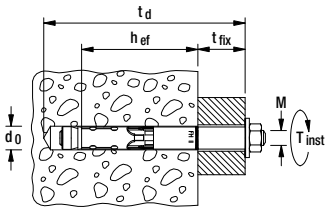
High performance anchor **FH II-H**, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	min. drill-hole depth for through fixings	effect. anchorage depth	total length	max. usable length	thread	width across nut	qty. per box
			ETA	d_0	t_d	h_{ef}	l	t_{fix}	M	SW	
				[mm]	[mm]	[mm]	[mm]	[mm]			pcs.
FH 10/10 H	**45055**	0	■	10	85	50	90	10	M 6	13	50
FH 10/25 H	**45056**	7	■	10	100	50	105	25	M 6	13	50
FH 10/50 H	**45057**	4	■	10	125	50	130	50	M 6	13	50
FH II 12/10 H	**44905**	9	■	12	90	60	93	10	M 8	17	50
FH II 12/25 H	**44906**	6	■	12	105	60	108	25	M 8	17	50
FH II 12/50 H	**44907**	3	■	12	130	60	133	50	M 8	17	25
FH II 15/10 H	**44908**	0	■	15	100	70	113	10	M 10	17	25
FH II 15/25 H	**44909**	7	■	15	115	70	128	25	M 10	17	25
FH II 15/50 H	**44910**	3	■	15	140	70	153	50	M 10	17	25
FH II 18/25 H	**44915**	8	■	18	130	80	139	25	M 12	19	20
FH II 18/50 H	**44916**	5	■	18	155	80	164	50	M 12	19	20



High performance anchor **FH II-B**, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	min. drill-hole depth for through fixings	effect. anchorage depth	total length	max. usable length	thread	width across nut	qty. per box
			ETA	d_0	t_d	h_{ef}	l	t_{fix}	M	SW	
				[mm]	[mm]	[mm]	[mm]	[mm]			pcs.
FH 10/10 B	**45001**	7	■	10	80	50	85	10	M 6	10	50
FH 10/25 B	**45002**	4	■	10	95	50	100	25	M 6	10	50
FH 10/50 B	**45003**	1	■	10	120	50	125	50	M 6	10	50
FH II 12/10 B	**48773**	0	■	12	90	60	90	10	M 8	13	50
FH II 12/25 B	**48774**	7	■	12	105	60	105	25	M 8	13	50
FH II 12/50 B	**48775**	4	■	12	130	60	130	50	M 8	13	25
FH II 12/100 B	**46832**	6	■	12	190	60	184	100	M 8	13	25
FH II 15/10 B	**48776**	1	■	15	100	70	110	10	M 10	17	25
FH II 15/25 B	**48777**	8	■	15	115	70	125	25	M 10	17	25
FH II 15/50 B	**48778**	5	■	15	140	70	150	50	M 10	17	25
FH II 15/100 B	**46835**	7	■	15	190	70	200	100	M 10	17	20
FH II 18/25 B	**48779**	2	■	18	130	80	135	25	M 12	19	20
FH II 18/50 B	**48780**	8	■	18	155	80	160	50	M 12	19	20
FH II 18/100 B	**46841**	8	■	18	205	80	214	100	M 12	19	10
FH II 24/25 B	**48886**	7	■	24	150	100	167	25	M 16	24	10
FH II 24/50 B	**48887**	4	■	24	175	100	192	50	M 16	24	10
FH II 24/100 B	**46842**	5	■	24	225	100	242	100	M 16	24	5
FH II 28/30 B	**47547**	8	*)	28	185	125	198	30	M 20	30	4
FH II 28/60 B	**47548**	5	*)	28	215	125	228	60	M 20	30	4
FH II 32/30 B	**47549**	2	*)	32	210	150	228	30	M 24	36	4
FH II 32/60 B	**47550**	8	*)	32	240	150	258	60	M 24	36	4



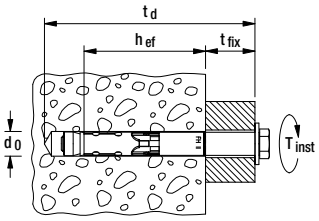
*) Approval applied

High performance anchor FH II

TECHNICAL DATA

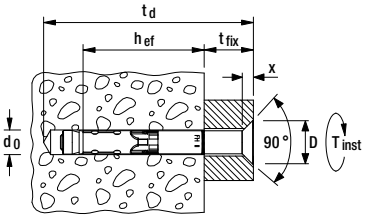
High performance anchor **FH II-S**, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	min. drill-hole depth for through fixings	effect. anchorage depth	total length	max. usable length	thread	width across nut	qty. per box
			■ ETA	d_0	t_d	h_{ef}	l	t_{fix}	M	SW	
				[mm]	[mm]	[mm]	[mm]	[mm]			pcs.
FH 10/10 S	**45030**	7	■	10	85	50	84	10	M 6	10	50
FH 10/25 S	**45031**	4	■	10	100	50	99	25	M 6	10	50
FH 10/50 S	**45032**	1	■	10	125	50	124	50	M 6	10	50
FH II 12/10 S	**44884**	7	■	12	90	60	90	10	M 8	13	50
FH II 12/25 S	**44885**	4	■	12	105	60	105	25	M 8	13	50
FH II 12/50 S	**44886**	1	■	12	130	60	130	50	M 8	13	25
FH II 15/10 S	**44887**	8	■	15	100	70	107	10	M 10	17	25
FH II 15/25 S	**44888**	5	■	15	115	70	122	25	M 10	17	25
FH II 15/50 S	**44889**	2	■	15	140	70	147	50	M 10	17	25
FH II 18/10 S	**46847**	0	■	18	115	80	118	10	M 12	19	20
FH II 18/25 S	**44894**	6	■	18	130	80	133	25	M 12	19	20
FH II 18/50 S	**44896**	0	■	18	155	80	158	50	M 12	19	20
FH II 24/25 S	**44898**	4	■	24	150	100	160	25	M 16	24	10
FH II 24/50 S	**44900**	4	■	24	175	100	185	50	M 16	24	10
FH II 28/30 S	**44901**	1	■	28	185	125	193	30	M 20	30	4
FH II 28/60 S	**44902**	8	■	28	215	125	223	60	M 20	30	4
FH II 32/30 S	**44903**	5	■	32	210	150	215	30	M 24	36	4
FH II 32/60 S	**44904**	2	■	32	240	150	245	60	M 24	36	4
FH 10/10 S A4	**45222**	6		10	85	50	84	10	M 6	10	50
FH 12/10 S A4	**45224**	0		12	95	60	95	10	M 8	13	50
FH 12/25 S A4	**45102**	1		12	110	60	110	25	M 8	13	20
FH 15/10 S A4	**45226**	4		15	110	70	111	10	M 10	17	50
FH 15/25 S A4	**45104**	5		15	125	70	126	25	M 10	17	20
FH 15/50 S A4	**45105**	2		15	150	70	151	50	M 10	17	10
FH 18 x 100/25 S A4	**45106**	9		18	160	100	158	25	M 12	19	10
FH 18 x 100/50 S A4	**45107**	6		18	185	100	183	50	M 12	19	10



High performance anchor **FH II-SK**, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	min. drill-hole depth for through fixings	effect. anchorage depth	total length	max. usable length	thread	width across nut	qty. per box
			■ ETA	d_0	t_d	h_{ef}	l	t_{fix}	M	SW	
				[mm]	[mm]	[mm]	[mm]	[mm]			pcs.
FH II 12/15 SK	**44917**	2	■	12	95	60	90	15	M 8	5	25
FH II 12/25 SK	**44918**	9	■	12	105	60	100	25	M 8	5	25
FH II 12/50 SK	**44919**	6	■	12	130	60	125	50	M 8	5	25
FH II 15/15 SK	**44920**	2	■	15	105	70	100	15	M 10	6	25
FH II 15/25 SK	**44921**	9	■	15	115	70	110	25	M 10	6	25
FH II 15/50 SK	**44922**	6	■	15	140	70	135	50	M 10	6	25
FH II 18/15 SK	**44923**	3	■	18	120	80	115	15	M 12	8	20
FH II 18/25 SK	**44924**	0	■	18	130	80	125	25	M 12	8	20
FH II 18/50 SK	**44925**	7	■	18	155	80	150	50	M 12	8	20



	X [mm]	⌀ D [mm]	counter bore
FH II 12/... SK	5,8	22	90°
FH II 15/... SK	5,8	25	90°

FIRE PROTECTION

Red hot: see page 308 for information about fire protection.

CORROSION

All about corrosion and how you can avoid it is written on page 309.

LOADS

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer High-performance anchor FH II and FH 10 with large axial spacing and edge distance

					Non-cracked concrete							Cracked concrete						
Anchor size					FH 10	FH II 12	FH II 15	FH II 18	FH II 24	FH II 28	FH II 32	FH 10	FH II 12	FH II 15	FH II 18	FH II 24	FH II 28	FH II 32
					M6	M8	M10	M12	M16	M20	M24	M6	M8	M10	M12	M16	M20	M24
					gvz	gvz	gvz	gvz	gvz	gvz	gvz	gvz	gvz	gvz	gvz	gvz	gvz	gvz
Effective anchorage depth		h_{ef}	[mm]		50	60	70	80	100	125	150	50	60	70	80	100	125	150
Drill hole depth		$h_1 \geq$	[mm]		75 (70)[3]	80	90	105	125	155	180	75 (70)[1]	80	90	105	125	155	180
Drill hole diameter		d_0	[mm]		10	12	15	18	24	28	32	10	12	15	18	24	28	32
Mean ultimate loads N_u and V_u [kN]																		
Tensile	0°	N_u	[kN]	gvz	16.0	29.3*	39.5	48.3	67.5	94.3	124.0	14.1	21.0	27.7	33.8	47.3	66.0	86.8
				A4	14.1*	22.3	34.3	–	55.8	–	94.3	134.6	14.1*	19.5	28.3	–	45.5	–
Shear	90°	V_u	[kN]	gvz	13.5*	30.6* (36.1*)[2]	48.7* (56.9*)[2]	71.1* (82.5*)[2]	148.6*	170.4*	223.1*	13.5*	30.6* (36.1*)[2]	48.7* (56.9*)[2]	71.1* (82.5*)[2]	148.6*	170.4*	223.1*
				A4	19.8*	29.5*	48.3*	–	71.6*	–	102.9*	148.3*	19.8*	29.5*	48.3*	–	71.6*	–
Design resistant loads N_{Rd} and V_{Rd} [kN]																		
Tensile	0°	N_{Rd}	[kN]	gvz	9.5	15.6	19.7	26.4	37.0	51.7	67.9	5.3	9.8	14.1	17.1	24.0	33.5	44.1
				A4	7.5	11.6	18.0	–	25.4	–	43.0	53.2	–	–	–	–	–	–
Shear	90°	V_{Rd}	[kN]	gvz	10.8	20.0 (24.0)[2]	32.0 (37.6)[2]	47.2 (52.9)[2]	73.9	103.3	135.8	8.5	20.0 (22.3)[2]	28.1	34.3	48.0	67.1	88.2
				A4	7.5	11.1	18.2	–	26.8	–	55.0	72.9	–	–	–	–	–	–
Recommended loads N_{rec} and V_{rec} [kN]																		
Tensile	0°	N_{rec}	[kN]	gvz	6.8	11.2	14.1	18.9	26.4	36.9	48.5	3.8	7.0	10.0	12.2	17.1	24.0	31.5
				A4	5.4	8.3	12.8	–	18.1	–	30.7	38.0	–	–	–	–	–	–
Shear	90°	V_{rec}	[kN]	gvz	7.7	14.3 (17.1)[2]	22.9 (26.9)[2]	33.7 (37.8)[2]	52.8	73.8	97.0	6.1	14.3 (15.9)[2]	20.1	24.5	34.3	47.9	63.0
				A4	5.4	7.9	13.0	–	19.2	–	39.3	52.1	–	–	–	–	–	–
Recommended bending moment M_{rec} [Nm]																		
		M_{rec}	[Nm]	gvz	6.9	17.1	34.3	60.0	152.0	296.0	512.0	6.9	17.1	34.3	60.0	152.0	296.0	512.0
				A4	4.9	12.0	24.0	–	42.0	–	208.1	359.6	4.9	12.0	24.0	–	42.0	–
Anchor characteristics																		
Characteristic axial spacing		$S_{cr,N}$	[mm]		= 3 x h_{ef}							= 3 x h_{ef}						
Characteristic edge distance		$C_{cr,N}$	[mm]		= 1.5 x h_{ef}							= 1.5 h_{ef}						
Minimum axial spacing[1]		S_{min}	[mm]		50	60	70	80	100	375	450	50	50	60	70	80	375	450
	for c ≥		[mm]		100	100	100	160	200	-	-	100	80	120	140	180	-	-
Minimum edge distance[1]		c_{min}	[mm]		50	60	70	80	100	375	450	50	50	60	70	80	375	450
	for s ≥		[mm]		100	100	140	200	220	-	-	100	80	120	160	200	-	-
Minimum structural component thickness		h_{min}	[mm]		100	120	140	160	200	250	300	100	120	140	160	200	250	300
Clearance-hole in fixture to be attached		d_f	[mm]		12	14	17	20	26	31	35	12	14	17	20	26	31	35
Required torque		T_{inst}	[Nm]		10	22.5 (17.5)[3]	40 (38)[3]	80	160 (75)[3]	180	200	10	22.5 (17.5)[3]	40 (38)[3]	80	160 (75)[3]	180	200

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

*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')!
[2] Values in brackets are valid for screw type FH II-S and type with countersunk screw head FH II-SK only.
[3] Values in brackets are valid bolt type FH II-B resp. FH 10 B only.

The conditions of application may differ from those given in the European Technical Approval.
For further detailed information about ETA's please contact your local fischer representative.

CORROSION
All about corrosion and how you can avoid it is written on page 309.

Multi Bolt FMB

Easy to install - Easy to remove - Safe to reuse.

OVERVIEW

Multi Bolt **FMB** pre-assembled, zinc-plated steel

Multi Bolt **FMB** components

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

For fixing of:
- Bracings of formwork
- Precast concrete tilt up panels

DESCRIPTION

- Anchor bolt consisting of expansion component and anchor screw
- For the temporary fixing of bracings and concrete tilt up panels.

Advantages/benefits

- Economical system, as **the anchor screw can be re-used up to five times.**
- 20 mm steel diameter of the anchor screw for higher shear forces.
- Expansion component with fischer expertise for maximum anchorage.
- No projecting parts after removal of the anchor screw. This offers a time saving method which provides a high level of safety on site.
- The hexagon nut can also be used for other applications, a change of setting tool **is not required**.
- Large washer for better load distribution.

INSTALLATION

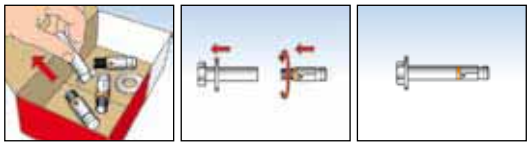
Type of installation

- Push-through installation

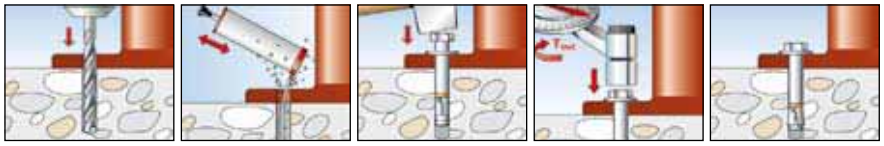
Installation tips

- Before setting, the expansion component needs to be screwed into the anchor screw until it's firm.
- Only use the anchor screw up to five times to ensure the safety of the fixing.
- The usage can be indicated on the packaging.
- After working unscrew the hexagonal bolt.
- The expansion element remains in the drill-hole.
- Return the screw and the washer into the box.

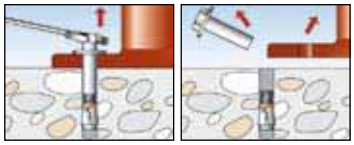
Assembly



Installation



Removal



Reusability

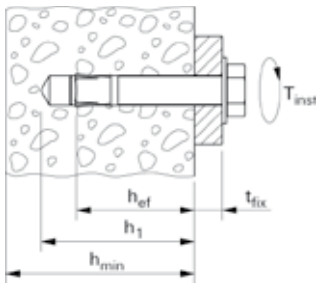
TECHNICAL DATA

Multi Bolt **FMB**, zinc-plated steel

Multi Bolt **FMB**, 20 EXP

Type	Art.-No.	ID	drill-Ø d_0 [mm]	drill hole depth h_0 [mm]	anchor length l [mm]	max. usable length t_{fix} [mm]	thread M	width across nut SW	washer [mm]	qty. per box pcs.
FMB 20/20 Set	**96840**	6	20	100	138	20	M 16	30	44 x 3	1)
FMB 20 EXP	**96841**									

1) 2 hexagon head screws with washer, 10 expansion components



LOADS

Loads of a single fixing FMB 20 with large axial spacing and edge distances		
Max. recommended tensile load N_{rec} of a single fixing with large axial spacings and edge distances ($c \geq h_{ef}$ and $s \geq s_{cr}$)		
Uncracked concrete f_{ck} = 20 N/mm²	[kN]	20
Max. shear force-bearing capacity V_{rec} of a single fixing with large axial spacing and edge distances ($c \geq h_{ef}$ and $s \geq s_{cr}$)		
Steel, strength class: 8.8	[kN]	64
Installation torque T_{inst}	[Nm]	150

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.

Heavy-duty anchor TA M

The flexible, low-cost sleeve anchor for the non-cracked compression zone.

OVERVIEW

Heavy-duty anchor **TA M**

Heavy-duty anchor **TA M-S** with screw, zinc-plated steel

Heavy-duty anchor **TA M-T**, for push-through installation

Heavy-duty anchor **TA M8 BP**, with twist-off head

TA M8 BP, features security head

Approved for:
- Non-cracked concrete C12/15 to C50/60

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

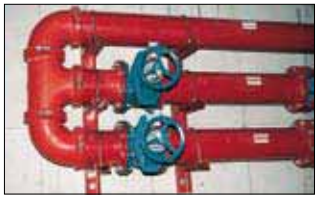
For fixing of:
- Steel constructions
- Handrails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Facades
- Window elements
- Stand-off installations
- Park benches
- Trash cans
- Gratings

DESCRIPTION

- Heavy-duty sleeve anchor for pre-positioned installation (Internally-threaded anchor TA M, anchor with screw. TA M-S) and push-through installation (TA M-T and TA M8 BP).
- When the bolt or hexagon nut is tightened, the cone is pulled into the expansion sleeve and expands it against the hole wall.
- Special tamper-proof fixing as protection against theft (TA M8 BP).

Advantages/benefits

- Suitable for all bolts or studs with metric thread.
- Fixing can be easily driven in, therefore less installation effort.
- Surface-flush fixing allows the mounted item to be removed and refitted several times.
- Plastic cap protects against contamination with drilling dust and ensures the thread remains free-running.
- Anchor version with internal thread for high flexibility by using threaded rods or screws of different lengths and type.
- Three-part expansion sleeve allows even load distribution and small edge and axial spacing.



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

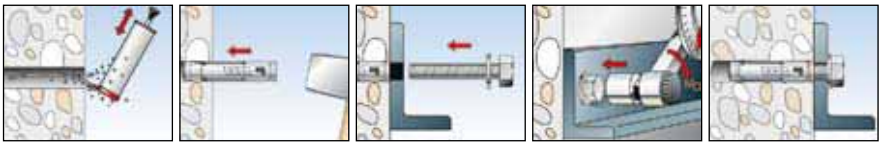
- Pre-positioned and stand-off installation (TA M, TA M-S)
- Push-through installation (TA M8 BP, TA M-T)

Installation tips

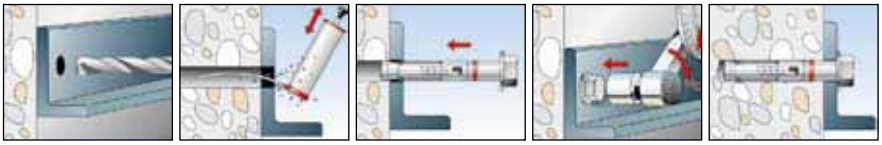
- For correct installation, the fixing sleeve of the TA M and TA M-S has to be supported on the attached item, or the stud can be locked with a locknut.
- Observe the required screw-in depth in the fixing when determining the bolt length l_s:

Anchor length
+ Thickness of the building component t_{fix}
+ Washer
= Screw length

Pre-positioned installation



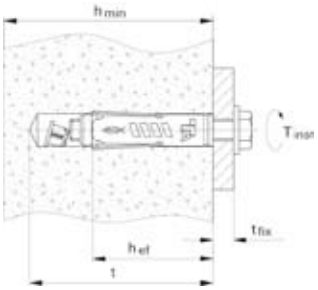
Push-through installation



TECHNICAL DATA

Heavy-duty anchor **TA M**, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	min. drill hole depth for pre-fixing	anchor length	thread	qty. per box
			■ ETA	d_0	t	l	M	
				[mm]	[mm]	[mm]		pcs.
TA M6	**90245**	5	■	10	65	49	M 6	50
TA M8	**90246**	2	■	12	70	56	M 8	50
TA M10	**90247**	9	■	15	90	69	M 10	25
TA M12	**90248**	6	■	18	105	86	M 12	25

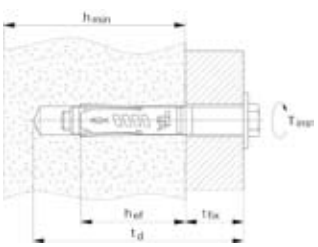


Heavy-duty anchor **TA M-S** with screw, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	min. drill hole depth	anchor length	max. usable length	thread	width across nut	qty. per box
			■ ETA	d_0	t	l	t_{fix}		SW	
				[mm]	[mm]	[mm]	[mm]	[Ø x length]		pcs.
TA M6 S/10	**90249**	3	■	10	75	49	10	M 6 x 60	10	50
TA M8 S/10	**90250**	9	■	12	80	56	10	M 8 x 65	13	50
TA M10 S/20	**90251**	6	■	15	110	69	20	M 10 x 90	17	25
TA M12 S/25	**90252**	3	■	18	130	86	25	12 x 110	19	20

Heavy-duty anchor **TA M-T**, for push-through installation

Type	Art.-No.	ID	approval	drill-Ø	min. drill hole depth for push-through installation	screw length	max. usable length	thread	width across nut	qty. per box
			■ ETA	d_0	t_d	l_s	t_{fix}	M	SW	
				[mm]	[mm]	[mm]	[mm]			pcs.
TA M6 T/25 S	**90267**	7	■	10	90	80	25	M 6	10	50
TA M8 T/25 S	**90268**	4	■	12	95	85	25	M 8	13	50
TA M10 T/25 S	**90269**	1	■	15	110	100	25	M 10	17	25
TA M12 T/25 S	**90270**	7	■	18	120	110	25	M 12	19	20



FIRE PROTECTION

Red hot: see page 308 for information about fire protection.

Heavy-duty anchor TA M

TECHNICAL DATA

Heavy-duty anchor **TA M8 BP**, with twist-off head

Type	Art.-No.	ID	drill	min. drill hole depth for push-trough installation	anchor length	max. usable length	Installation torque	width across nut	qty. per box
			d_0	t_d	l	t_{fix}	T_{inst}	SW	
			[mm]	[mm]	[mm]	[mm]			pcs.
TA M8 BP	**90265**	3	12	95	85	25	until head twists off	13	50

LOADS

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Heavy Duty Anchor TA M with large axial spacing and edge distance.

				Non-cracked concrete			
Anchor size				**TA M6[1)]**	**TA M8[1)]**	**TA M10[1)]**	**TA M12[1)]**
Effective anchorage depth	h_{ef}	[mm]		**40**	**45**	**55**	**70**
Drill hole depth for TA M, TA M-S	$h_1 \geqq$	[mm]		65	70	90	105
Drill hole depth for TA M-T	$h_1 \geqq$	[mm]		60	65	80	95
Drill hole diameter	d_0	[mm]		10	12	15	18
Mean ultimate loads N_u [kN]							
Tensile	N_u	[kN]	gvz	11.0	16.3	25.0	32.1
Shear	V_u	[kN]	gvz	6.9*	14.6*	21.4*	32.9*
Design resistant loads N_{Rd} [kN]							
Tensile	N_{Rd}	[kN]	gvz	5.9	9.1	13.3	18.0
Shear	V_{Rd}	[kN]	gvz	4.6	9.4	15.4	23.8
Recommended loads N_{rec} [kN]							
Tensile	N_{rec}	[kN]	gvz	4.2	6.5	9.5	12.9
Shear	V_{rec}	[kN]	gvz	3.3	6.7	11.0	17.0
Component dimensions, minimum axial spacings and edge distances							
Min. axial spacing[2)]	s_{min}	[mm]		80	90	110	160
Min. edge distance[2)]	c_{min}	[mm]		50	60	70	120
Min. structural component thickness	h_{min}	[mm]		100	100	110	140
Required torque	T_{inst}	[Nm]		10	20	40	75

* steel failure decisive

1) The values apply to screws with a strength classification 8.8

2) 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 C20/25 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.

The conditions of application may differ from those given in the European Technical Approval.
For further detailed information about ETA please contact your local fischer representative.

Bolt FBN II

The flexible, low-cost expansion bolt for the non-cracked compression zone.

OVERVIEW

Bolt **FBN II**, zinc-plated steel

Bolt **FBN A4**, stainless steel A4

Bolt **FBN II-GS** (with large washer), zinc-plated steel

Bolt **FBN 8 H**

Approved for:
- Non-cracked concrete C20/25 to C50/60

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

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

DESCRIPTION

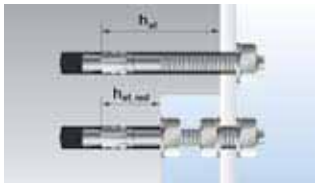
- Anchor bolt for push-through and pre-positioned installation
- When the hexagon nut is tightened, the tapered bolt is pulled into the expansion clip and expands it against the hole wall.
- A4 stainless steel and hot-dip galvanised version for outdoor use and in damp conditions.
- For wooden structures use the FBN II GS with large washer as per DIN 440.

Advantages/benefits

- Long thread allows stand-off installations and variable usable lengths.
- FBN II 8 K to FBN II 20 K mm diameter also for reduced anchorage depths, e.g. for small loads or if reinforcements are hit.
- Embossed letter on the head for subsequent control of the installation as it indicates the setting depth.
- Hook anchor FBN 8 H for simple installation of meshed reinforcements, wire gratings, etc.

EXAMPLE - FBN II 16/25

- Usable Standard length of 25 mm at anchorage depth of 80 mm - maximum load
- Maximum usable length of 40 mm at anchorage depth of 65 mm - reduced load



INSTALLATION

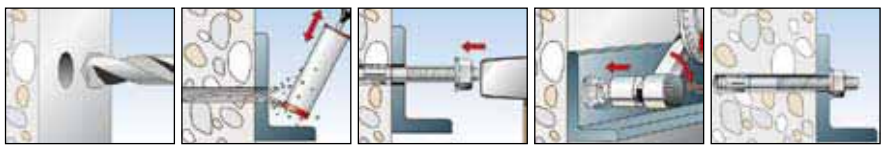
Type of installation

- Push-through and pre-positioned installation

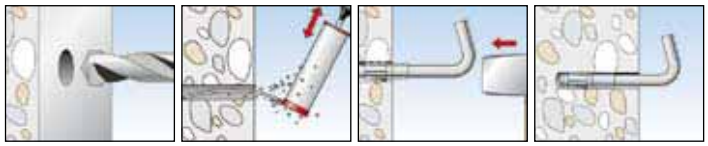
Installation tips

- For series installation we recommend the Anchor bolt setting tool FABS (see page 90) to reduce installation time.
- Before driving in, the hexagon nut must be brought into the optimal installation position (the bolt projecting by 2 to 3 mm).

FBN



FBN 8 H



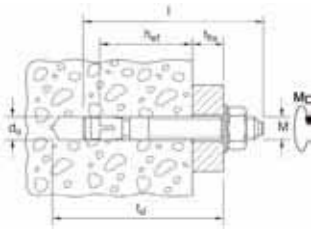
STANDARDS

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

Bolt FBN II

TECHNICAL DATA

Bolt **FBN II**, zinc-plated steel



Type	Art.-No.	ID	approval	Imprint on head	drill-Ø	usable length	effect. anchorage depth	min. drill-hole depth for through fixings	total length	thread	qty. per box
			■ ETA		d_0	d_a	h_{ef}	t_d	l		
					[mm]	[mm]	[mm]	[mm]	[mm]	[Ø x length]	pcs.
FBN 6/5	**45130**	4		-	6	5/ -	20/ -	45	40	M 6 x 16	100
FBN 6/10	**45136**	6		-	6	10/ -	25/ -	50	55	M 6 x 30	100
FBN 6/30	**45137**	3		-	6	30/ -	25/ -	70	75	M 6 x 30	100
FBN II 8/5	**40662**	5	■	A	8	5/15	40/30	61	66	M 8 x 34	50
FBN II 8/10	**40664**	9	■	B	8	10/20	40/30	66	71	M 8 x 39	50
FBN II 8/20	**40669**	4	■	D	8	20/30	40/30	76	81	M 8 x 49	50
FBN II 8/30	**40700**	4	■	F	8	30/40	40/30	86	91	M 8 x 59	50
FBN II 8/50	**40771**	4	■	K	8	50/60	40/30	106	111	M 8 x 79	50
FBN II 8/70	**40777**	6	■	M	8	70/80	40/30	126	131	M 8 x 99	20
FBN II 8/100	**40783**	7	■	P	8	100/110	40/30	156	161	M 8 x 100	20
FBN II 10/10	**40827**	8	■	B	10	10/20	50/40	78	86	M 10 x 46	50
FBN II 10/20	**40851**	3	■	D	10	20/30	50/40	88	96	M 10 x 56	50
FBN II 10/30	**40854**	4	■	F	10	30/40	50/40	98	106	M 10 x 66	50
FBN II 10/50	**40855**	1	■	K	10	50/60	50/40	118	126	M 10 x 86	20
FBN II 10/70	**40931**	2	■	M	10	70/80	50/40	138	146	M 10 x 100	20
FBN II 10/100	**40943**	5	■	P	10	100/110	50/40	168	176	M 10 x 100	20
FBN II 10/140	**40944**	2	■	S	10	140/150	50/40	208	216	M 10 x 100	20
FBN II 10/160	**40945**	9	■	T	10	160/170	50/40	228	236	M 10 x 100	20
FBN II 12/10	**40950**	3	■	B	12	10/25	65/50	95	106	M 12 x 59	20
FBN II 12/20	**44558**	7	■	D	12	20/35	65/50	105	116	M 12 x 69	20
FBN II 12/30	**45263**	9	■	F	12	30/45	65/50	115	126	M 12 x 79	20
FBN II 12/50	**45264**	6	■	K	12	50/65	65/50	135	146	M 12 x 99	20
FBN II 12/80	**45265**	3	■	N	12	80/95	65/50	165	176	M 12 x 129	20
FBN II 12/100	**45266**	0	■	P	12	100/115	65/50	185	196	M 12 x 149	20
FBN II 12/120	**45267**	7	■	R	12	120/135	65/50	205	216	M 12 x 169	20
FBN II 12/140	**45268**	4	■	S	12	140/155	65/50	225	236	M 12 x 189	20
FBN II 12/160	**45269**	1	■	T	12	160/185	65/50	245	256	M 12 x 100	20
FBN II 16/25	**45564**	7	■	E	16	25/40	80/65	129	145	M 16 x 89	10
FBN II 16/50	**45565**	4	■	K	16	50/65	80/65	154	170	M 16 x 114	10
FBN II 16/80	**45566**	1	■	N	16	80/95	80/65	184	200	M 16 x144	10
FBN II 16/100	**45567**	8	■	P	16	100/115	80/65	204	220	M 16 x 164	10
FBN II 16/140	**45568**	5	■	S	16	140/155	80/65	244	260	M 16 x 100	10
FBN II 16/160	**45569**	2	■	T	16	160/175	80/65	264	280	M 16 x 100	10
FBN II 16/200	**45570**	8	■	V	16	200/215	80/65	304	320	M 16 x 100	10
FBN II 20/30	**45573**	9	■	F	20	30/55	105/80	165	184	M 20 x 50	10
FBN II 20/60	**45574**	6	■	L	20	60/85	105/80	195	214	M 20 x 90	10
FBN II 20/80	**45575**	3	■	N	20	80/105	105/80	215	234	M 20 x 90	10
FBN II 20/120	**45576**	0	■	R	20	120/145	105/80	255	274	M 20 x90	10
FBN II K - Short Version											
FBN II 8/5 K	**40806**	3	■	-A-	8	- /5	- /30	51	56	M 8 x 24	50
FBN II 8/10 K	**40807**	0	■	-B-	8	- /10	- /30	56	61	M 8 x 29	50
FBN II 8/30 K	**40826**	1	■	-F-	8	- /30	- /30	76	81	M 8 x 49	50
FBN II 10/5 K	**40946**	6	■	-A-	10	- /5	- /40	63	71	M 10 x 31	50
FBN II 10/10 K	**40947**	3	■	-B-	10	- /10	- /40	68	76	M 10 x 36	50
FBN II 10/30 K	**40948**	0	■	-F-	10	- /30	- /40	88	96	M 10 x 56	50
FBN II 12/5 K	**45272**	1	■	-A-	12	- /5	- /50	75	86	M 12 x 39	20
FBN II 12/10 K	**45273**	8	■	-B-	12	- /10	- /50	80	91	M 12 x 44	20
FBN II 12/30 K	**45274**	5	■	-F-	12	- /30	- /50	100	111	M 12 x 64	20
FBN II 16/15 K	**45571**	5	■	-C-	16	- /15	- /65	104	120	M 16 x 64	10
FBN II 16/25 K	**45572**	2	■	-E-	16	- /25	- /65	114	130	M 16 x 74	10
FBN II 20/10 K	**45577**	7	■	-B-	20	- /10	- /65	120	139	M 20 x -	10

FIRE PROTECTION

Red hot: see page 308 for information about fire protection.

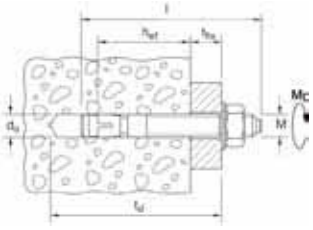
CORROSION

All about corrosion and how you can avoid it is written on page 309.

TECHNICAL DATA

Bolt **FBN A4**, stainless steel A4

Bolt **FBN II-GS** (with large washer), zinc-plated steel



Type		Art.-No.	ID	approval ■ ETA	Imprint on head	drill-Ø d_0 [mm]	usable length d_a [mm]	effect. anchorage depth h_{ef} [mm]	min. drill-hole depth for through fixings t_d [mm]	total length l [mm]	thread [Ø x length]	qty. per box pcs.
FBN 6/10 A4		**69087**	1	■	-	6	10	40	65	68	M 6 x 25	100
FBN 6/30 A4		**69088**	8	■	-	6	30	40	85	88	M 6 x 30	100
FBN 8/10 + 23 A4	1)	**69089**	5	■	B	8	10/23	48/35	73	76	M 8 x 41	50
FBN 8/30 + 43 A4	1)	**69090**	1	■	F	8	30/43	48/35	93	96	M 8 x 59	50
FBN 8/50 + 63 A4	1)	**69091**	8	■	K	8	50/63	48/35	113	116	M 8 x 81	50
FBN 10/15 + 23 A4	1)	**69092**	5	■	C	10	15/23	50/42	83	89	M 10 x 51	50
FBN 10/50 + 58 A4	1)	**69093**	2	■	K	10	50/58	50/42	118	125	M 10 x 87	20
FBN 10/100 + 108 A4	1)	**69094**	9	■	P	10	100/108	50/42	168	174	M 10 x 134	20
FBN 12/15 + 35 A4	1)	**69095**	6	■	C	12	15/35	70/50	105	113	M 12 x 71	20
FBN 12/45 + 65 A4	1)	**69096**	3	■	I	12	45/65	70/50	135	143	M 12 x 103	20
FBN 12/100 + 120 A4	1)	**69097**	0	■	P	12	100/120	70/50	190	202	M 12 x 157	20
FBN 16/10 A4		**69098**	7	■	-	16	10	64	98	109	M 16 x 54	10
FBN 16/25 + 45 A4	1)	**69099**	4	■	E	16	25/45	84/64	133	144	M 16 x 89	10
FBN 16/50 + 70 A4	1)	**69100**	7	■	K	16	50/70	84/64	158	169	M 16 x 114	10
FBN II 12/80 GS		**45578**	4	■	N	12	80/95	65/50	165	176	M 12 x 129	20
FBN II 12/100 GS		**45579**	1	■	P	12	100/115	65/50	185	196	M 12 x 149	20
FBN II 12/120 GS		**45580**	7	■	R	12	120/135	65/50	205	216	M 12 x 169	20
FBN II 12/140 GS		**45581**	4	■	S	12	140/155	65/50	225	236	M 12 x 189	10
FBN II 12/160 GS		**45583**	8	■	T	12	160/175	65/50	245	256	M 12 x 100	10
FBN II 12/180 GS		**45584**	5	■	U	12	180/195	65/50	265	276	M 12 x 100	10
FBN II 12/200 GS		**45585**	2	■	V	12	200/215	65/50	285	296	M 12 x 100	10
FBN II 12/250 GS		**45586**	9	■	W	12	250/265	65/50	335	346	M 12 x 100	10
FBN II 16/80 GS		**45587**	6	■	N	16	80/95	80/65	184	200	M 16 x 144	10
FBN II 16/100 GS		**45588**	3	■	P	16	100/115	80/65	204	220	M 16 x 164	10
FBN II 16/120 GS		**45589**	0	■	R	16	120/135	80/65	224	240	M 16 x 184	10
FBN II 16/140 GS		**45590**	6	■	S	16	140/155	80/65	244	260	M 16 x 100	10
FBN II 16/160 GS		**45591**	3	■	T	16	160/175	80/65	264	280	M 16 x 100	10
FBN II 16/180 GS		**45592**	0	■	U	16	180/195	80/65	284	300	M 16 x 100	10
FBN II 16/200 GS		**45593**	7	■	V	16	200/215	80/65	304	320	M 16 x 100	10
FBN II 16/250 GS		**52192**	2	■	W	16	250/265	80/65	354	370	M 16 x 100	10
FBN II 16/300 GS		**52204**	2	■	X	16	300/315	80/65	404	420	M 16 x 100	10

1) Different usable lengths for the corresponding dimensions are possible. The values for max. usable length and anchorage depth before (resp. after) the slash belong together.

Bolt FBN II

TECHNICAL DATA

Bolt **FBN HDG**,
hot-dip galvanised steel

Type	Art.-No.	ID	Imprint on head	drill-Ø d_0 [mm]	usable length d_a [mm]	effect. anchorage depth h_{ef} [mm]	min. drill-hole depth for through fixings t_d [mm]	total length l [mm]	thread [Ø x length]	qty. per box pcs.
FBN 8/5 HDG	**57525**	3	-	8	5	35	55	58	M 8 x 23	100
FBN 8/10 HDG	**57526**	0	-	8	10	48	73	76	M 8 x 41	50
FBN 8/50 HDG	**57527**	7	-	8	50	48	113	116	M 8 x 81	50
FBN 8/100 HDG	**57528**	4	-	8	100	48	163	166	M 8 x 130	25
FBN 10/5 HDG	**57529**	1	-	10	5	42	65	69	M 10 x 31	50
FBN 10/15 HDG	**57530**	7	-	10	15	50	83	89	M 10 x 51	50
FBN 10/50 HDG	**57531**	4	-	10	50	50	118	124	M 10 x 87	20
FBN 10/100 HDG	**57532**	1	-	10	100	50	168	174	M 10 x 134	20
FBN 10/140 HDG	**57533**	8	-	10	140	50	208	214	M 10 x 174	20
FBN 12/5 HDG	**57534**	5	-	12	5	50	75	83	M 12 x 41	20
FBN 12/15 HDG	**57535**	2	-	12	15	70	105	113	M 12 x 71	20
FBN 12/30 HDG	**57536**	9	-	12	30	70	120	128	M 12 x 86	20
FBN 12/45 HDG	**57537**	6	-	12	45	70	135	143	M 12 x 103	20
FBN 12/100 HDG	**57538**	3	-	12	100	70	190	202	M 12 x 137	20
FBN 16/10 HDG	**57539**	0	-	16	10	64	98	109	M 16 x 54	10
FBN 16/25 HDG	**57540**	6	-	16	25	84	133	144,	M 16 x 89	10
FBN 16/50 HDG	**57541**	3	-	16	50	84	158	169	M 16 x 114	10
FBN 16/100 HDG	**57542**	0	-	16	100	84	208	221	M 16 x 166	10

Bolt **FBN 8 H**

Type		Art.-No.	ID	drill-Ø d_0 [mm]	drill depth = mounting depth [mm]	total length l [mm]	length of hook [mm]	failure load [kN]	qty. per box pcs.
FBN 8 x 75 H	1)	**92420**	4	8	50	75	30	1.10	50
FBN 8 x 95 H	1)	**92421**	1	8	50	95	30	1.10	50

1) Take a safety factor into consideration.

LOADS

fischer Bolt FBN A4 / FBN II

Recommended Loads[1] of single anchors in normal-weight concrete C20/25[2].

For the design complete approval ETA-07/XXXX (FBN II

Anchor type			FBN 6	FBN II 8		FBN 8		FBN II 10		FBN 10		FBN II 12		FBN 12		FBN II 16		FBN 16		FBN II 20	
			A4	gvz		A4		gvz		A4		gvz		A4		gvz		A4		gvz	
Effective anchorage depth	h_{ef}	[mm]	40	30[3]	40	35[3]	48	40	50	42	50	50	65	50	70	65	80	64	84	80	105
Recommended tensile load N_{perm} of one singlea nchor without edge influence, i.e. edge distance $c \geq 1.5 \times h_{ef}$ and axial spacing $s \geq 3 \times h_{ef}$																					
in non-cracked concrete C20/25[2]	N_{perm}	[kN]	3.6	2.9	6.1	3.2	4.8	6.1	8.5	5.1	6.5	8.5	12.6	8.5	11.9	12.6	17.2	10.0	14.6	17.2	25.8
Recommended shear load V_{perm} of one single anchor without edge influence, i.e. edge distance $c \geq 10 \times h_{ef}$ and axial spacing $s \geq 3 \times h_{ef}$																					
in non-cracked concrete C20/25[2]	V_{perm}	[kN]	3.6	3.9	6.1	5.0	6.0	6.1	8.5	6.5	8.5	8.5	12.0	8.5	12.5	22.9	22.9	22.4	22.4	34.3	38.8
Permissible bending moment	M_{perm}	[Nm]	5.2	11.0[3]	12.9	12.4[3]	12.4	25.2	25.6	24.8		44.9	44.9	39.0		114.3	114.3	95.2		199.4	241.1
Anchor characteristics																					
Characteristics axial spacing	$s_{cr,N}$	[mm]	120	90[3]	120	110[3]	140	120	150	130	150	150	195	150	210	195	240	190	250	240	315
Characteristic edge distance	$c_{cr,N}$	[mm]	60	45[3]	60	55[3]	70	60	75	65	75	75	97.5	75	105	97.5	120	95	125	120	157.5
Minimum axial spacing	s_{min}	[mm]	40	40[3]	40	50[3]	50	50	50	50	60	70	70	95	80	90	90	90	100	120	120
Minimum edge distance	c_{min}	[mm]	35	40[3]	40	45[3]	35	80	50	60	55	100	70	95	75	120	90	80	100	120	120
Minimum structural component thickness	h_{min}	[mm]	100	100	100	100	100	100	100	100	100	100	120	100	140	120	160	130	170	160	200
Nominal drill diameter	d_0	[mm]	6	8		8		10		10		12		12		16		16		20	
Drill hole depth	$h_1 \geq$	[mm]	55	46[3]	56	50[3]	63	58	68	60	68	70	85	70	90	89	104	88	108	110	135
Clearance-hole in fixture to be attached	$d_f \leq$	[mm]	7	9		9		12		12		14		14		18		18		22	
Installation torque	T_{inst}	[Nm]	7.7	15		15		30		30		50		50		100		100		200	

Note: With the fischer Design Software COMPUFIX you can use the full performance of the fischer Bolt FBN and you are able to do designs under individual application conditions.

[1] The partial safety factors for resistance and the partial safety factor for load with $\gamma_F = 1,4$ are considered.
Please observe the design method A (ETAG, annex C) if combined tensile and shear loads, edge influences and influences of spacings of anchor groups are to be considered.

[2] The concrete is considered to be normally reinforced; For higher concrete strength classes an increase in performance of up to 55% is possible.

[3] Use restricted to anchoring of structural components which are statically indeterminate.

Concrete screw FBS

The simple and time-saving threaded concrete screw for the cracked or tension zone.

OVERVIEW

Concrete screw **FBS-P**, panhead

Concrete screw **FBS-SK**, countersunk head

Concrete screw **FBS-US**, hexagon head withintegrated washer

Concrete screw **FBS-S**, hexagon head

Concrete screw **FBS-M8**, outside diameter M8

Concrete screw **FBS-M8/M10**, internal thread M8/M10

FBS M12
Concrete screw with thread and hexagon drive, stainless steel

Approved for:
- Cracked and non-cracked concrete C20/25 to C50/60
- Lightweight ceilings and suspended ceilings according to DIN 18168
- Statically comparable fixings

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure
- Solid brick,
- Solid sand-lime brick

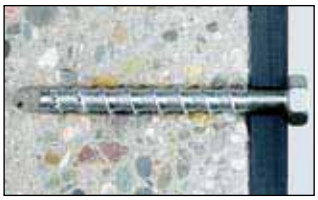
For fixing of:
- Handrails
- Consoles
- Ladders
- Cable trays
- Machines
- Gates
- Facades
- Window elements
- Battens
- Metal profiles
- Wire hangers
- Chains
- Cables
- Punched tapes
- Ventilation pipes
- Substructures made of wood and metal
- Ceilings

DESCRIPTION

- Self-tapping concrete screw for push-through and prior insertion installation
- When the concrete screw is screwed into the hole, the thread taps into the concrete and creates a positive fit anchorage.
- A4 stainless steel version for outdoor use or in damp conditions.

Advantages/benefits

- Setting and installation in one working operation saves time.
- Completely removable anchor, therefore particularly suitable for temporary fixings (e.g. shuttering supports).
- Virtually expansion-free operation allows cost-efficient fixing with small axial spaces and edge distances.
- Serrations on the thread makes the screws easy to screw in.
- Re-usability of the screws reduces costs.
- Fixing with different head designs for different areas of application.



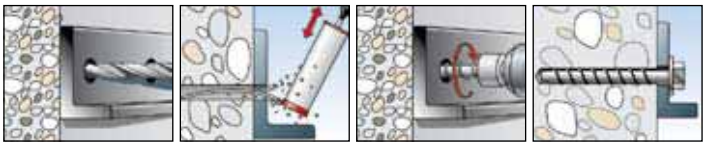
FIRE PROTECTION
Red hot: see page 308 for information about fire protection.

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

INSTALLATION

Type of installation

- Pre-positioned installation
- Push-through installation



Installation tips

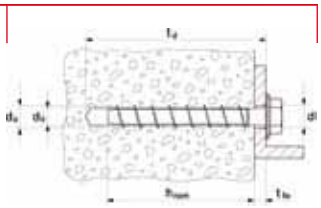
- We recommend use of an impact wrench with tangential impact (see the table for power output).

Performance details of impact wrench

Concrete screw	recommended installation torque
FBS 5	100 [Nm]
FBS 6	
FBS 8	200 [Nm]
FBS 10	300 [Nm]

Use nuts (black) which fit percussion power screwdrivers!

TECHNICAL DATA



Concrete screw **FBS-P** panhead, zinc-plated steel

Concrete screw **FBS-SK** countersunk head, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	drill-hole diameter in object	screw diameter	drill hole depth	anchorage depth	max. usable length	actuation	qty. per box
			● DIBt	d_0	d_f	d_s	h_0	h_{ef}	t_{fix}		
				[mm]	[Ø mm]	[mm]	[mm]	[mm]	[mm]		pcs.
FBS 5/5 P	**66774**	3	●	5	7	6,5	65	55	5	T30	100
FBS 6/5 SK	**66935**	8	●	6	8	7,6	65	55	5	T30	100
FBS 6/5 P	**66939**	6	●	6	8	7,6	65	55	5	T30	100
FBS 6/25 P	**66948**	8	●	6	8	7,6	65	55	25	T30	100

Concrete screw **FBS-M8**, outside diameter M8, zinc-plated steel

Concrete screw **FBS-M8/M10**, internal thread M8/M10, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	drill-hole diameter in object	screw diameter	min. drill-hole depth for through fixings	anchorage depth	thread	width across nut	qty. per box
			● DIBt	d_0	d_f	d_s	t_d	h_{ef}	M	SW	
				[mm]	[Ø mm]	[mm]	[mm]	[mm]			pcs.
FBS 6 M8	**66949**	5	●	6	8	7,6	60	55	M 8	SW10	100
FBS 6 M8/M10I	**66950**	1	●	6	8	7,6	60	55	M 8	SW13	100

Concrete screw **FBS-US**, hexagon head with integrated washe

Concrete screw **FBS-S**, hexagon head

Type	Art.-No.	ID	approval	drill-Ø	drill-hole diameter in object	screw diameter	drill hole depth	anchorage depth	max. usable length	actuation	qty. per box
			● DIBt	d_0	d_f	d_s	h_0	h_{ef}	t_{fix}		
				[mm]	[Ø mm]	[mm]	[mm]	[mm]	[mm]		pcs.
FBS 8/5 US	**66956**	3	●	8	12	10,5	90	75	5	T40/SW13	100
FBS 8/25 US	**66957**	0	●	8	12	10,5	110	75	25	T40/SW13	100
FBS 8/15 S	**66958**	7	●	8	12	10,5	100	75	15	SW 16	100
FBS 10/5 S	**67062**	0	●	10	14	12,5	100	85	5	SW 18	50
FBS 10/15 S	**67063**	7	●	10	14	12,5	110	85	15	SW 18	50
FBS 10/25 S	**67168**	9	●	10	14	12,5	120	85	25	SW 18	50
FBS 10/15 S A4	**47465**	6	●	10	14	12,5	105	85	10	SW 17	50
FBS 10/20 S A4	**98336**	2	●	10	14	12,5	115	85	20	SW 17	50

CORROSION
All about corrosion and how you can avoid it is written on page 309.

Concrete screw FBS

TECHNICAL DATA

FBS M12 Concrete screw with thread and hexagon drive, zinc-plated steel

FBS M12 A4 Concrete screw with thread and hexagon drive, stainless steel

Type		Art.-No.	ID	approval	drill-Ø	drill-hole diameter in object	screw diameter	drill hole depth	anchorage depth	max. usable length	thread	width across nut	qty. per box
				● DIBt	d_0	d_f	d_s	h_0	h_{ef}	t_{fix}	M	SW	
					[mm]	[Ø mm]	[mm]	[mm]	[mm]	[mm]			pcs.
FBS 10 M12/30	1)	**98339**	3	●	10	14	12,5	125	85	30	M 12	9	50
FBS 10 M12/53	1)	**98340**	9	●	10	14	12,5	148	85	53	M 12	9	50
FBS 10 M12/40 A4	1)	**98337**	9	●	10	14	12,5	135	85	40	M 12	9	50
FBS 10 M12/60 A4	1)	**98338**	9	●	10	14	12,5	155	85	60	M 12	9	50

1) Including nuts and washer, not pre-assembled.

LOADS

Design resistant and recommended loads for single anchors of fischer Concrete screw FBS with large axial spacing and edge distance

					Non-cracked concrete				Cracked concrete			
Anchor size					**FBS 5**[2]	**FBS 6**[2]	**FBS 8**	**FBS 10**	**FBS 5***	**FBS 6***	**FBS 8***	**FBS 10**
Effective anchorage depth		h_{ef}	[mm]		**55**	**55**	**50**	**60**	**55**	**55**	**50**	**60**
Drill hole depth		$h_0 \geqq$	[mm]		60	60	85	95	60	60	85	95
Screw in depth		$h_{nom} \geqq$	[mm]		-	-	75	85	55	55	75	85
Drill hole diameter		d_0	[mm]		5	6	8	10	5	6	8	10
Design resistant loads N_{Rd} and V_{Rd} [kN]												
Tensile	0°	N_{Rd}	[kN]	gvz	-	-	7.2	9.0	0.4	1.1	3.4	5.4
				A4	-	-	-	9.0	-	-	-	5.4
Shear	90°	V_{Rd}	[kN]	gvz	-	-	10.3	16.9	-	-	10.4	16.9
				A4	-	-	-	19.0	-	-	-	17.6
Recommended loads N_{rec} and V_{rec} [kN]												
Tensile	0°	N_{rec}	[kN]	gvz	2.2	3.7	5.1	6.4	0.3	0.8	2.4	3.9
				A4	-	-	-	6.4	-	-	-	3.9
Shear	90°	V_{rec}	[kN]	gvz	-	-	7.4	12.1	-	-	7.4	12.1
				A4	-	-	-	13.6	-	-	-	12.6
Recommended bending moment M_{rec} [Nm]												
		M_{rec}	[Nm]	gvz	-	-	19.0	40.0	-	8.0	19.0	40.0
				A4	-	-	-	36.8	-	-	-	36.8
Component dimensions, minimum axial spacings and edge distances												
Min. axial spacing[1]		s_{min}	[mm]		-	-	50	60	50	50	50	60
Min. edge distance[1]		c_{min}	[mm]		-	-	70	65	100	100	70	65
Min. structural component thickness		h_{min}	[mm]		-	-	120	130	110	110	120	130

* For the fixing of lightweight suspended ceiling constructions only.

[1] 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 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.

[2] Not included in any approvals, results are from fischer in house tests.

The conditions of application differ from those given in the German Approval.
For further detailed information about approvals please contact your local fischer representative.

Hollow-ceiling anchor FHY

Specially for fixings in prestressed hollow-ceiling slabs.

OVERVIEW

Hollow-ceiling anchor **FHY**, zinc-plated steel

Hollow-ceiling anchor **FHY A4**, stainless steel

Approved for:
- Prestressed hollow-core concrete slabs C50/60 (only zinc-plated version)

Also suitable for:
- Concrete C12/15 to C50/60
- Natural stone with dense structure

For fixing of:
- Pipes
- Ventilation systems
- Sprinkler systems
- Consoles
- Steel constructions
- Gratings
- Cable trays
- Gates
- Suspended ceilings

DESCRIPTION

- Sleeve anchor with internal thread specially for anchoring in prestressed concrete hollow ceilings
- When the screw or hexagon nut is tightened, the cone is pulled into the sleeve and expands it into the cavity or expands it in the solid material against the hole wall.
- A4 stainless steel version for outdoor use or in damp conditions (not part of the official approval).

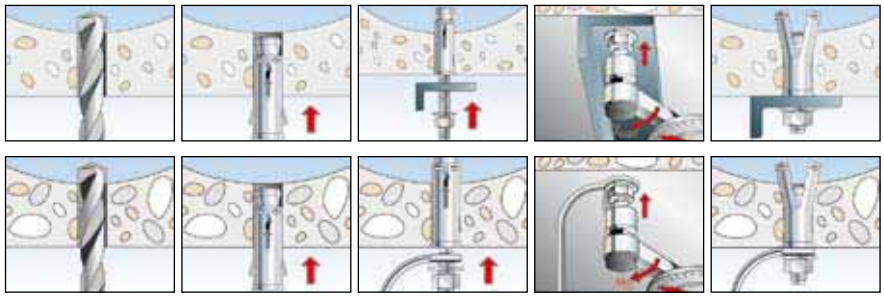
Advantages/benefits

- Suitable for cavities and solid zones of prestressed concrete hollow ceilings.
- Suitable for all screws or studs with metric threads.
- The anchor can also be installed outside the cavity axis up to 5 cm from the tensioning wire.
- No special tools necessary.

INSTALLATION

Type of installation

- Pre-positioned installation
- Stand-off installation



Installation tips

- Suitable bolts and studs can be found in the SaMontec specialist catalogue.
- Observe the required screw-in depth e_2 in the fixing when determining the bolt length l_s:
  Minimum screw-in depth e_2
  + Thickness of building component t_{fix}
  + Thickness of washer
  = Screw length

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

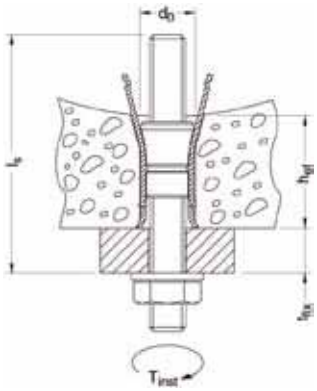
Hollow-ceiling anchor FHY

TECHNICAL DATA

Hollow-ceiling anchor **FHY**, zinc-plated steel

Hollow-ceiling anchor **FHY A4**, stainless steel

Type	Art.-No.	ID	approval	drill-Ø	min. drill hole depth	effect. anchorage depth	anchor length	thread	min. bolt penetration	max. bolt penetration	qty. per box
			● DIBt	d_0	t	h_{ef}	l	M	e_2	e_1	
				[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	pcs.
FHY M 6	**30138**	8	●	10	50	30	37	M 6	37	45	50
FHY M 8	**30146**	3	●	12	60	35	43	M 8	43	55	25
FHY M10	**30148**	7	●	16	65	40	52	M 10	52	60	20
FHY M 6 A4	**30139**	5		10	50	30	37	M 6	37	45	50
FHY M 8 A4	**30147**	0		12	60	35	43	M 8	43	55	25
FHY M10 A4	**30151**	7		16	65	40	52	M 10	52	60	20



LOADS

Safe working loads[1] fixing parameters and component dimensions for tension, shear and diagonal load at any angle in hollow-slab floors of prestressed concrete of strength class ≥ C50/60. When dimensioning, observe the approval Z-21.1-1711 in its entirety.

Fixing type			**FHY M 6**			**FHY M 8**			**FHY M 10**	
Web thickness	d_u	[mm]	≥ 25 < 30	≥ 30 < 40	≥ 40	≥ 25 < 30	≥ 30 < 40	≥ 40	≥ 30 < 40	≥ 40
Drill hole depth	h_1 ≥	[mm]	50			60			65	
Drill hole diameter		[mm]	10			12			16	
Single fixing										
Perm. F[2] with	c ≥ $c_{cr1.2}$	[kN]	0.7	0.9	2.0	0.7	0.9	2.0	1.2	3.0
Perm. F[2] with	c = $c_{min1.2}$	[kN]	0.35	0.8	1.8	0.35	0.8	1.8	1.0	2.7
Axial spacing[2]	$c_{cr1.2}$ ≥	[mm]	150							
Min. edge distance[2]	$c_{min1.2}$ ≥	[mm]	100							
Axial spacing	$s_{cr1.2.}$ ≥	[mm]	300							
Pairs of fixings[3]										
Perm. F with	c ≥ $c_{cr1.2}$	[kN]	0.7	1.4	2.6	0.7	1.4	2.6	2.0	4.8
Perm. F with	c = c_{min}	[kN]	0.35	1.25	2.35	0.35	1.25	2.35	1.8	4.3
Min. axial spacing	$S_{min1.2}$ ≥	[mm]	70	80	100	70	80	100	80	100
Edge distance	$c_{cr1.2}$ ≥	[mm]		150			150		150	
Min. edge distance	$c_{min1.2.}$ =	[mm]		100			100		100	
Safe working bending moment										
Grade 4.6		[Nm]		-			6.4		12.8	
Grade 5.8		[Nm]		4.4[4]			10.7[4]		21.4[4]	
Grade 5.8		[Nm]		7.0[4]			17.1[4]		34.2[4]	
Length of hexagon-head screw[5]	min l_s ≥	[mm]		39 + t_{fix}			45 + t_{fix}		54 + t_{fix}	
Length of threaded bolt	min l_B ≥	[mm]		62 + t_{fix}			68 + t_{fix}		77 + t_{fix}	
Installation torque	T_{inst}	[Nm]		10			10		20	
Through-hole in the component to be attached	d_f ≤	[mm]		7			9		12	

[1] The anchorage of the Cavity Fixing FHY is permissible only in hollow-slab ceilings of prestressed concrete, the width of whose cavities is not more than 4.2 times the web width. The fixing may also be used as multiple fastening **for anchoring lightweight ceiling coverings and underceilings** to DIN 18168 on hollow-slab ceilings of prestressed concrete, **and for statically similar anchorages up to 1.0 kN/m²**. When external loads are suspended from the prestressed-concrete hollow-slab ceilings, **the shearing loadbearing capacity must be reduced**. For fastening lightweight ceiling coverings and underceilings, to DIN 18168, this reduction is not necessary.

[2] For edge distances $c_{min} < c \leq c_{cr}$ the permissible loads may be determined by linear interpolation.

[3] The permissible load applies for a pair of fixings. The permissible load for the most highly stressed fixing must not exceed the values stated for the single fixing.
For pairs of fixings with min axial distances of $s_{min1.2} < s_{1.2} < s_{cr1.2}$ the permissible load may be interpolated linearly.
The linear value at $s_{1.2} = s_{cr1.2}$ for the pair of fixings with tensile load applied, may be assumed to be twice the permissible load for the single fixing.

[4] Only threaded rods marked in accordance with the approval may be used.

[5] With hexagon bolts with shaft to DIN EN 24014, the shaft length must be ≦ t_{fix}.

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

Sleeve anchor FSA

The lightweight sleeve anchor for non structural and non safety critical applications.

OVERVIEW

Sleeve anchor
FSA-S

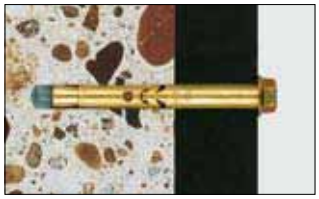
Sleeve anchor
FSA-B

Suitable for:
- Concrete C12/15 to C50/60
- Natural stone with dense structure
- Good quality brick

For fixing of:
- Steel constructions
- Gratings
- Handrails
- Consoles
- Ladders
- Machines
- Gates

DESCRIPTION

- Light sleeve anchor for push-through installation.
- When the hexagon nut or bolt is tightened, the tapered bolt is pulled into the expansion sleeve and expands it against the hole wall.



Advantages/benefits

- The half-moon shaped recesses stamped in the sleeve allows for contraction in length when tightened, this clamps the item being attached firmly against the concrete.
- Version FSA-S for fixings with detailed design: where no protruding thread is visual after the installation.

INSTALLATION

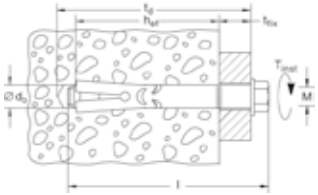
Type of installation

- Push-through installation

TECHNICAL DATA

fischer Sleeve anchor **FSA-S**,
zinc-plated steel

Type	Art.-No.	ID	drill-Ø d_0 [mm]	min. drill-hole depth for through fixings t_d [mm]	effect. anchorage depth h_{ef} [mm]	anchor length l [mm]	max. usable length t_{fix} [mm]	thread M	width across nut SW	qty. per box pcs.
FSA 8/15 S	**68520**	4	8	65	35	69	15	M 6	10	50
FSA 8/40 S	**68521**	1	8	90	35	94	40	M 6	10	50
FSA 8/65 S	**68522**	8	8	115	35	119	65	M 6	10	50
FSA 10/10 S	**68523**	5	10	65	40	70	10	M 8	13	20
FSA 10/35 S	**68524**	2	10	90	40	95	35	M 8	13	20
FSA 10/60 S	**68525**	9	10	115	40	120	60	M 8	13	20
FSA 12/10 S	**68526**	6	12	75	50	81	10	M 10	17	20
FSA 12/25 S	**68527**	3	12	90	50	96	25	M 10	17	20
FSA 12/50 S	**68528**	0	12	115	50	121	50	M 10	17	20



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

TECHNICAL DATA

Sleeve anchor **FSA-B**, zinc-plated steel

Type	Art.-No.	ID	drill-Ø	min. drill-hole depth for through fixings	effect. anchorage depth	anchor length	max. usable length	thread	width across nut	qty. per box
			d_0	t_d	h_{ef}	l	t_{fix}	M	SW	
			[mm]	[mm]	[mm]	[mm]	[mm]			pcs.
FSA 8/15 B	**68500**	6	8	65	35	65	15	M 6	10	50
FSA 8/40 B	**68501**	3	8	90	35	90	40	M 6	10	50
FSA 8/65 B	**68502**	0	8	115	35	115	65	M 6	10	50
FSA 10/10 B	**68503**	7	10	65	40	69	10	M 8	13	20
FSA 10/35 B	**68504**	4	10	90	40	94	35	M 8	13	20
FSA 10/60 B	**68505**	1	10	115	40	119	60	M 8	13	20
FSA 12/10 B	**68506**	8	12	75	50	81	10	M 10	17	20
FSA 12/25 B	**68507**	5	12	90	50	96	25	M 10	17	20
FSA 12/50 B	**68508**	2	12	115	50	121	50	M 10	17	20
FSA 12/75 B	**68509**	9	12	140	50	146	75	M 10	17	20

LOADS

Mean ultimate loads and recommended loads for single anchors of fischer Sleeve anchor FSA with large axial spacing and edge distance.

					Non-cracked concrete		
Anchor size					**FSA 8/.. M 6**	**FSA 10/.. M 8**	**FSA 12/.. M 10**
Effective anchorage depth		h_{ef}	[mm]		**35**	**40**	**50**
Drill hole depth		$h_1 \geqq$	[mm]		50	55	65
Drill hole diameter		d_0	[mm]		8	10	12
Mean ultimate loads N_u and V_u [kN]							
Tensile	0°	N_u	[kN]	gvz	10.7	13.1	19.2
Shear	90°	V_u	[kN]	gvz	13.2*	16.7	23.3
Design resistant loads N_{Rd} and V_{Rd} [kN]							
Tensile	0°	N_{Rd}	[kN]	gvz	3.5	4.6	5.6
Shear	90°	V_{Rd}	[kN]	gvz	7.1	7.8	10.9
Recommended loads N_{rec} and V_{rec} [kN]							
Tensile	0°	N_{rec}	[kN]	gvz	2.5	3.3	4.0
Shear	90°	V_{rec}	[kN]	gvz	5.1	5.5	7.8
Recommended bending moment M_{rec} [Nm]							
		M_{rec}	[Nm]	gvz	5.2	12.9	25.7
Component dimensions, minimum axial spacings and edge distances							
Min. axial spacing[1)]		s_{min}	[mm]		70	80	100
Min. edge distance[1)]		c_{min}	[mm]		50	60	60
Min. structural component thickness		h_{min}	[mm]		70	80	100
Required torque		T_{inst}	[Nm]		10	25	40

* steel failure

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

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

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

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

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

Sleeve anchor FSA

The lightweight sleeve anchor for non structural and non safety critical applications.

OVERVIEW

Sleeve anchor
FSA GB

Suitable for:
- Concrete C12/15 to C50/60
- Natural stone with dense structure
- Good quality brick

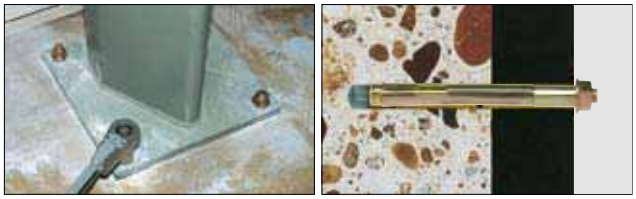
For fixing of:
- Steel constructions
- Gratings
- Handrails
- Consoles
- Ladders
- Machines
- Gates

DESCRIPTION

- Sleeve anchor for push-through installation.
- When the hexagon nut or bolt is tightened, the tapered bolt is pulled into the expansion sleeve and expands it against the hole wall.

Advantages/benefits

- The recesses stamped in the sleeve effect contraction in length when tightened, this clamps the item being attached firmly against the concrete.



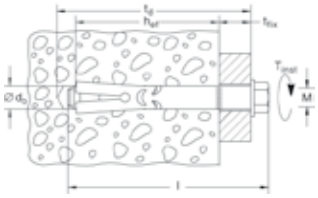
INSTALLATION

Type of installation

- Push-through installation

TECHNICAL DATA

fischer Sleeve anchor **FSA GB**, zinc-plated steel



Type	Art.-No.	ID		drill-Ø	min. drill-hole depth for through fixings	effect. anchorage depth	anchor length	max. usable length	thread	width across nut	qty. per box
				d_0	t_d	h_{ef}	l	t_{fix}	M	SW	
				[mm]	[mm]	[mm]	[mm]	[mm]			pcs.
FSA GB 6/5 (6x25)	**42672**	8		6	35	20	25	5	M4.5		100
FSA GB 6/8 (6x35)	**42661**	5		6	46	30	38	8	M4.5		100
FSA GB 6/25 (6x56)	**42662**	2		6	66	33	58	25	M4.5		100
FSA GB 8/8 (8x40)	**42663**	9		8	55	34	42	8	M6		100
FSA GB 8/30 (8x65)	**42655**	3		8	70	36	66	30	M6		100
FSA GB 8/55 (8x85)	**42664**	6		8	100	37	92	55	M6		100
FSA GB 10/10 (10x50)	**42665**	2		10	65	38	48	10	M8		50
FSA GB 10/35 (10x70)	**42656**	0		10	92	40	75	35	M8		50
FSA GB 10/60 (10x97)	**42657**	7		10	112	40	100	60	M8		50
FSA GB 12/12 (12x60)	**42666**	9		12	75	46	58	12	M10		25
FSA GB 12/20 (12x75)	**42658**	4		12	90	50	70	20	M10		25
FSA GB 12/50 (12x99)	**42659**	1		12	114	50	100	50	M10		20
FSA GB 12/75 (12x129)	**42667**	6		12	144	50	125	75	M10		20
FSA GB 16/12 (16x65)	**42668**	3		16	85	52	64	12	M12		20
FSA GB 16/50 (16x111)	**42660**	8		16	131	58	108	50	M12		10
FSA GB 16/80 (16x147)	**42669**	0		16	167	62	142	80	M12		10
FSA GB 20/20 (20x82)	**42670**	7		20	102	62	82	20	M16		10
FSA GB 20/95 (20x151)	**42671**	1		20	176	63	158	95	M16		5
FSA GB 8/10 A2 (8x45)	**42574**	0		8	-	25	45	10	M6		100
FSA GB 8/25 A2 (8x65)	**42575**	7		8	-	30	65	25	M6		50
FSA GB 10/5 A2 (10x50)	**42576**	4		10	-	30	50	5	M8		50
FSA GB 10/25 A2 (10x70)	**42577**	1		10	-	35	70	25	M8		50
FSA GB 10/55 A2 (10x100)	**42578**	8		10	-	35	100	55	M8		50
FSA GB 10/75 A2 (10x120)	**42579**	5		10	-	35	120	75	M8		50
FSA GB 12/10 A2 (12x60)	**42580**	2		12	-	35	60	10	M10		25
FSA GB 12/25 A2 (12x80)	**42581**	9		12	-	40	80	25	M10		25
FSA GB 12/45 A2 (12x100)	**42582**	6		12	-	40	100	45	M10		20
FSA GB 12/65 A2 (12x120)	**42583**	3		12	-	40	120	65	M10		20

LOADS

Mean ultimate loads and recommended loads for single anchors of fischer Sleeve anchor FSA with large axial spacing and edge distance.

					Non-cracked concrete					
Anchor size					**FSA GB 6/.. M 4.5**	**FSA GB 8/.. M 6**	**FSA GB 10/.. M 8**	**FSA GB 12/.. M 10**	**FSA GB 16/.. M 12**	**FSA GB 20/.. M 16**
Drill hole depth		$h_1 \geqq$	[mm]		30	40	45	55	60	70
Drill hole diameter		d_0	[mm]		6	8	10	12	16	20
Recommended loads N_{rec} and V_{rec} [kN]										
Tensile	0°	N_{rec}	[kN]	gvz	2	2.3	3.0	3.6	7.5	10.4
Required Torque			[Nm]		5	10	25	40	60	100

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Express anchor EXA

OVERVIEW

Express anchor **EXA**, zinc-plated steel

Express anchor **EXA**, stainless steel A4

Express anchor **EXA**, hot-dipped galvanised

Express anchor **EXA**, with big washer DIN 440

Approved for:
- Non-cracked concrete C20/25 to C50/60
- Lightweight and suspended ceilings according to DIN 18 168 as well as statically comparable fixings

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

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

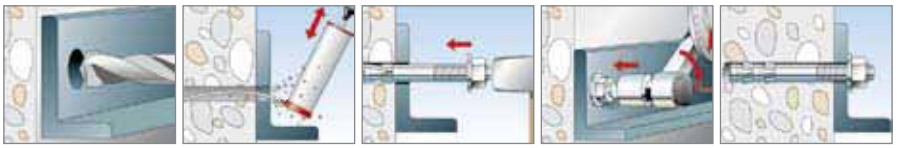
DESCRIPTION

- Express anchor for push-through and pre-positioned stallation
- When the hexagon nut is tightened, the tapered bolt is pulled into the expansion clip and expands it against the hole wall.
- A4 stainless steel and hot dip-galvanized version for outdoor use and in damp conditions.
- For wooden structures use the EXA-GS with large washer as per DIN 440.

Advantages/benefits
- Double-clip method tried and tested, gives double security.
- Minimum slippage due to powerful expansion when tightening.

INSTALLATION

Type of installation
- Push-through and pre-positioned installation



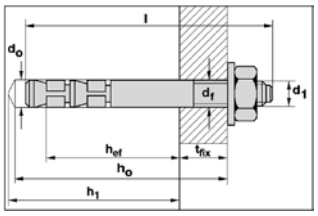
Installation tips
- For series installation we recommend the anchor bolt setting tool FABS to reduce installation time (Page 90).
- Before driving in, the hexagon nut must be brought into the optimal installation position (the thread projects by 2 to 3 mm).

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

Express anchor EXA

TECHNICAL DATA

Express anchor **EXA**, zinc-plated steel



Type	Art.-No.	ID	approvals	drill-Ø	thread	max. fixing thickness	total length	drill depth through fixture	Washer (outer diameter x thickness)	qty. per box
			■ ETA	d_0	M	t_{fix}	l	h_0		
				[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	pcs.
EXA 6/5 (6x50) gvz	**97729**	3		6	M 6	5	50	45	12 x 1,6	100
EXA 6/10 (6x70) gvz	**97730**	9		6	M 6	10	70	70	12 x 1,6	100
EXA 6/40 (6x100) gvz	**97731**	6		6	M 6	40	100	100	12 x 1,6	100
EXA 8/5 (8x60) gvz	**97732**	3		8	M 8	5	60	60	16 x 1,6	50
EXA 8/15 (8x65) gvz	**97733**	0	■	8	M 8	15	85	80	16 x 1,6	50
EXA 8/28 (8x98) gvz	**97734**	7	■	8	M 8	28	98	95	16 x 1,6	50
EXA 8/55 (8x125) gvz	**97735**	4	■	8	M 8	55	125	120	16 x 1,6	50
EXA 8/100 (8x170) gvz	**97736**	1	■	8	M 8	100	170	165	16 x 1,6	50
EXA 10/5 (10x70) gvz	**97737**	8		10	M 10	5	70	65	20 x 2	50
EXA 10/15 (10x92) gvz	**97738**	5	■	10	M 10	15	92	85	20 x 2	50
EXA 10/45 (10x122) gvz	**97739**	2	■	10	M 10	45	122	115	20 x 2	50
EXA 10/90 (10x167) gvz	**97740**	8	■	10	M 10	90	167	160	20 x 2	50
EXA 10/140 (10x217) gvz	**97741**	5	■	10	M 10	140	217	210	20 x 2	25
EXA 10/160 (10x197) gvz	**97937**	2	■	10	M 10	160	237	230	20 x 2	25
EXA 12/5 (12x80) gvz	**97742**	2		12	M 12	5	80	75	24 x 2,5	25
EXA 12/15 (12x116) gvz	**97743**	9	■	12	M 12	15	116	105	24 x 2,5	25
EXA 12/35 (12x136) gvz	**97744**	6	■	12	M 12	35	136	125	24 x 2,5	25
EXA 12/55 (12x156) gvz	**97745**	3	■	12	M 12	55	156	145	24 x 2,5	25
EXA 12/85 (12x186) gvz	**97746**	0	■	12	M 12	85	186	175	24 x 2,5	25
EXA 12/105 (12x206) gvz	**97747**	7	■	12	M 12	105	206	195	24 x 2,5	25
EXA 12/125 (12x226) gvz	**97748**	4	■	12	M 12	125	226	215	24 x 2,5	25
EXA 12/145 (12x246) gvz	**97749**	1	■	12	M 12	145	246	235	24 x 2,5	25
EXA 12/160 (12x261) gvz	**97750**	7	■	12	M 12	160	261	250	24 x 2,5	25
EXA 16/10 (16x110) gvz	**97751**	4		16	M 16	10	110	100	30 x 3	20
EXA 16/30 (16x153) gvz	**97752**	1	■	16	M 16	30	153	140	30 x 3	10
EXA 16/75 (16X198) gvz	**97753**	8	■	16	M 16	75	198	185	30 x 3	20
EXA 16/100 (16x223) gvz	**97754**	5	■	16	M 16	100	223	210	30 x 3	20
EXA 16/130 (16x253) gvz	**97755**	2	■	16	M 16	130	253	240	30 x 3	20
EXA 16/170 (16x293) gvz	**97938**	9	■	16	M 16	170	293	280	30 x 3	10
EXA 16/200 (16x323) gvz	**97939**	6	■	16	M 16	200	323	310	30 x 3	10
EXA 20/10 (20x130) gvz	**97756**	9		20	M 20	10	130	110	37 x 3	10
EXA 20/25 (20x175) gvz	**97757**	6	■	20	M 20	25	175	155	37 x 3	10
EXA 20/80 (20x230) gvz	**97758**	3	■	20	M 20	80	230	210	37 x 3	10

Express anchor **EXA**, stainless steel A4

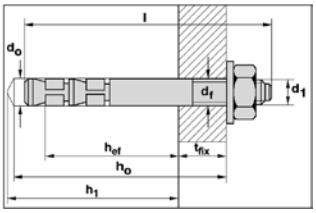
Type	Art.-No.	ID	drill-Ø	thread	max. fixing thickness	total length	drill depth through fixture	Washer (outer diameter x thickness)	qty. per box
			d_0	M	t_{fix}	l	h_0		
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	pcs.
EXA 6/10 (6x70) A4	**97780**	4	6	M 6	10	70	70	12 x 1,6	100
EXA 8/5 (8x60) A4	**97781**	1	8	M 8	5	60	60	16 x 1,6	50
EXA 8/15 (8x82) A4	**97782**	8	8	M 8	15	85	80	16 x 1,6	50
EXA 8/55 (8x122) A4	**97783**	5	8	M 8	55	125	120	16 x 1,6	50
EXA 8/100 (8x167) A4	**97945**	7	8	M 8	100	170	165	16 x 1,6	50
EXA 10/15 (10x90) A4	**97785**	9	10	M 10	15	92	85	20 x 2	50
EXA 10/45 (10x120) A4	**97787**	3	10	M 10	45	122	115	20 x 2	50
EXA 10/90 (10x165) A4	**97788**	0	10	M 10	90	167	160	20 x 2	50
EXA 12/15 (12x113) A4	**97790**	3	12	M 12	15	116	105	24 x 2,5	25
EXA 12/55 (12x153) A4	**97791**	0	12	M 12	55	156	145	24 x 2,5	25
EXA 12/85 (12x183) A4	**97946**	4	12	M 12	85	186	175	24 x 2,5	25
EXA 12/105 (12x203) A4	**97947**	1	12	M 12	105	206	195	24 x 2,5	25

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.

TECHNICAL DATA

Express anchor **EXA**, stainless steel A4



Type	Art.-No.	ID	drill-Ø d_o [mm]	thread M [mm]	max. fixing thickness t_{fix} [mm]	total length l [mm]	drill depth through fixture h_0 [mm]	washer (outer diameter x thickness) [mm]	qty. per box pcs.
EXA 12/145 (12x243) A4	**97948**	8	12	M 12	145	246	235	24 x 2,5	25
EXA 12/160 (12x258) A4	**97949**	5	12	M 12	160	261	250	24 x 2,5	25
EXA 16/10 (16x110) A4	**97793**	4	16	M 16	10	110	100	30 x 3	10
EXA 16/30 (16x153) A4	**97794**	1	16	M 16	30	153	140	30 x 3	10
EXA 20/25 (20x175) A4	**97795**	8	20	M 20	25	175	155	37 x 3	10

Express anchor **EXA**, hot-dip galvanized

Type	Art.-No.	ID	drill-Ø d_o [mm]	thread M [mm]	max. fixing thickness t_{fix} [mm]	total length l [mm]	drill depth through fixture h_0 [mm]	washer (outer diameter x thickness) [mm]	qty. per box pcs.
EXA 6/5 (6x50) fvz	**97764**	4	6	M 6	5	50	50	12 x 1,6	100
EXA 6/10 (6x70) fvz	**97765**	1	6	M 6	10	70	70	12 x 1,6	100
EXA 8/5 (8x60) fvz	**97766**	8	8	M 8	5	60	60	16 x 1,6	50
EXA 10/5 (10x70) fvz	**97767**	5	10	M 10	5	70	65	20 x 2	50
EXA 10/15 (10x92) fvz	**97768**	2	10	M 10	15	92	85	20 x 2	50
EXA 10/45 (10x122) fvz	**97769**	9	10	M 10	45	122	115	20 x 2	50
EXA 10/90 (10x167) fvz	**97770**	5	10	M 10	90	167	160	20 x 2	50
EXA 12/5 (12x80) fvz	**97771**	2	12	M 12	5	80	75	24 x 2,5	25
EXA 12/15 (12x116) fvz	**97772**	9	12	M 12	15	116	105	24 x 2,5	25
EXA 12/35 (12x136) fvz	**97773**	6	12	M 12	35	136	125	24 x 2,5	25
EXA 12/55 (12x156) fvz	**97774**	3	12	M 12	55	156	145	24 x 2,5	25
EXA 12/85 (12x186) fvz	**97775**	0	12	M 12	85	186	175	24 x 2,5	25
EXA 16/10 (16x110) fvz	**97776**	7	16	M 16	10	110	100	30 x 3	20
EXA 16/30 (16x153) fvz	**97778**	1	16	M 16	30	153	140	30 x 3	10
EXA 20/25 (97779) fvz	**97779**	8	20	M 20	25	175	155	37 x 3	10

Express anchor **EXA**, with big washer DIN 440

Type	Art.-No.	ID	approvals ■ ETA	drill-Ø d_o [mm]	thread M [mm]	max. fixing thickness t_{fix} [mm]	total length l [mm]	drill depth through fixture h_0 [mm]	washer (outer diameter x thickness) [mm]	qty. per box pcs.
EXA 12/85 (12x186)	**97796**	5	■	12	M 12	85	186	175	44 x 4	25
EXA 12/105 (12x206)	**97759**	0	■	12	M 12	105	206	195	44 x 4	25
EXA 12/125 (12x226)	**97760**	6	■	12	M 12	125	226	215	44 x 4	25
EXA 12/145 (12x246)	**97761**	3	■	12	M 12	145	246	235	44 x 4	25
EXA 12/170 (12x271)	**97762**	0	■	12	M 12	170	268	250	44 x 4	25
EXA 12/250 (12x351)	**97763**	7	■	12	M 12	250	350	342	44 x 4	25
EXA 16/75 (16x198)	**97940**	2	■	16	M 16	75	198	185	50 x 5	20
EXA 16/100 (16x223)	**97941**	9	■	16	M 16	100	223	210	50 x 5	20
EXA 16/130 (16x253)	**97942**	6	■	16	M 16	130	253	240	50 x 5	20
EXA 16/170 (16x293)	**97943**	3	■	16	M 16	170	293	280	50 x 5	10
EXA 16/200 (16x323)	**97944**	0	■	16	M 16	200	323	310	50 x 5	10

Express anchor EXA

LOADS

Mean ultimate loads, design and recommended loads for single anchors of fischer Express anchor EXA with large axial spacing and edge distance

				Non-cracked concrete				
Anchor size				**M8**	**M10**	**M12**	**M16**	**M20**
Effective anchorage depth		h_{ef}	[mm]	47	49	67	85	103
Drill hole depth		$h_1 \geq$	[mm]	65	70	90	110	130
Drill hole diameter		d_0	[mm]	8	10	12	16	20
Mean ultimate loads N_u and V_u [kN]								
Tensile	0°	N_u	[kN] gvz	16.0	22.0	35.0	52.9	70.6
Shear	90°	V_u	[kN] gvz	15.8*	23.3*	32.9*	58.7*	82.9*
Design resistant loads N_{Rd} and V_{Rd} [kN]								
Tensile	0°	N_{Rd}	[kN] gvz	6.2	9.6	15.0	26.3	35.1
Shear	90°	V_{Rd}	[kN] gvz	8.7	11.5	15.3	38.9	57.3
Recommended loads N_{rec} and V_{rec} [kN]								
Tensile	0°	N_{rec}	[kN] gvz	4.4	6.9	10.7	18.8	25.1
Shear	90°	V_{rec}	[kN] gvz	6.2	8.2	11.0	27.8	40.9
Recommended bending moment M_{rec} [Nm]								
		M_{rec}	[Nm] gvz	12.9	23.8	46.7	99.8	194.7
Component dimensions, minimum axial spacings and edge distances								
Min. axial spacing[1)]		s_{min}	[mm] gvz	45	50	75	85	105
		for c ≧	[mm] gvz	60	85	90	145	170
Min. edge distance[1)]		c_{min}	[mm] gvz	40	65	90	90	100
		for s ≧	[mm] gvz	100	100	75	145	170
Min. structural component thickness		h_{min}	[mm]	100	100	135	170	205
Required torque		T_{inst}	[Nm]	14	45	65	110	230

* steel failure decisive

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 Non-cracked concrete C20/25 without edge and spacing influences.
Design resistant loads: Material safety factors γ_M are included. Materal safety factor γ_M depends on type of anchor.
Recommended loads: Material safety factors γ_M and safety factor for load γ_L = 1.4 are included.

For further detailed information about European Technical Approvals please contact fischer technical service department.

Recommended loads for single anchors of fischer Express anchor EXA for the anchorage of lightweight ceilings and suspended ceilings (multiple fixing).

Type			**EXA M 8**		**EXA M 10**		**EXA M 12**	
Material			**gvz**	**A4**	**gvz**	**A4**	**gvz**	**A4**
Effective anchorage depth	h_{ef}	[mm]	47		49		67	
Drill hole depth	h_1	[mm]	65		70		90	
Drill diameter	d_0	[mm]	8		10		12	
Recommended loads in concrete C20/25								
Recommended load	F_{rec}	[kN]	0.8		0.8		0.8	
Recommended bending moment	M_{rec}	[kN]	12.7	13.4	25.4	26.7	36.6	46.7
Component dimensions, minimum axial spacings and edge distances								
Min. axial spacing	s_{min}	[mm]	180		260		340	
Min. edge distance	c_{min}	[mm]	90		130		170	
Min. structural component thickness	h_{min}	[mm]	150		200		220	
Clearance hole in fixture to be attached	d_f	[mm]	≦9		≦12		≦14	
Required torque	T_{inst}	[Nm]	23		45		65	

Wallbolt GM

Professional Wallbolt

OVERVIEW

Wallbolt **GM S**
shield only

Wallbolt **GM L**
loose bolt type

Wallbolt **GM P**
projecting bolt type

Wallbolt **GM E**
closed eye

Approved for:
- Concrete ≥B15 and natural stone with dense structure.

For fixing of:
- Installation rails,
- Ventilation ducts
- Pipework
- Suspended ceilings
- Metal profiles
- Shelf feet

Also suitable for:
- temporary fastenings such as wall shuttering

DESCRIPTION

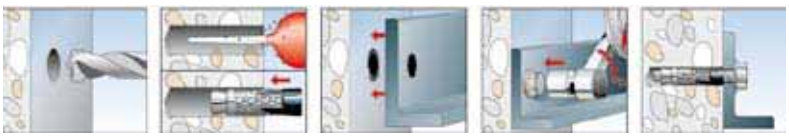
The segmented malleable iron expansion shield is assembled ready for use with bolts or threaded rods of the appropriate diameter.

- Torque controlled friction locking expansion.
- Four piece malleable shield for even load spread.
- Unique metal spring clip for retaining the segments and the wedge.
- Traditional fixing method accepted widely by end users.
- Zinc plated and passivated for protection against corrosion.

INSTALLATION

Installation tips

For the best results with the GM anchor remember to:
- Choose the most suitable head type.
- Choose the right sized anchor in relation to load type.
- Check load bearing capacity values in the table.
- Make sure the drilled hole is dust free.



STANDARDS

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

Wallbolt GM

TECHNICAL DATA

Wallbolt **GM S**, shield only
zinc plated and passivated

Type	Art.-No.	ID	drill Ø	min. drill-hole depth	min. anchorage depth	bolt Ø	Fixing thickness min	Fixing thickness max	torque	qty. per box
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Nm	pcs.
GM 6 S	**42624**		12	60	47	6	-	-	10	50
GM 8 S	**42625**		15	70	50	8	-	-	25	50
GM 10 S	**42626**		18	80	60	10	-	-	40	25
GM 12 S	**42627**		22	100	75	12	-	-	75	20

Wallbolt **GM L**, loose bolt
zinc plated and passivated

Type	Art.-No.	ID	drill Ø	min. drill-hole depth	min. anchorage depth	bolt Ø	Fixing thickness min	Fixing thickness max	torque	qty. per box
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Nm	pcs.
GM 6/10L	**42585**		12	60	47	6	0	10	10	50
GM 6/25L	**42586**		12	60	47	6	0	25	10	50
GM 6/40L	**42587**		12	60	47	6	0	40	10	50
GM 8/10L	**42588**		15	70	50	8	0	10	25	50
GM 8/25L	**42589**		15	70	50	8	0	25	25	50
GM 8/40L	**42590**		15	70	50	8	0	40	25	50
GM 10/10L	**42591**		18	80	60	10	0	10	40	50
GM 10/25L	**42592**		18	80	60	10	0	25	40	50
GM 10/50L	**42593**		18	80	60	10	0	50	40	50
GM 10/75L	**42594**		18	80	60	10	25	75	40	25
GM 12/10L	**42595**		22	100	75	12	0	10	75	25
GM 12/25L	**42596**		22	100	75	12	0	25	75	25
GM 12/50L	**42597**		22	100	75	12	0	50	75	25
GM 12/75L	**42598**		22	100	75	12	25	75	75	25

Wallbolt **GM P**, projecting bolt
zinc plated and passivated

Type	Art.-No.	ID	drill Ø	min. drill-hole depth	min. anchorage depth	bolt Ø	Fixing thickness min	Fixing thickness max	torque	qty. per box
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Nm	pcs.
GM 6/10P	**42602**		12	60	47	6	0	10	10	50
GM 6/25P	**42603**		12	60	47	6	0	26	10	50
GM 6/60P	**42604**		15	70	50	8	0	60	25	50
GM 8/10P	**42605**		15	70	50	8	0	10	25	50
GM 8/25P	**42606**		15	70	50	8	0	25	25	50
GM 8/60PL	**42607**		18	80	60	10	0	60	40	50
GM 10/15P	**42608**		18	80	60	10	0	15	40	50
GM 10/30P	**42609**		18	80	60	10	0	30	40	50
GM 10/60P	**42610**		18	80	60	10	0	60	40	25
GM 12/15P	**42611**		22	100	75	12	0	15	75	25
GM 12/35P	**42612**		22	100	75	12	0	35	75	25
GM 12/75P	**42613**		22	100	75	12	0	75	75	25

Wallbolt **GM E**, zinc plated
and passivated

Type	Art.-No.	ID	drill Ø	min. drill-hole depth	min. anchorage depth	bolt Ø	eye Ø	torque	qty. per box
			[mm]	[mm]	[mm]	[mm]	[mm]	Nm	pcs.
GM 6 E	**42616**		12	60	47	6	10.5	10	50
GM 8 E	**42617**		15	70	50	8	11	25	50
GM 10 E	**42618**		18	80	60	10	12.5	40	25
GM 12 E	**42619**		22	100	75	12	15.5	75	15

LOADS

Recommended loads N_{rec} [kN]

Loads in concrete cl.f_c = 25Nm/mm² - kN						
Anchor type	**GM6**	**GM8**	**GM10**	**GM12**	**GM16**	**GM20**
Bolt cl. 8.8	4.00	4.65	5.90	8.40	13.40	20.65
Critical edge distance and critical spacing [mm]						
Axial spacing a	140	170	200	250	315	400
Edge spacing a_r	95	100	125	155	215	285
Min axial sp.a min.	80	80	100	125	170	230
Min edge dist. a_r min.	50	50	65	80	105	140
Min struct. thickness t	100	100	100	125	175	230

FIRE PROTECTION
Red hot: see page 308 or information about fire protection.

CORROSION
All about corrosion and how you can avoid it is written on page 309.

Wallbolt FWB

The economical heavy duty anchor

OVERVIEW

Wallbolt **FWB S**
Shield only

Wallbolt **FWB L**
Loose bolt

Wallbolt **FWB P**
Projecting bolt

Wallbolt **FWB H**
Hook bolt

Wallbolt **FWB E**
Eye bolt

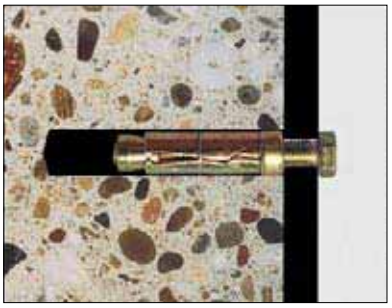
Suitable for:
- Concrete ≥ B15
- Dense natural stone
- Dense solid stone
- Good quality masonry

For fixing of:
- Installation rails
- Ventilation ducts
- Pipework
- Suspended ceilings
- Metal constructions
- Metal profiles

Also suitable for temporary fixings such as wall shuttering

DESCRIPTION

The segmented steel expansion shield is pre-assembled ready for use with various head Types.
- Function - torque controlled friction locking expansion.
- Three piece shield for even load spread.
- Traditional fixing method accepted widely by end users.
- Zinc plated and passivated for protection against corrosion.
- Versitile heavy duty anchor.
- Screw - 5.8 steel



INSTALLATION

Type of installation
- Flush fixing

Installation tips
For the best results with the FWB anchor remember to:
- Choose the most suitable head.
- Choose the right sized anchor in relation to load type.
- Check load bearing capacity values.
- Make sure the drilled hole is dust free.

To determine the screw length l_s :
Length of the Heavy duty anchor FWB + thickness of the building component d_a = length of screw.
(if using threaded bolts remember to include + thickness of washer and nut)

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

Wallbolt FWB

TECHNICAL DATA

Wallbolt **FWB L**, loose bolt
zinc plated and passivated

Type	Art.-No.	drill Ø	min. drill-hole depth	min. anchorage depth	bolt Ø	Fixing thickness min	Fixing thickness max	torque	qty. per box
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Nm	pcs.
FWB 6/10L	**42677**	12	50	45	6	0	10	10	25
FWB 6/25L	**42678**	12	50	45	6	0	25	10	25
FWB 6/40L	**42679**	12	50	45	6	0	40	10	25
FWB 8/10L	**42680**	14	55	50	8	0	10	25	25
FWB 8/25L	**42681**	14	55	50	8	0	25	25	25
FWB 8/40L	**42682**	14	55	50	8	0	40	25	25
FWB 10/10L	**42683**	16	65	60	10	0	10	40	25
FWB 10/25L	**42684**	16	65	60	10	0	25	40	25
FWB 10/50L	**42685**	16	65	60	10	0	50	40	25
FWB 10/75L	**42686**	16	65	60	10	25	75	40	25
FWB 12/10L	**42687**	20	85	75	12	0	10	75	25
FWB 12/25L	**42688**	20	85	75	12	0	25	75	25
FWB 12/40L	**42689**	20	85	75	12	0	50	75	25
FWB 12/60L	**42690**	20	85	75	12	25	60	75	25
FWB 16/15L	**42691**	25	130	115	16	0	15	180	10
FWB 16/30L	**42692**	25	130	115	16	0	30	180	10
FWB 16/60L	**42693**	25	130	115	16	25	60	180	10
FWB 20/60L	**42694**	32	150	130	20	20	60	345	10
FWB 20/100L	**42695**	32	150	130	20	60	100	345	10

Wallbolt **FWB P**, projecting bolt
zinc plated and passivated

Type	Art.-No.	drill Ø	min. drill-hole depth	min. anchorage depth	bolt Ø	Fixing thickness min	Fixing thickness max	torque	qty. per box
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Nm	pcs.
FWB 6/10P	**42696**	12	50	45	6	0	10	10	50
FWB 6/25P	**42697**	12	50	45	6	0	25	10	50
FWB 6/60P	**42698**	12	50	45	6	0	60	10	50
FWB 8/10P	**42699**	14	55	50	8	0	10	25	50
FWB 8/25P	**42700**	14	55	50	8	0	25	25	50
FWB 8/60PL	**42701**	14	55	60	8	0	60	25	25
FWB 10/15P	**42702**	16	65	60	10	0	15	40	50
FWB 10/30P	**42703**	16	65	60	10	0	30	40	25
FWB 10/60P	**42704**	16	65	60	10	0	60	40	25
FWB 12/15P	**42705**	20	85	75	12	0	15	75	25
FWB 12/35P	**42706**	20	85	75	12	0	35	75	25
FWB 12/75P	**42707**	20	85	75	12	0	75	75	25
FWB 16/15P	**42708**	25	130	115	16	0	15	180	10
FWB 16/35P	**42709**	25	130	115	16	0	35	180	10
FWB 16/75P	**42710**	25	130	115	16	0	75	180	10
FWB 20/15P	**42711**	32	150	130	20	0	15	345	10
FWB 20/30P	**42712**	32	150	130	20	0	30	345	10
FWB 20/100P	**42713**	32	150	130	20	0	100	345	10

Wallbolt **FWB S**, shield only
zinc plated and passivated

Type	Art.-No.	drill Ø	min. drill-hole depth	min. anchorage depth	bolt Ø	Fixing thickness min	Fixing thickness max	torque	qty. per box
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Nm	pcs.
FWB 6 S	**51302**	12	50	45	6	-	-	10	50
FWB 8 S	**42673**	14	55	50	8	-	-	25	50
FWB 10 S	**42674**	16	65	60	10	-	-	40	50
FWB 12 S	**42675**	20	85	75	12	-	-	75	25
FWB 16 S	**51303**	25	130	115	16	-	-	180	10
FWB 20 S	**42676**	32	150	130	20	-	-	345	10

Wallbolt **FWB H**, hook
zinc plated and passivated

Wallbolt **FWB E**, eye bolt
zinc plated and passivated

Type	Art.-No.	drill Ø	min. drill-hole depth	min. anchorage depth	bolt Ø	hook /eye	torque	qty. per box
		[mm]	[mm]	[mm]	[mm]	[mm]	Nm	pcs.
FWB 6 H	**42719**	12	50	45	6	8	10	50
FWB 8 H	**42720**	14	55	50	8	10	25	50
FWB 10 H	**42721**	16	65	60	10	12	40	25
FWB 12 H	**42722**	20	85	75	12	16	75	25
FWB 6 E	**42714**	12	60	47	6	12	10	50
FWB 8 E	**42715**	14	70	50	8	12	25	50
FWB 10 E	**42716**	16	80	60	10	15	40	25
FWB 12 E	**42717**	20	100	75	12	24	75	15
FWB 16 E	**42718**	25	130	102	16	19	180	10

LOADS

Recommended loads N_{rec} [kN]

Loads in concrete cl.f_c = 25Nm/mm² - kN						
Anchor type	**FWB6**	**FWB8**	**FWB10**	**FWB12**	**FWB16**	**FWB20**
Drill diameter [mm]	12	14	16	20	25	32
Minimum drill hole depth [mm]	50	55	65	85	130	150
Tightening Torque [Nm]	10	25	40	75	180	345
Recommended Load [kN] In concrete	3	4	5	6	10	16

Hammerset anchor EA II

The simple hammerset anchor with internal thread.

OVERVIEW

Hammerset anchor **EA II**, zinc-plated steel

Hammerset anchor **EA II A4**, stainless steel

Approved for:
- Non-cracked concrete C20/25 to C50/60
- Lightweight and suspended ceilings according to DIN 18168 as well as statically comparable fixings

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

For fixing of:
- Pipes
- Ventilation systems
- Sprinkler systems
- Gratings
- Cable trays
- Suspended ceilings

VdS from size M8

Fire resistance classification F 120

European Technical Approval - Option 7 for non-cracked concrete

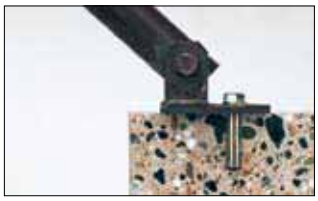
For multiple fixings of non-structural applications in cracked concrete

DESCRIPTION

- Hammerset anchor with internal thread for pre-positioned installation
- When the cone is driven in with the Hammerset tool EAW H, the anchor sleeve is spreaded and thus expand against the hole wall.
- A4 stainless steel version for outdoor use and in damp conditions.

Advantages/benefits

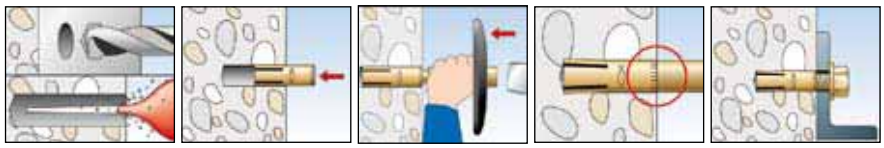
- Suitable for all screws or studs with metric thread.
- Low anchorage depth reduces drilling time and thus cost-efficient installation.
- Surface-flush anchor allows the attached item to be removed and refitted several times.



INSTALLATION

Type of installation

- Pre-positioned installation



Installation tips

- Observe the minimum and maximum screw-in depths when selecting the screws.
- For fixing diamond drills and diamond saws, use the special EA II M 12 D with reinforced anchor sleeve or the FDBB special fixing.

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

Hammerset anchor EA II

TECHNICAL DATA

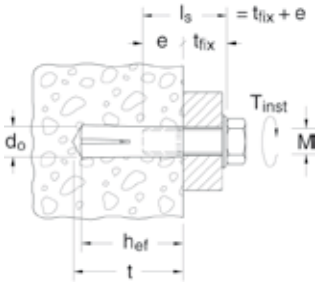
Hammerset anchor **EA II**, zinc-plated steel, **specially for diamond drilling devices and diamond saws**

Type	Art.-No.	ID	approval	drill-Ø	min. drill hole depth	effect. anchorage depth	anchor length	thread	min. bolt penetration	max. bolt penetration	qty. per box
			ETA	d_0	t	h_{ef}	l	M	e_2	e_1	
				[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	pcs.
EA II M 12 D	**48407**	4		16	54	50	50	12	14	22	25

Hammerset anchor **EA II**, zinc-plated steel

Hammerset anchor **EA II A4**, stainless steel

Type	Art.-No.	ID	approval	drill-Ø	min. drill hole depth	effect. anchorage depth	anchor length	thread	min. bolt penetration	max. bolt penetration	qty. per box
			ETA	d_0	t	h_{ef}	l	M	e_2	e_1	
				[mm]	[mm]	[mm]	[mm]		[mm]	[mm]	pcs.
EA II M 6	**48264**	3		8	32	30	30	6	8	12	100
EA II M 8	**48284**	1		10	33	30	30	8	10	13	100
EA II M 8 x 40	**48323**	7		10	43	40	40	8	10	13	50
EA II M 10 x 30	**48332**	9		12	33	30	30	10	12	12	50
EA II M 10	**48339**	8		12	43	40	40	10	12	16	50
EA II M 12	**48406**	7		15	54	50	50	12	14	22	25
EA II M 16	**48408**	1		20	70	65	65	16	18	28	20
EA II M 20	**48409**	8		24	85	80	80	20	23	34	10
EA II M 6 A4	**48410**	4		8	32	30	30	6	8	12	100
EA II M 8 A4	**48411**	1		10	33	30	30	8	10	13	100
EA II M 8 x 40 A4	**48412**	8		10	43	40	40	8	10	13	50
EA II M 10 A4	**48414**	2		12	43	40	40	10	12	16	50
EA II M 12 A4	**48415**	9		15	54	50	50	12	14	22	25
EA II M 16 A4	**48416**	6		20	70	65	65	16	18	28	20
EA II M 20 A4	**48417**	3		24	85	80	80	20	23	34	10



Hammerset tools **EAW H Plus**

Type	Art.-No.	ID	fits	qty. per box
				pcs.
EAW H 6 Plus	**44630**	0	EA M 6/ TL M5 / FDA-R 6	1
EAW H 8 x 30 Plus	**44631**	7	EA M 8/TL M8/FDA-R 8	1
EAW H 8 x 40 Plus	**44632**	4	EA M 8 x 40	1
EAW H 10 Plus	**44633**	1	EA M 10 /TL M10	1
EAW H 12 Plus	**44634**	8	EA M 12 / TL M12	1
EAW H 16 Plus	**44635**	5	EA M 16 / TL M16	1
EAW H 20 Plus	**44636**	2	EA M 20	1

LOADS

fischer Hammerset anchor EA II

Recommended loads[1] of single anchors in normal-weight concrete C20/25[2]

For the design the complete approval ETA-07/0135 is to be observed

Anchor type			M6			M8x30			M8x40			M10x30			M10			M12			M16			M20		
			gvz		A4			A4	gvz		A4			A4	gvz		A4	gvz		A4	gvz		A4	gvz		A4
Quality of the used screw			5.8	8.8	A4-70	5.8	8.8	A4-70	5.8	8.8	A4-70	5.8	8.8	A4-70	5.8	8.8	A4-70	5.8	8.8	A4-70	5.8	8.8	A4-70	5.8	8.8	A4-70
Effective embedment depth	h_{ef}	[mm]	30			30			40			30			40			50			65			80		
Recommended tensile load N_{perm} of one single anchor without edge influence, i.e. edge distance ≥ 1.5 x h_{ef} and spacing s ≥ 3 x h_{ef}																										
in non-cracked concrete C20/25[2]	V_{perm}	[kN]	3.9			3.9			6.1			3.9			6.1			8.5			12.6			17.2		
Recommended shear load V_{perm} of one single anchor without edge influence, i.e. edge distance ≥ 10 x h_{ef} and spacing s ≥ 3 x h_{ef}																										
in non-cracked concrete C20/25[2]	N_{perm}	[kN]	2.9		3.2	3.9			4.9		5.6	3.9			6.1			8.5			18.3		21.1	29.1		33.7
Anchor characteristics																										
Characteristic spacing	$s_{cr,N}$	[mm]	= 3 x h_{ef}																							
Characteristic edge distance	$c_{cr,N}$	[mm]	= 1.5 x h_{ef}																							
Minimum spacing[3]	s_{min}	[mm]	65			95			95			85			95			145			180			190		
Minimum edge distance[3]	c_{min}	[mm]	115			140			140			140			160			200			240			280		
Minimum structural component thickness	h_{min}	[mm]	100			100			100			120			120			120			160			200		
Nominal drill hole diameter	d_0	[mm]	8			10			10			12			12			15			20			25		
Drill hole depth	h_1 ≥	[mm]	32			33			43			33			43			54			70			85		
Minimum screw penetration depth	min ℓ_s	[mm]	6			8			8			10			10			12			16			20		
Maximum screw penetration depth	max ℓ_s	[mm]	13			13			13			13			17			22			28			34		
Clearance-hole in fixture to be attached	d_f ≤	[mm]	7			9			9			12			12			14			18			22		
Maximum torque	max T_{inst}	[Nm]	4			8			8			15			15			35			60			120		

Note: With the fischer Design Software COMPUFIX you can see the full performance of the EA II and you are able to do designs under individual conditions.

[1] The partial safety factors for resistance and the partial safety factor for load with γ_F =1,4 are considered.
Please observe the design method A (ETAG, annex C) if combined tensile and shear loads, edge influences and influences of spacings of anchor groups are to be considered.

[2] The concrete is considered to be normally reinforced; For higher concrete strength classes an increase in performance of up to 55 % is possible.

[3] Along with reduction of the load at the same time.

[4] Use restricted to anchoring of structural components which are statically indeterminate.

fischer Hammerset anchor EA II - single anchor of multiple fixing

Permissible loads[1] of a single anchor of a multiple fixing in normal-weight concrete C20/25 to C50/60.
For the design the complete approval ETA-07/0142 is to be observed.

Anchor type			EA II M6			EA II M8			EA II M8 x 40			EA II M10 x 30			EA II M10			EA II M12		
			gvz		A4	gvz		A4	gvz		A4	gvz		A4	gvz		A4	gvz		A4
Quality of the used screw			5.8	8.8	A4-70	5.8	8.8	A4-70	5.8	8.8	A4-70	5.8	8,8	A4-70	5.8	8.8	A4-70	5.8	8.8	A4-70
Effective embedment depth	h_{ef}	[mm]	30			30			40			30			40			50		
Permissible load F_{perm}[1] of a single anchor of a multiple fixing without edge influence according to ETAG 001-6																				
in cracked and non-cracked concrete C20/25 to C50/60	F_{perm}	[kN]	1.0		1.0	1.7		1.7	1.7		1.7	1.7		1.7	2.5		2.5	3.6		3.6
Permissible bending moment M_{perm}																				
	M_{perm}	[Nm]	4.3	6.9	5.0	10.9	17.1	11.9	10.9	17.1	11.9	21.1	34.3	23.8	21.1	34.3	23.8	37.7	60.0	42.1
Anchor characteristics																				
Characteristic spacing	s_{cr}	[mm]	90			90			120			90			200			300		
Characteristic edge distance	c_{cr}	[mm]	45			45			60			45			100			150		
Minimum structural component thickness	h_{min1}	[mm]	100[2]			100[2]			100[2]			120[2]			120[2]			120[2]		
Minimum spacing	s_{min1}	[mm]	65[2]			95[2]			95[2]			85[2]			95[2]			145[2]		
Minimum edge distance	c_{min1}	[mm]	115[2]			140[2]			140[2]			140[2]			160[2]			200[2]		
Minimum structural component thickness	h_{min2}	[mm]	80[2]			80[2]			80[2]			80[2]			80[2]			100[2]		
Minimum spacing	s_{min2}	[mm]	200[2]			200[2]			200[2]			200[2]			250[2]			300[2]		
Minimum edge distance	c_{min2}	[mm]	150[2]			150[2]			150[2]			150[2]			200[2]			300[2]		
Nominal drill hole diameter	d_0	[mm]	8			10			10			12			12			15		
Drill hole depth	h_1 ≥	[mm]	32			33			43			33			43			54		
Minimum screw penetration depth	min ℓ_s	[mm]	6			8			8			10			10			12		
Maximum screw penetration depth	max ℓ_s	[mm]	13			13			13			13			17			22		
Clearance-hole in fixture to be attached	d_f ≤	[mm]	7			9			9			12			12			14		
Maximum torque	max T_{inst}	[Nm]	4			8			8			15			15			35		

[1] The loads are valid axial tensile load, shear load and oblique tensile load at any angle. Material safety factors according to the approval and safety factor for load = γ 1.4 are considered.

[2] The minimum structural component thickness h_{min1} are valid along with the minimum spacing and edge distance s_{min1} bzw. c_{min1}; the minimum structural component thickness h_{min2} are valid along with the minimum spacing and edge distance s_{min2} bzw. c_{min2}.

Drop-in anchor TL

The economical hammerset anchor with internal thread - not requireing approvals.

OVERVIEW

Drop-in anchor
TL

Suitable for:
- Non-cracked concrete C12/15
- Natural stone with dense structure

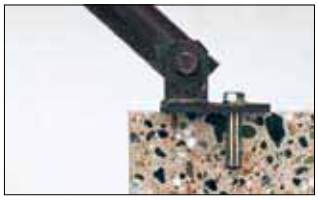
For fixing of:
- Pipes
- Ventilation systems
- Sprinkler systems
- Consoles
- Steel constructions
- Gratings
- Cable trays
- Facades
- Suspended ceilings

DESCRIPTION

- Drop-in anchor with internal thread for pre-positioned installation.
- When the expander plug is driven in with EAW H Plus setting tool, the anchor sleeve is expanded and is tensioned against the hole wall.

Advantages/benefits

- Suitable for non-cracked concrete and for anchoring light ceiling linings and suspended ceilings.
- Suitable for all screws or studs with metric threads.
- Low anchoring depth reduces drilling time and thus cost-efficient installation.
- Surface-flush anchor allows the attached item to be removed and refitted several times.



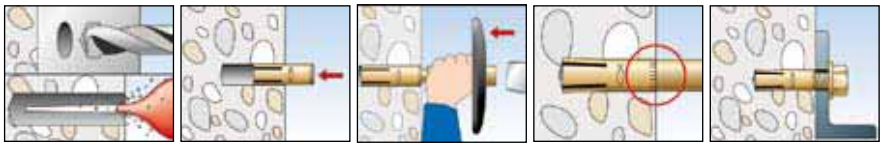
INSTALLATION

Type of installation

- Pre-positioned installation

Installation tips

- Use fischer EAW H Plus setting tool.
- Oberserve the minimum and maximum screw-in depths when selecting the screws.



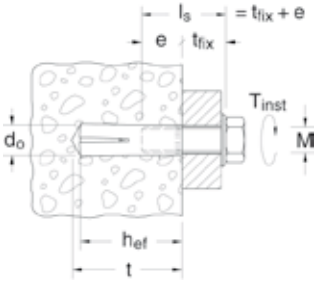
FIXING PRINCIPLES

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

TECHNICAL DATA

Drop-in anchor **TL**

Type	Art.-No.	ID	drill-Ø d_0 [mm]	min. drill hole depth t [mm]	effect. anchorage depth h_{ef} [mm]	anchor length l [mm]	thread M	min. bolt penetration e_2 [mm]	max. bolt penetration e_1 [mm]	qty. per box pcs.
TL Drop-in M 6	**42633**	2	8	25	25	25	M 6	6	12	100
TL Drop-in M 8	**42634**	9	10	30	30	30	M 8	8	13	100
TL Drop-in M 10	**42635**	6	12	40	40	40	M 10	10	17	50
TL Drop-in M 12	**42636**	3	15	55	50	50	M 12	12	22	50
TL Drop-in M 16	**42637**	0	20	65	65	65	M16	16	27	20
EA M 16 N	**90163**	2	20	65	65	65	M 16	16	23	25
EA M 20 N	**90164**	9	25	80	80	80	M 20	20	34	25



Hammerset tools **EAW H**

Type	Art.-No.	ID	fits	qty. per box pcs.
EAW H 6	**60836**	4	EA M 6	1
EAW H 8	**60837**	1	EA M 8	1
EAW H 8 x 40	**60846**	3	EA M 8 x 40	1
EAW H 10	**60838**	8	EA M 10	1
EAW H 12	**60839**	5	EA M 12	1
EAW H 16	**60841**	8	EA M 16	1
EAW H 20	**60843**	2	EA M 20	1

LOADS

Anchor size			**TL M 6**	**TL M 8**	**TL M 10**	**TL M 12**	**TL M 16**
Recommended tensile load	N_{rec}	[kN]	1.5	2.1	3.3	4.8	7.0
Maximum torque	T_{inst}	[Nm]	4	8	15	35	60

Drop-in Anchor FDA-R

OVERVIEW

Drop-in anchor
FDA-R

Suitable for:
- Concrete B 15 and dense natural stone

For fixing of:
- Pipes
- Ventilation systems
- Cable trays etc

DESCRIPTION

- Drop-in anchor with internal thread for pre-positioned installation
- The rim ensures the anchor remains flush with the surface at all times

Advantages/benefits
- Suitable for all screws or studs with metric thread.
- Surface-flush anchor allows the attached item to be removed and refitted several times.

A rim for the accurate setting of the anchor flush to the surface, not dependant on hole depth

LOADS

Mean Ultimate loads in kN,
Use 80% of EA loads in table above.

TECHNICAL DATA

Type	Art.-No.	Dill dia. [mm]	Min. depth for through fixing [mm]	Fixing length [mm]	qty. per box pcs.	FDA-R
FDA-R 6x25	**42630**	8	27	25	1	Setting tool as EA
FDA-R 8x30	**42631**	10	32	30	1	
FDA-R 10x30	**42632**	12	33	30	1	Setting tool as 48487

Ceiling nail FDN

For cost-saving hammersetting.

OVERVIEW

Ceiling nail **FDN**

Approved for:
- Lightweight ceilings and suspended ceilings according to DIN 18168
- Statically comparable fixings in concrete C20/25 to C50/60

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure
- Solid brick
- Solid sand-lime brick
- Prestressed hollow-core concrete slabs

For fixing of:
- Battens
- Metal profiles
- Wire hangers
- Chains
- Punched tapes
- Ventilation pipes
- Substructures made of wood and metal
- Ceilings

ETA CE
For multiple fixings of non-structural applications in cracked concrete

Mit allgemeiner bauaufsichtlicher Zulassung

Fire resistance classification **F 90**
Anchor types see test report

DESCRIPTION

- Hammerset anchor for push-through installation for ceiling suspensions.
- When the expansion wedge is driven in, the ceiling nail is expanded against the hole wall.
- A4 stainless steel version for outdoor use and in damp conditions.

Advantages/benefits

- Quick and simple hammerset installation reduces installation time.
- Forced expansion guarantees minimum slippage under load.
- No special tools necessary.

LOADS

Permissible loads
(for stress direction of centre load, shear load and oblique tension for type FDN 6/35 as well as for centre load for FDN 6/65 and stress due to fire) for anchoring light ceiling linings and panels according to DIN 18168.

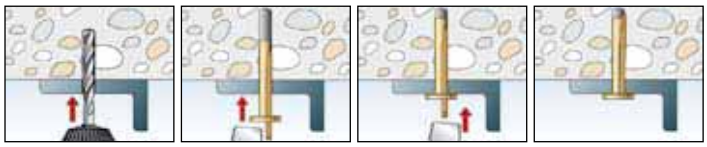
Concrete strength C20/25 to C50/60			**FDN 6**
per fixing		[kN]	0.5
With fire-resistance time F 60		[kN]	0.4
With fire-resistance time F 90		[kN]	0.25
Axial spacing	s ≧	[mm]	200
Edge distance	c ≧	[mm]	100
Minimum component thickness	h_{min} ≧	[mm]	100

The complete approval decision should be considered in the design and production of the anchoring.

INSTALLATION

Type of installation

- Push-through installation



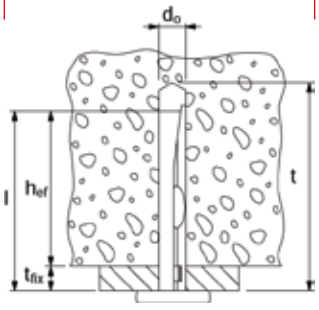
Installation tips

- When driving the ceiling nail into the hole, do not strike the expansion wedge.

TECHNICAL DATA

Ceiling nail **FDN**, zinc-plated steel

Type	Art.-No.	ID	approval	drill-Ø	min. drill hole depth	effect. anchorage depth	anchor length	max. usable length	qty. per box
			● DIBt	d_0	t	h_{ef}	l	t_{fix}	
				[mm]	[mm]	[mm]	[mm]	[mm]	pcs.
FDN 6/35	**78644**	4	●	6	45	32	39	4,5	100
FDN 6/65	**78645**	1	●	6	75	32	69	35	100



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.

Nail anchor FNA II

For cost-efficient hammerset installation.

OVERVIEW

Nail anchor **FNA II** with nail head, zinc-plated steel

Nail anchor **FNA II** with thread, zinc-plated steel

Nail anchor **FNA II** with hook, zinc-plated steel

Nail anchor **FNA II** with eye, zinc-plated steel

Approved for:

- Lightweight ceilings and suspended ceilings according to DIN 18168
- Statically comparable fixings in concrete C20/25 to C50/60

For fixing of:

- Squared timbers
- Battens
- Metal profiles
- Wire and nonius hangers
- Chains
- Cables
- Punched tapes
- Fire partitions
- Ventilation pipes
- Substructures made of wood and metal
- Ceilings
- Metal clamps

Also suitable for:

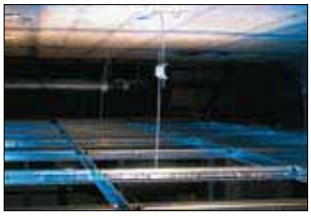
- Concrete ≥C12/15
- Natural stone with dense structure

DESCRIPTION

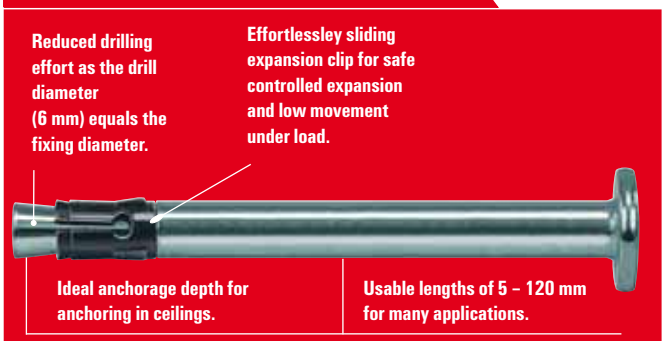
- Nail anchor for hammerset installation
- The installed nail anchor expands automatically under load, pulls the cone into the expansion clip and expands against the hole wall.
- A4 stainless steel version for outdoor use and in damp conditions. Highly corrosion-resistant steel C (material no. 1.4529) for applications in aggressive atmospheres.

Advantages/benefits

- Simple and easy setting with a few hammer blows reduces work, particularly with overhead installation.
- Little hammering force required, allowing sensitive materials to be fixed, e.g. fire protection boards.
- Fixing with different head designs for different areas of application.
- Only 6 mm hole diameter.



FNA II - ADVANTAGES AT A GLANCE



INSTALLATION

Type of installation

- Push-through resp. pre-positioned installation (only FNA II-H, FNA II-OE).

Installation tips

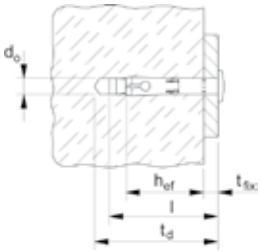
- Setting tool FNA S is recommended for installing channels.
- Compressed air setting tool available upon request.

TECHNICAL DATA

Nail anchor **FNA II** with nail head, zinc-plated steel

Nail anchor **FNA II A4** resp. **FNA II C** nail head, stainless steel resp. high corrosion-resistant steel 1.4529

Type		Art.-No.	ID	approval ● DIBt	approval ■ ETA	drill-Ø d_0 [mm]	min. drill-hole depth for through fixings t_d [mm]	effect. anchorage depth h_{ef} [mm]	anchor length l [mm]	max. usable length t_{fix} [mm]	head diameter Ø [mm]	qty. per box pcs.
FNA II 6 x 25/5		**44121**	2	●	■	6	40	25	35	5	13	100
FNA II 6 x 30/5		**44115**	8	●	■	6	45	30	43	5	13	100
FNA II 6 x 30/30		**44116**	1	●	■	6	70	30	68	30	13	50
FNA II 6 x 30/50		**44117**	5	●	■	6	90	30	88	50	13	50
FNA II 6 x 30/75		**44118**	8	●	■	6	115	30	113	75	13	50
FNA II 6 x 30/100		**44119**	2	●	■	6	140	30	138	100	13	50
FNA II 6 x 30/120		**44120**	9	●	■	6	160	30	158	120	13	50
FNA II 6 x 30/5 A4		**44122**	9	●	■	6	45	30	40	5	13	100
FNA II 6 x 30/30 A4		**44123**	0	●	■	6	70	30	65	30	13	50
FNA II 6 x 30/5 C	1)	**44124**	4	●	■	6	45	30	40	5	13	100
FNA II 6 x 30/30 C	1)	**44125**	1	●	■	6	70	30	65	30	13	50



1) Prices and delivery times available on request.

Nail anchor **FNA II** with hook, zinc-plated steel

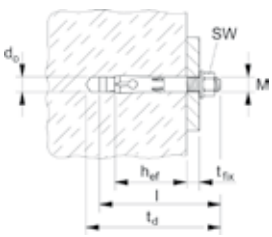
Nail anchor **FNA II** with eye, zinc-plated steel

Type		Art.-No.	ID	approval ● DIBt	approval ■ ETA	drill-Ø d_0 [mm]	min. drill hole depth t [mm]	effect. anchorage depth h_{ef} [mm]	anchor length l [mm]	head diameter Ø [mm]	qty. per box pcs.
FNA II 6 x 25 H		**44126**	8		■	6	31	25	54	10	50
FNA II 6 x 30 OE		**44127**	5	●	■	6	35	25	53	10	50

Nail anchor **FNA II** with thread, zinc-plated steel

Nail anchor **FNA II A4** resp. **FNA II C** with thread, stainless steel resp. high corrosion-resistant steel 1.4529

Type		Art.-No.	ID	approval ● DIBt	approval ■ ETA	drill-Ø d_0 [mm]	min. drill-hole depth for through fixings t_d [mm]	effect. anchorage depth h_{ef} [mm]	anchor length l [mm]	max. usable length t_{fix} [mm]	thread M	width across nut ○ SW	washer (outer diameter x thickness) [mm]	qty. per box pcs.
FNA II 6 x 25 M6/5	1) 3)	**44111**		●	■	6	40	25	45	5	M 6	10	14 x 6	100
FNA II 6 x 30 M6/5	1) 3)	**44109**		●	■	6	45	30	50	5	M 6	10	14 x 6	50
FNA II 6 x 30 M6 x 43	2)	**44110**		●	■	6	40	30	43	-	M 6	-	-	100
FNA II 6 x 30 M8/5		**44114**		●	■	6	45	30	50	5	M 8	13	18 x 8	50
FNA II 6 x 30 M6/5 A4	1) 3)	**44112**		●	■	6	45	30	50	5	M 6	10	12 x 1.5	100
FNA II 6 x 30 M6/5 C	1) 3)	**44113**		●	■	6	45	30	50	5	M 6	10	12 x 1.5	100



1) Max. installation torque = 4 Nm.
2) Without nut and washer, e. g. for the fixing of pipe clamps.
3) Prices and delivery times available on request.

FIRE PROTECTION
Red hot: see page 308 for information about fire protection.

CORROSION
All about corrosion and how you can avoid it is written on page 309.

Nail anchor FNA II

TECHNICAL DATA

Machine setting tool
FNA S-SDS

Machine setting tool
FNA S-SBO

Type	Art.-No.	ID			qty. per box
					pcs.
FNA S-SDS	**61547**	8			1
FNA S-SBO	**61548**	5		for mounting on the drill bit (drill-Ø 6mm)	1

LOADS

Mean ultimate loads, design resistant and recommended loads of one fixing point[2] in normal-weight concrete C12/15 to C50/60.

				Non-cracked concrete								
Anchor type				FNA II 6 x 30			FNA II 6 x 25	FNA II 6 x 30	FNA II 6 x 25 OE	FNA II 6 x 30		
				gvz	A4	C	gvz	gvz	gvz	gvz	A4	C
Effective anchorage depth		h_{ef}	[mm]	30			25	25	25	30		
Drill hole depth		$h_1 \geq$	[mm]	40			35	35	35	40		
Nominal drill hole diameter		d_o	[mm]	6			6	6	6	6		
Mean ultimate loads $N_{u,m}$ and $V_{u,m}$												
Concrete C12/15		$N_{u,m}$	[kN]	5.4	6.5		4.6	4.6	4.6	4.8	5.3	
		$V_{u,m}$	[kN]	6.0*	7.0*		4.0*	4.0*	-	4.0*	6.0	
Concrete C20/25		$N_{u,m}$	[kN]	7.2	8.7		5.9	5.9	5.9	6.2	6.8	
		$V_{u,m}$	[kN]	6.0*	7.0*		4.0*	4.0*	-	4.0*	7.0*	
Design resistant loads F_{Rd}[1] of one fixing point[2] for c ≥ 100 mm and a ≥ 200 mm [3]												
Concrete C12/15	0°	N_{Rd}	[kN]	3.0	3.6		1.4[1]	1.4[1]	0.8[1]	1.7[1]		
	90°	V_{Rd}	[kN]	4.0	5.1							
Concrete C20/25 to C50/60	0°	N_{Rd}	[kN]	4.0	4.8		1.7[1]	1.7[1]	0.8[1]	2.2[1]		
	90°	V_{Rd}	[kN]	4.0	5.1							
Design resistant loads $F_{Rd,min}$[1] of one fixing point[2] for c ≥ 50 mm and a ≥ 100 mm [3]												
Concrete C12/15			[kN]	1.2[1]	1.3[1]		0.7[1]	0.7[1]	0.7[1]	0.7[1]		
Concrete C20/25 to C50/60			[kN]	1.5[1]	1.7[1]		0.7[1]	0.7[1]	0.7[1]	0.8[1]		
Recommended loads F_{rec}[1] of one fixing point[2] for c ≥ 100 mm and a ≥ 200 mm [3]												
Concrete C12/15	0°	N_{rec}	[kN]	3.0	3.6		1.0[1]	1.0[1]	0.6[1]	1.2[1]		
	90°	V_{rec}	[kN]	4.0	5.1							
Concrete C20/25 to C50/60	0°	N_{rec}	[kN]	4.0	4.8		1.2[1]	1.2[1]	0.6[1]	1.6[1]		
	90°	V_{rec}	[kN]	4.0	5.1							
Recommended loads $F_{rec,min}$[1] of one fixing point[2] for c ≥ 50 mm and a ≥ 100 mm [3]												
Concrete C12/15			[kN]	0.9[1]	0.9[1]		0.5[1]	0.5[1]	0.5[1]	0.5[1]		
Concrete C20/25 to C50/60			[kN]	1.1[1]	1.2[1]		0.5[1]	0.5[1]	0.5[1]	0.6[1]		
Recommended bending moment M_{rec}												
			[Nm]	4.0	4.6		4.0	4.0	4.0	4.0	4.6	
Anchor characteristics												
Minimum structural component		h_{min}	[mm]	80			80	80	80	80		
Clearance-hole in fixture to be attached		$d_f \leq$	[mm]	7[4]			7[4]	7[4]	-	7[4]		
Maximum torque		T_{inst}	[Nm]	4[5]			4[5]	4[5]	-	4[5]		

[*] Steel failure decisive

[1] The loads are valid for anxial tensile load, shear load and oblique tensile load at any angle.
Design resistant loads: material safety factors included.
Recommended loads: material safety factors and safety factor for load γ_L = 1,4 included.

[2] A fixing point can consist of a single anchor, a group of two anchors with $s_1 \geq 50$ mm or a group of four anchors with $s_1 = s_2 \geq 50$ mm

[3] c is the distance of the outermost anchor of a fixing point to the concrete; a is the distance between the outer anchors of neighboured fixing points.

[4] For FNA II 6 M8: $d_f \leq 9$mm.

[5] Only for FNA II 6 M6 and FNA II 6 M8.

Heavy-duty anchor SL M

The classic steel anchor for all metric screws.

OVERVIEW

Heavy-duty anchor **SL M**, zinc-plated steel

Heavy-duty anchor **SLM-N A4**, stainless steel

Approved for:
- Non-cracked concrete C15/20

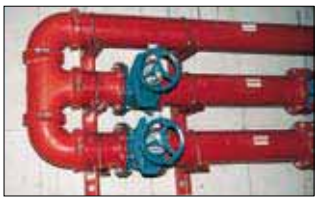
For fixing of:
- Steel constructions
- Handrails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Window elements
- Stand-off installations

DESCRIPTION

- Sleeve anchor with internal thread for pre-positioned installation
- When the screw or hexagon nut is tightened, the cone is pulled into the expansion sleeve and expands it against the hole wall.
- A4 stainless steel version for outdoor use and in damp conditions.

Advantages/benefits

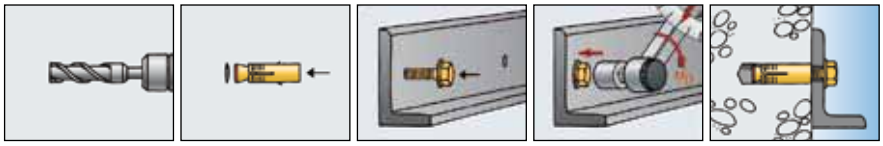
- Suitable for all bolts or studs with metric thread.
- Surface-flush fixing allows the attached item to be removed and refitted several times.
- Plastic cap protects against contamination with drilling dust and ensures the thread remains free-running.



INSTALLATION

Type of installation

- Pre-positioned installation
- Stand-off installation



Installation tips

- For correct installation, the face of the fixing should be tightened against the back of the plate to be fixed. For stand off fixing, this can be achieved with a lock nut.
- Observe the required screw-in depth in the fixing when determining the screw length l_s:
  Length of anchor
  + Thickness of the building component t_{fix}
  + Thickness of washer
  = Screw length
  (with threaded bolts please add thickness of nut)

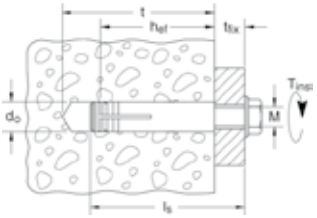
FIXING PRINCIPLES
In detail: The general principles for installation, the correct drilling procedure and much more on page 303

Heavy-duty anchor SL M

TECHNICAL DATA

Heavy-duty anchor **SL M**,
zinc-plated steel

Type	Art.-No.	ID	drill-Ø d_0 [mm]	min. drill hole depth t [mm]	effect. anchorage depth h_{ef} [mm]	anchor length l [mm]	internal thread d_s	qty. per box pcs.
SL M 16	**50556**	4	24	110	62	90	M 16	10
SL M 20	**50557**	1	30	130	77	110	M 20	5
SL M 24	**50558**	8	35	150	90	125	M 24	5



Heavy-duty anchor **SLM-N A4**,
stainless steel

Type	Art.-No.	ID	drill-Ø d_0 [mm]	min. drill hole depth t [mm]	effect. anchorage depth h_{ef} [mm]	anchor length l [mm]	internal thread d_s	qty. per box pcs.
SL M 8 N A4	**50526**	7	12	60	45	52	M 8	25
SL M 10 N A4	**50527**	4	16	70	50	60	M 10	20

LOADS

Mean ultimate loads and recommended loads for single anchors of fischer Heavy duty anchor SL M resp. SL M-N A4 with large axial spacing and edge distance

					Non-cracked concrete				
Anchor size					**M 8**	**M 10**	**M 16**	**M 20**	**M 24**
Effective anchorage depth		h_{ef}	[mm]		**45**	**50**	**62**	**77**	**90**
Drill hole depth		$h_1 \geq$	[mm]		60	70	110	130	150
Drill hole diameter		d_0	[mm]		12	16	24	30	35
Mean ultimate loads N_u and V_u [kN]									
Tensile	0°	N_u	[kN]	gvz	-	-	32.2	44.6	56.3
				A4	16.0	21.0	–	–	–
Shear	90°	V_u	[kN]	gvz	-	-	75.4*	117.6*	170*
				A4	15.4*	24.4*	–	–	–
Design resistant loads N_{Rd} and V_{Rd} [kN]									
Tensile	0°	N_{Rd}	[kN]	gvz	-	-	13.7	18.9	23.9
				A4	7.4	8.7	–	–	–
Shear	90°	V_{Rd}	[kN]	gvz	-	-	32.8	45.4	57.4
				A4	8.2	11.9	–	–	–
Recommended loads N_{rec} and V_{rec} [kN]									
Tensile	0°	N_{rec}	[kN]	gvz	-	-	9.8	13.5	17.1
				A4	5.3	6.2	–	–	–
Shear	90°	V_{rec}	[kN]	gvz	-	-	23.4	32.4	41.0
				A4	5.9	8.5	–	–	–
Recommended bending moment M_{rec} [Nm], values apply to screws with a strength classification 8.8 and A4-70 resp.									
		M_{rec}	[Nm]	gvz	-	-	152.2	296.7	513.2
				A4	12.5	25.0	–	–	–
Component dimensions, minimum axial spacings and edge distances									
Min. axial spacing[1)]		s_{min}	[mm]		50	50	60	80	90
Min. edge distance[1)]		c_{min}	[mm]		90	100	120	160	180
Min. structural component thickness		h_{min}	[mm]		100	100	130	150	200
Required torque		T_{inst}	[Nm]	gvz	-	-	100	150	200
				A4	25	45	–	–	–

* steel failure, values apply to screws with a strength classification 8.8 and A4-70 respectively.

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

CORROSION

Rust prevention tips: Everything you need to know about corrosion and how to prevent it is on page 319.

Hammerset wall bolt MR

Bolt anchor with distance-controlled impact expansion.

OVERVIEW

Wall screw **MR**, zinc-plated steel

Suitable for:
- Concrete ≧ C12/15

For fixing of:
- Gratings
- Machines
- Metal profiles
- Gates
- Consoles
- Steel constructions

DESCRIPTION

- Hammerset anchor for push-through installation.
- The anchor is driven into the hole without the expansion pin.
- Then the expansion pin is driven in to expand the anchor against the hole wall.

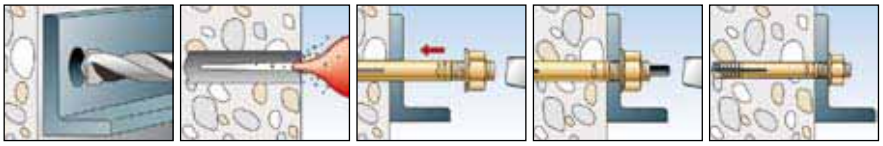
Advantages/benefits

- Quick and simple hammerset installation reduces installation time.

INSTALLATION

Type of installation

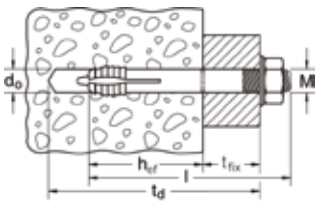
- Push-through installation



TECHNICAL DATA

Hammerset wall bolt **MR**, zinc-plated steel

Type	Art.-No.	ID	drill-Ø d_0 [mm]	min. drill-hole depth for through fixings t_d [mm]	effect. anchorage depth h_{ef} [mm]	anchor length l [mm]	max. usable length t_{fix} [mm]	width across nut SW	thread M	qty. per box pcs.
MR 8	**50583**	0	8	70	40	70	22	13	M 8	25
MR 10	**50584**	7	10	85	50	85	24	17	M 10	20
MR 12	**50585**	4	12	100	60	100	27	19	M 12	10



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Fixing set for Diamond Drills FDBB

OVERVIEW

Fixing set **FDBB**, zinc-plated steel

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

For fixing of:
- Diamond drills
- Diamond saws

DESCRIPTION

- Fixing set for diamond drills and diamond saws
- When the nut is tightened, the tapered bolt is pulled into the expansion clip and expands it against the hole wall.
- The expansion element stays in the hole on disassembly, and the spindle bolt is fitted with a new expansion element and re-used.

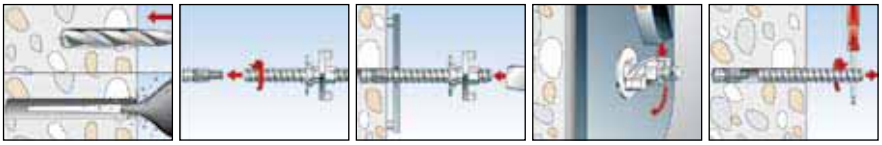
Advantages/benefits

- Active controlled expansion behaviour guarantees high security in use.
- Robust unit specially for rough on-site conditions; also tolerates skew bolt positions and jerky tilting of the drill bit.
- Large steel cross-section at the concrete surface provides high steel load-bearing capability.
- Protected internal thread and high-quality steel increase the long life of the spindle bolt and improve cost efficiency.

INSTALLATION

Type of installation

- Push-through installation
- Pre-positioned installation



Installation tips

- Spindle bolt and expansion element need to be fitted before installation.
- Simple hammerset installation without additional setting tool.
- The nut can either be tightened with a hammer or a wrench.

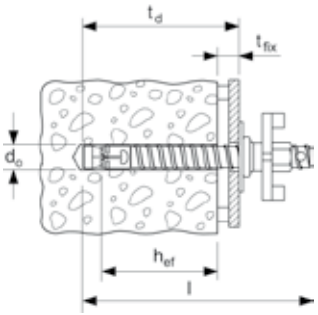
TECHNICAL DATA

Fixing set **FDBB**

Expansion element **FDBB SE**

Spindle bolt **FDBB SB**

Type	Art.-No.	ID	drill-Ø d_0 [mm]	usable length d_a [mm]	min. drill-hole depth for through fixings t_d [mm]	total length approx. [mm]	anchorage depth h_{ef} [mm]	contents	width across nut SW	qty. per box pcs.
FDBB 16/50 Set	**90680**	4	16	50	135	200	60	1 Expansion element 16 SE, 1 Spindle bolt 16/50/160, 1 Washer, 1 Nut	27	1
FDBB 16 SE	**90681**	1	16	-	-	-	-	Expansion element	-	25
FDBB 16/50/160 SB	**91947**	7	16	50	135	200	60	Spindle bolt	-	5
FDBB 16/100/210 SB	**92962**	9	16	100	185	250	60	Spindle bolt	-	5
FDBB 16/150/260 SB	**92964**	3	16	150	235	300	60	Spindle bolt	-	5



Notes

NOTES PAGE

Please use this page to record your notes and remarks

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