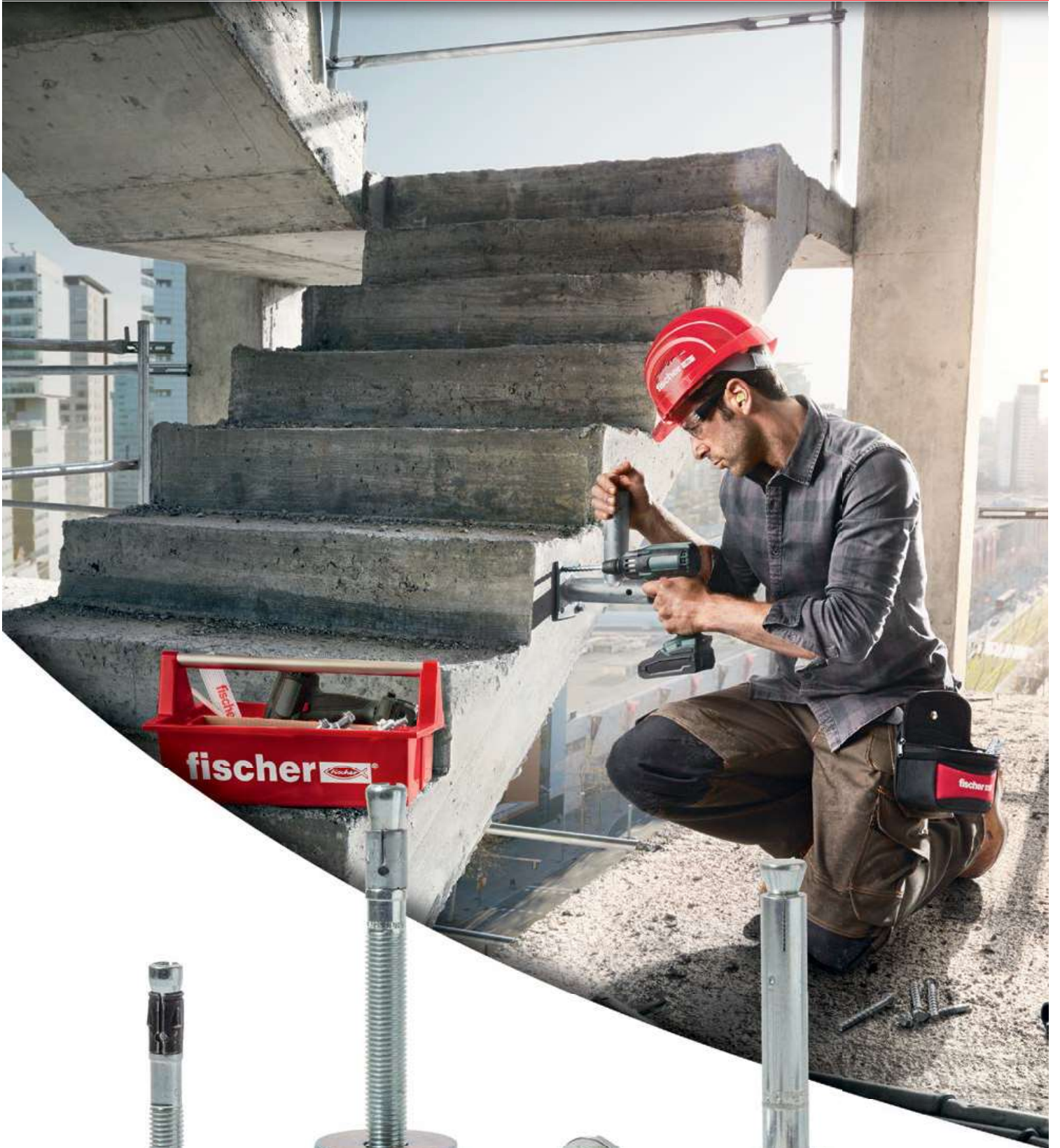


# High Performance Steel Anchors






















**Cracked Concrete**

	61
<b>Bolt anchor FAZ II</b>	
	65
<b>Bolt anchor FBZ</b>	
	68
<b>Multi-Use Concrete Screw FBS II</b>	
	72
<b>Ultracut Concrete Screw FBS II A4</b>	
	75
<b>High performance anchor FH II</b>	
	79
<b>High performance anchor FH II-I</b>	
	87
<b>ZYKON undercut anchor FZA</b>	
	92
<b>ZYKON Hammerfix anchor FZEA II</b>	
	94
<b>Drop-in anchor EA II</b>	
	102
<b>Nail anchor FNA II</b>	
	104
<b>Ceiling nail FDN II</b>	
	105
<b>Cost-efficient Ceiling Nail FDZ</b>	





**Non-cracked Concrete**

	61
<b>Bolt anchor FAZ II</b>	
	65
<b>Bolt anchor FBZ</b>	
	68
<b>Multi-Use Concrete Screw FBS II</b>	
	72
<b>Ultracut Concrete Screw FBS II A4</b>	
	75
<b>High performance anchor FH II</b>	
	79
<b>High performance anchor FH II-I</b>	
	82
<b>Bolt anchor FBN II</b>	
	85
<b>Bolt Anchor FXA</b>	
	87
<b>ZYKON undercut anchor FZA</b>	
	92
<b>ZYKON Hammerfix anchor FZEA II</b>	
	94
<b>Drop-in anchor EA II</b>	
	97
<b>Drop-in anchor EA N</b>	

	99
<b>Brass fixing MS</b>	
	102
<b>Nail anchor FNA II</b>	
	104
<b>Ceiling nail FDN II</b>	
	105
<b>Cost-efficient Ceiling Nail FDZ</b>	
	106
<b>Bolt Anchor FWA</b>	



**Hollow-core Slab**

	94
<b>Drop-in anchor EA II Short</b>	
	100
<b>Hollow-ceiling anchor FHY</b>	



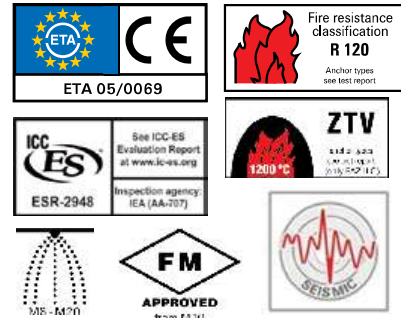
**Aerated Concrete**

	109
<b>Aircrete anchor FPX-I</b>	

## For highest demands of cracked concrete. Powerful and flexible.



### APPROVALS



### ADVANTAGES

- The optimised expansion clip allows for a high load-bearing capacity. Thus fewer fixing points and smaller anchor plates are required.
- The international approvals guarantee maximum safety and the best performance.
- The bolt geometry allows for optimal load distribution and therefore enables use close to edges and in thin components.
- Fewer hammer blows and the minimal torque slippage allow for a noticeably simpler installation.
- The drive-in pin protects the thread from damage and ensures a trouble-free dismantling of the fixture

### BUILDING MATERIALS

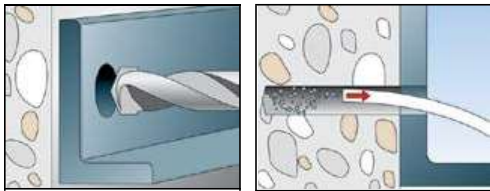
- Approved for:**
- Concrete C20/25toC50/60
  - Cracked and non-cracked
  - Seismic conditions
- Also suitable for:**
- Concrete C12/15 & C80/95
  - Natural stone with dense structure

### VERSION

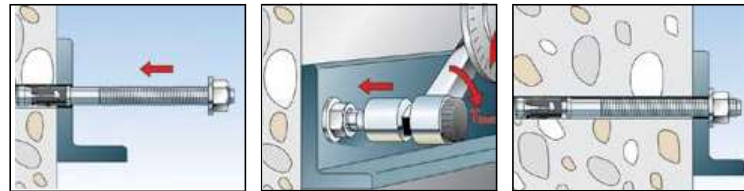
- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

### INSTALLATION

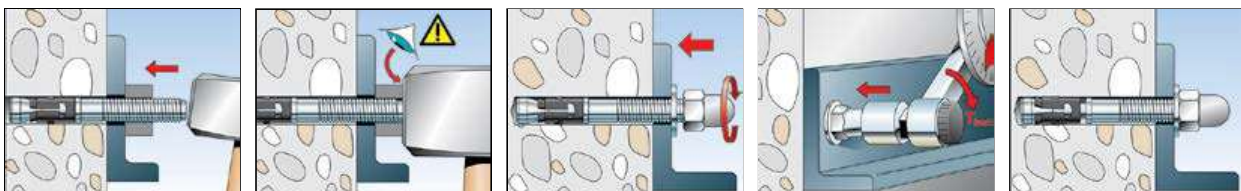
#### DRILL HOLE PREPARATION



#### PUSH-THROUGH INSTALLATION WITH HEXAGON NUT



#### PUSH-THROUGH INSTALLATION OF THE CUP NUT VERSION WITH SETTING GAUGE



Anchor Type	FAZ II M6			FAZ II M8			FAZ II M10			FAZ II M12			FAZ II M16			FAZ II M20			FAZ II M24					
	gvz	A4	C	gvz	A4	C	gvz	A4	C	gvz	A4	C	gvz	A4	C	gvz	A4	C	gvz	A4	C			
drill hole diameter	d <sub>0</sub> (mm)			8			10			12			16			20			24					
hef,min	(mm)			-			40			50			65			-			-					
Minimum member thickness <sup>1)</sup>	(mm)			-			80			100			140			-			-					
hef,max	(mm)			40			45			60			70			85			100			125		
Minimum member thickness <sup>1)</sup>	(mm)			80			100			120			140			170			200			250		
Torque moment	T <sub>inst</sub> (Nm)			8			20			45			60			110			200			270		
Cracked Concrete	Min. spacing	S <sub>min</sub> <sup>2)</sup> (mm)		35			35			40			50			65			95			100		
	Min. edge distance	C <sub>min</sub> <sup>2)</sup> (mm)		45			40			45			55			65			85			100		
Non-cracked Concrete	Min. spacing	S <sub>min</sub> <sup>2)</sup> (mm)		35			40			40			50			65			95			100		
	Min. edge distance	C <sub>min</sub> <sup>2)</sup> (mm)		45			40			45			55			65			95			135		

(1) According approval the minimum member thickness ( $h_{min} \geq 2 \times hef$ ) can be reduced under specific conditions.  
 (2) Minimum possible axial spacings resp. edge distance while reducing the permissible load for the minimum member thickness ( $h_{min} \geq 2 \times hef$ ). The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according approval.

## TECHNICAL DATA



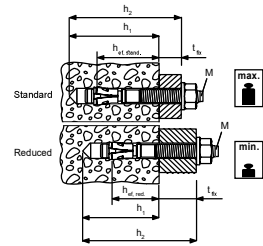
Bolt anchor FAZ II



Bolt anchor FAZ II H



Bolt anchor FAZ II K/FAZ II K GS (short version)



2

High Performance Steel Anchors

Item	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Letter code marking	Drill hole diameter	Anchor length	Drill hole depth for pre-position fixing Stand/Red.	Drill hole depth for through fixing	Max. usable length hef, stand/hef, red	Thread	Width across nut	Sales unit
	Art-No.	Art-No.	Art-No.		$d_0$ (mm)	$l$ (mm)	$h_1$ (mm)	$h_2$ (mm)	$t_{fix}$ (mm)	$\emptyset$ length (mm)	$\emptyset$ SW (mm)	(pcs)
	<b>gz</b>	<b>A4</b>	<b>C</b>									
FAZ II 6/10	542621	542623	—	—	6	65	—	60	10/	M 6 x 35	10	50
FAZ II 6/20	542622	542624	—	—	6	75	—	70	20/	M 6 x 45	10	50
FAZ II 8/10	94871 <sup>1)</sup>	501396 <sup>1)</sup>	—	B	8	75	55	65	10/20	M 8 x 38	13	50
FAZ II 8/10	—	—	501428	B	8	75	55	65	10/20	M 8 x 38	13	10
FAZ II 8/30	94877 <sup>1)</sup>	501399 <sup>1)</sup>	—	F	8	95	55	85	30/40	M 8 x 58	13	50
FAZ II 8/30	—	—	501429	F	8	95	55	85	30/40	M 8 x 58	13	10
FAZ II 8/50	94878 <sup>1)</sup>	501401 <sup>1)</sup>	—	K	8	115	55	105	50/60	M 8 x 78	13	50
FAZ II 8/100	94879 <sup>1)</sup>	—	—	P	8	165	55	155	100/110	M 8 x 128	13	25
FAZ II 8/160	503251	—	—	T	8	225	55	215	160/170	M 8 x 100	13	20
FAZ II 10/10	94981 <sup>1)</sup>	501403 <sup>1)</sup>	—	B	10	95	75/55	85	10/30	M 10 x 53	17	50
FAZ II 10/10	—	—	501430	B	10	95	75/55	85	10/30	M 10 x 53	17	10
FAZ II 10/20	94982 <sup>1)</sup>	—	—	D	10	105	75/55	95	20/40	M 10 x 63	17	25
FAZ II 10/20	—	501406 <sup>1)</sup>	—	D	10	105	75/55	95	20/40	M 10 x 63	17	50
FAZ II 10/30	94983 <sup>1)</sup>	—	—	F	10	115	75/55	105	30/50	M 10 x 73	17	25
FAZ II 10/30	—	501407 <sup>1)</sup>	—	F	10	115	75/55	105	30/50	M 10 x 73	17	50
FAZ II 10/30	—	—	503185	F	10	115	75/55	105	30/50	M 10 x 73	17	10
FAZ II 10/50	94984 <sup>1)</sup>	501409 <sup>1)</sup>	—	K	10	135	75/55	125	50/70	M 10 x 93	17	20
FAZ II 10/70	—	501410 <sup>1)</sup>	—	M	10	155	75/55	145	70/90	M 10 x 113	17	20
FAZ II 10/80	94985 <sup>1)</sup>	—	—	N	10	165	75/55	155	80/100	M 10 x 123	17	20
FAZ II 10/100	94986 <sup>1)</sup>	501411	—	P	10	185	75/55	175	100/120	M 10 x 143	17	20
FAZ II 10/160	503252	—	—	T	10	245	75/55	235	160/180	M 10 x 193	17	20
FAZ II 10/160	—	501412	—	T	10	245	75/55	235	160/180	M 10 x 193	17	20
FAZ II 12/10	95419 <sup>1)</sup>	501413 <sup>1)</sup>	—	B	12	110	90/70	100	10/30	M 12 x 61	19	20
FAZ II 12/10	—	—	503186	B	12	110	90/70	100	10/30	M 12 x 61	19	10
FAZ II 12/20	95420 <sup>1)</sup>	501415 <sup>1)</sup>	—	D	12	120	90/70	110	20/40	M 12 x 71	19	20
FAZ II 12/30	95421 <sup>1)</sup>	501416 <sup>1)</sup>	—	F	12	130	90/70	120	30/50	M 12 x 81	19	20
FAZ II 12/30	—	—	501431	F	12	130	90/70	120	30/50	M 12 x 81	19	10
FAZ II 12/50	95446 <sup>1)</sup>	501419 <sup>1)</sup>	—	K	12	150	90/70	140	50/70	M 12 x 101	19	20
FAZ II 12/60	—	501420 <sup>1)</sup>	—	L	12	160	90/70	150	60/80	M 12 x 111	19	20
FAZ II 12/80	95454 <sup>1)</sup>	—	—	N	12	180	90/70	170	80/100	M 12 x 131	19	20
FAZ II 12/100	95470 <sup>1)</sup>	501421 <sup>1)</sup>	—	P	12	200	90/70	190	100/120	M 12 x 151	19	20
FAZ II 12/160	503253	—	—	T	12	260	90/70	250	160/180	M 12 x 186	19	10
FAZ II 12/160	—	503180	—	T	12	260	90/70	250	160/180	M 12 x 186	19	20
FAZ II 12/200	95605	—	—	V	12	300	90/70	290	200/220	M 12 x 186	19	10
FAZ II 16/5	—	522125	—	A	16	128	110/90	115	5/25	M 16 x 64	—	10
FAZ II 16/5	522124 <sup>1)</sup>	—	—	A	16	128	110/90	115	5/25	M 16 x 64	—	20
FAZ II 16/25	95836 <sup>1)</sup>	—	501432	E	16	148	110/90	135	25/45	M 16 x 84	24	10
FAZ II 16/25	—	501423 <sup>1)</sup>	—	E	16	148	110/90	135	25/45	M 16 x 84	24	20
FAZ II 16/50	95864 <sup>1)</sup>	—	503187	K	16	173	110/90	160	50/70	M 16 x 109	24	10
FAZ II 16/50	—	501424 <sup>1)</sup>	—	K	16	173	110/90	160	50/70	M 16 x 109	24	20
FAZ II 16/100	95865 <sup>1)</sup>	501425 <sup>1)</sup>	—	P	16	223	110/90	210	100/120	M 16 x 159	24	10
FAZ II 16/160	503254	—	—	T	16	283	110/90	270	160/180	M 16 x 189	24	10
FAZ II 16/200	95967 <sup>1)</sup>	—	—	V	16	323	110/90	310	200/220	M 16 x 189	24	10
FAZ II 16/250	95968	—	—	W	16	373	110/90	360	250/270	M 16 x 100	24	10
FAZ II 16/300	96188	—	—	X	16	423	110/90	410	300/320	M 16 x 100	24	10
FAZ II 20/30	46632 <sup>1)</sup>	—	—	F	20	172	125	155	30/	M 20 x 54	30	5
FAZ II 20/30	—	501426 <sup>1)</sup>	—	F	20	172	125	155	30/	M 20 x 54	30	5
FAZ II 20/60	46633 <sup>1)</sup>	—	—	L	20	202	125	185	60/	M 20 x 84	30	5
FAZ II 20/60	—	503183 <sup>1)</sup>	—	L	20	202	125	185	60/	M 20 x 84	30	4
FAZ II 20/160	503255 <sup>1)</sup>	—	—	T	20	302	125	285	160/	M 20 x 100	30	5
FAZ II 24/30	46635 <sup>1)</sup>	—	—	F	24	205	155	185	30/	M 24 x 58	36	5
FAZ II 24/30	—	501427 <sup>1)</sup>	—	F	24	205	155	185	30/	M 24 x 58	36	4
FAZ II 24/60	46636 <sup>1)</sup>	—	—	L	24	235	155	215	60/	M 24 x 88	36	5
FAZ II 24/60	—	503184 <sup>1)</sup>	—	L	24	235	155	215	60/	M 24 x 88	36	4
FAZ II 8/5 K	538989	538990	—	—	8	60	35	45	5/	M 8 x 23	13	50
FAZ II 10/10 K	522108	522116	—	B	10	75	55/25	65	10	M 10 x 33	17	50
FAZ II 10/20 K	522110	—	—	D	10	85	55/25	75	20	M 10 x 43	17	25

1) Approval Seismic C1/C2 only with maximum embedment depth

## TECHNICAL DATA

Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Highly corrosion resistant steel Art-No.	Letter code marking	Drill hole diameter $d_h$ (mm)	Anchor length $l$ (mm)	Drill hole depth for pre-position fixing Stand-/Red. $h_1$ (mm)	Drill hole depth for through fixing $h_2$ (mm)	Max. usable length hef, stand/hef, red $t_{in}$ (mm)	Thread $\emptyset$ length (mm)	Width across nut $\emptyset$ SW (mm)	Sales unit (pcs)
	gvz	A4	C									
FAZ II 10/20 K	—	522117	—	D	10	85	55/25	75	20	M 10 x 43	17	50
FAZ II 12/10 K	522118	522122	—	B	12	90	70/30	80	10	M 12 x 41	19	20
FAZ II 12/20 K	522119	522123	—	D	12	100	70/40	90	20	M 12 x 51	19	20
FAZ II 10/10 K GS	522115	—	—	B	10	75	55/25	65	10	M 10 x 33	17	50
FAZ II 12/10 K GS	522121	—	—	B	12	90	70/30	80	10	M 12 x 41	19	20
FAZ II 10/10 H	543392 <sup>1)</sup>	543396 <sup>1)</sup>	—	B	10	95	77/57	87	10/30	M 10 x 53	17	20
FAZ II 10/20 H	543393 <sup>1)</sup>	543397 <sup>1)</sup>	—	D	10	105	77/57	97	20/40	M 10 x 63	17	20
FAZ II 12/10 H	543394 <sup>1)</sup>	543398 <sup>1)</sup>	—	B	12	109	89/69	99	10/30	M 12 x 61	19	20
FAZ II 12/20 H	543395 <sup>1)</sup>	543399 <sup>1)</sup>	—	D	12	119	89/69	109	20/40	M 12 x 71	19	20

1) Available from spring 2018

Approval Seismic C1/C2 only with maximum embedment depth

## LOADS

### Bolt anchor FAZ II zinc plated steel / stainless steel A4 / high corrosion resistant steel C

Design & Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 9)</sup>

Item	Material fixing element	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load $N_{adm}$ (kN)	Permissible shear load $V_{adm}$ (kN)	Design Tension load $N_{des}$ (kN)	Design Shear Load $V_{des}$ (kN)
FAZ II 6 <sup>5)</sup>	galv.	40	0.7	3.4	0.98	4.76
FAZ II 6 <sup>5) 6)</sup>	A4	40	0.7	5.0	0.98	7
	C	40	0.7	5.0	0.98	7
FAZ II 8 <sup>6)</sup>	galv.	35 <sup>4)</sup>	2.6	7.8	3.64	10.92
		45	3.8		5.32	
	A4	35 <sup>4)</sup>	2.6	8.9	3.64	12.46
		45	3.8	9.6	5.32	13.44
	C	35 <sup>4)</sup>	2.6	8.9	3.64	12.46
		45	3.8	9.6	5.32	13.44
FAZ II 10 <sup>6)</sup>	galv.	40	4.3	11.3	6.02	15.82
		60	6.2	12.2	8.68	17.08
	A4	40	4.3	11.3	6.02	15.82
		60	6.2	15.1	8.68	21.14
	C	40	4.3	11.3	6.02	15.82
		60	6.2	15.1	8.68	21.14
FAZ II 12 <sup>6)</sup>	galv.	50	6.1	17.5	8.54	24.5
		70	9.5		13.3	
	A4	50	6.1	18.8	8.54	26.32
		70	9.5	21.9	13.3	30.66
	C	50	6.1	18.8	8.54	26.32
		70	9.5	21.9	13.3	30.66
FAZ II 16 <sup>6)</sup>	galv.	65	9.0	28.7	12.6	40.18
		85	13.4		18.76	
	A4	65	9.0	28.7	12.6	40.18
		85	13.4	39.9	18.76	55.86
	C	65	9.0	28.7	12.6	40.18
		85	13.4	39.9	18.76	55.86
FAZ II 20 <sup>6)</sup>	galv.	100	17.1	44.6	23.94	62.44
	A4					
	C					
FAZ II 24 <sup>6)</sup>	galv.	125	24.0	57.5	33.6	80.5
	A4					
	C					
FAZ II 10 H	galv.	60	6.2	12.2	8.68	17.08
	A4			15.1		21.14
	galv.			70		9.5
A4	21.9	30.66				

For the design the complete assessment ETA-05/0069 has to be considered.

(1) The partial safety factors for material resistance as regulated in the ETA-05/0069 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ .

(2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

(3) For all allowable drill methods see ETA-05/0069.

(4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

(5) Diamond drilling not permitted.

(6) Hollow drilling is not permitted for this size.

(7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

(8) The given loads refer to the European Technical Assessment ETA-05/0069, issue date 03/07/2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

(9) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0.3$  mm.

**LOADS**

**Bolt anchor FAZ II zinc plated steel / stainless steel A4 / high corrosion resistant steel C**

Design & Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1)2)3)</sup>

2

High Performance Steel Anchors

Item	Material fixing element	Effective anchorage depth	Permissible tension load	Permissible shear load	Design Tension load	Design Shear Load
		$h_{ef}$ (mm)	$N_{perm}$ (kN)	$V_{perm}$ (kN)	$N_{des}$ (kN)	$V_{des}$ (kN)
FAZ II 6 <sup>5)</sup>	galv.	40	3.6	3.4	5.04	4.76
FAZ II 6 <sup>5)6)</sup>	A4	40	5.0	5.0	7	7
	C					
FAZ II 8 <sup>6)</sup>	galv.	35 <sup>4)</sup>	5.0	7.8	7	10.92
		45	6.7		9.38	
	A4	35 <sup>4)</sup>	5.0	9.6	7	13.44
		45	6.7		9.38	
	C	35 <sup>4)</sup>	5.0	9.6	7	13.44
		45	6.7		9.38	
FAZ II 10 <sup>6)</sup>	galv.	40	6.1	12.2	8.54	17.08
		60	9.5		13.3	
	A4	40	6.1	15.1	8.54	21.14
		60	9.5		13.3	
	C	40	6.1	15.1	8.54	21.14
		60	9.5		13.3	
FAZ II 12 <sup>6)</sup>	galv.	50	8.5	17.5	11.9	24.5
		70	10.5		14.7	
	A4	50	8.5	21.9	11.9	30.66
		70	10.5		14.7	
	C	50	8.5	21.9	11.9	30.66
		70	10.5		14.7	
FAZ II 16 <sup>6)</sup>	galv.	65	12.6	31.4	17.64	43.96
		85	18.8		26.32	
	A4	65	12.6	39.9	17.64	55.86
		85	18.8		26.32	
	C	65	12.6	39.9	17.64	55.86
		85	18.8		26.32	
FAZ II 20 <sup>6)</sup>	galv.	100	24.0	46.5	33.6	65.1
	A4			60.7		84.98
	C			62.9		88.06
FAZ II 24 <sup>6)</sup>	galv.	125	33.6	62.9	47.04	88.06
	A4			80.7		112.98
	C			80.7		112.98
FAZ II 10 H	galv.	60	9.5	12.2	13.3	17.08
	A4			15.1		21.14
FAZ II 12 H	galv.	70	10.5	17.5	14.7	24.5
	A4			21.9		30.66

For the design the complete assessment ETA-05/0069 has to be considered.

(1) The partial safety factors for material resistance as regulated in the ETA-05/0069 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ .

(2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

(3) For all allowable drill methods see ETA-05/0069.

(4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

(5) Diamond drilling not permitted.

(6) Hollow drilling is not permitted for this size.

(7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

(8) The given loads refer to the European Technical Assessment ETA-05/0069, issue date 03/07/2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

(9) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \leq 0.3\text{mm}$ .

## Efficient fixing for cracked concrete



Facade Base plates

### APPROVALS



2

### ADVANTAGES

- The interaction of cone and expansion clip ensures high load capacity. Thus fewer fixing points and smaller anchor plates are required.
- The international approvals guarantee maximum safety and the best performance.
- The bolt geometry allows for optimal load distribution and therefore enables use close to edges and in thin components.
- The distinctive design ensures safe and comfortable setting of the anchor ensuring quick and reliable installation.
- The drive-in pin protects the thread from damage and ensures a trouble-free dismantling of the fixture.

### BUILDING MATERIALS

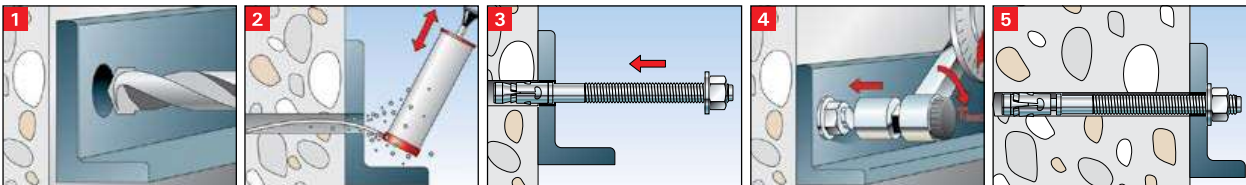
- Approved for:**
- Concrete C20/25 to C50/60
  - Cracked and non-cracked

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

### VERSION

- Zinc-plated steel
- Stainless steel

### INSTALLATION



Anchor Type	FBZ M8		FBZ M10		FBZ M12		FBZ M16		
	gvz	A4	gvz	A4	gvz	A4	gvz	A4	
drill hole diameter $d_o$ (mm)	8		10		12		16		
hef_min (mm)	3 <sup>3)</sup>		40 <sup>4)</sup>		50		65		
Minimum member thickness <sup>1)</sup> (mm)	80		80		100		140		
hef_max (mm)	45		60		70		85		
Torque moment $T_{inst}$ (Nm)	20		45		60		110		
Cracked Concrete	Min. spacing $S_{min}^{2)}$ (mm)	35		40		50		65	
	Min. edge distance $C_{min}^{2)}$ (mm)	40		45		55		65	
Non-cracked Concrete	Min. spacing $S_{min}^{2)}$ (mm)	35		40		50		65	
	Min. edge distance $C_{min}^{2)}$ (mm)	40		45		55		65	

1) According to approval the minimum member thickness ( $h_{min} \geq 2 \times hef$ ) can be reduced under specific conditions.

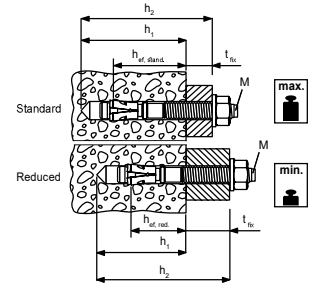
2) Minimum possible axial spacings resp. edge distance while reducing the permissible load for the minimum member thickness ( $h_{min} \geq 2 \times hef$ ). The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according to approval.

4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

## TECHNICAL DATA



Bolt anchor FBZ



2

High Performance Steel Anchors

Item	Art.-No.		Drill diameter $d_0$	Min. drill hole depth for push through installation $h_2$	Anchor length $l$	Standard embedment depth with respective usable length		Reduced embedment depth with respective usable length		Washer (outer diameter x thickness) $\varnothing \times \text{length}$	Thread $\varnothing \times \text{length}$	Sales unit	
	Steel, zinc-plated gvz	stainless steel A4				$h_{ef, std}$	$t_{fix}$	$h_{ef, red}$	$t_{fix}$			gvz	A4
	(mm)	(mm)				(mm)	(mm)	(mm)	(mm)			(pcs)	(pcs)
FBZ 8/10	543400	543409	8	70	75	45	10	35	20	16 x 1,6	M 8 x 38	50	50
FBZ 10/10	543401	543410	10	87	95	60	10	40	30	20 x 2,0	M 10 x 53	50	50
FBZ 10/20	543402	543411	10	97	105	60	20	40	40	20 x 2,0	M 10 x 63	25	50
FBZ 10/30	543961	543963	10	107	115	60	30	40	50	20 x 2,0	M 10 x 73	25	50
FBZ 12/10	543403	543412	12	99	110	70	10	50	10	24 x 2,5	M 12 x 61	20	20
FBZ 12/20	543404	543413	12	109	120	70	20	50	20	24 x 2,5	M 12 x 71	20	20
FBZ 12/30	543962	543964	12	119	130	70	30	50	50	24 x 2,5	M 12 x 81	20	20
FBZ 16/25	543405	543414	16	133	148	85	25	65	45	30 x 3,0	M 16 x 84	10	20
FBZ 8/10 GS	543406	543415	8	70	75	45	10	35	20	22 x 2,5	M 8 x 38	50	50
FBZ 10/10 GS	543407	543416	10	87	95	60	10	40	30	25 x 3,0	M 10 x 53	50	50
FBZ 10/20 GS	-	543417	10	97	105	60	20	40	40	25 x 3,0	M 10 x 63	-	50
FBZ 12/10 GS	543408	-	12	99	110	70	10	50	30	30 x 3,0	M 12 x 61	20	-

1) With reduced embedment depth only for statically indeterminate systems.

## LOADS

### Bolt anchor FBZ zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>

Item	Material fixing element	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load $N_{perm}^{5)}$ (kN)	Permissible shear load $V_{perm}^{5)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)	Required edge distance (with one edge) for		Required spacing for Max. load $s_{cr}$ (mm)						
							Max. tension load $c$ (mm)	Max. shear load $c$ (mm)							
FBZ 8	galv.	35 <sup>4)</sup>	1.9	6.9	2.66	9.66	45	175	105						
	A4							235							
	galv.	45	2.9	6.9	4.06	9.66	40	170	135						
	A4							150							
A4	235														
FBZ 10	galv.	60	4.8	11.3	4.62	15.82	45	290	120						
A4	270														
galv.	40							3.3		12.2	6.72	17.08	60	245	180
A4														340	
A4	310														
FBZ 12	galv.	50	4.8	17.5	6.72	24.50	55	400	150						
	A4							435							
	galv.	70	7.6	17.5	10.64	24.5	75	350	210						
	A4							320							
A4	435														
FBZ 16	galv.	65	7.1	28.7	9.94	40.18	75	545	195						
	A4							585							
	galv.	85	12.4	31.4	17.36	43.96	115	525	255						
	A4							610							
A4	550														

For the design the complete assessment ETA-17/0624 has to be considered.<sup>1)</sup>

- The partial safety factors for material resistance as regulated in the ETA-17/0624 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-17/0624.
- For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
- Hammer drilling resp. hollow drilling
- The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of ...non-structural systems.

- For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.
- Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-17/0624.
- The given loads refer to the European Technical Assessment ETA-17/0624, issue date 08/09/2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).
- A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be ...



## LOADS

### Bolt anchor FBZ zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1)2)3)</sup>

Item	Material fixing element	Effective anchorage depth $h_{ef}$ (mm)	Installation torque $T_{inst}$ (kN)	Permissible tension load $N_{perm}^{5)}$ (kN)	Permissible shear load $V_{perm}^{5)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
FBZ 8	galv.	35 <sup>4)</sup>	20	3.8	6.9	5.32	9.66
	A4				9.2		12.88
	galv.	45		5.2	6.9	7.28	9.66
	A4				9.2		12.88
FBZ 10	galv.	40	45	4.8	12.2	6.72	17.08
	A4				15.1		21.14
	galv.	60		7.6	12.2	10.64	17.08
	A4				15.1		21.14
FBZ 12	galv.	50	60	7.1	17.5	9.94	24.5
	A4				21.4		29.96
	galv.	70		8.1	17.5	11.34	24.50
	A4				21.4		29.96
FBZ 16	galv.	65	110	10.5	31.4	14.7	43.96
	A4				32.7		45.78
	galv.	85		16.2	31.4	22.68	43.96
	A4				32.7		45.78

For the design the complete assessment ETA-17/0624 has to be considered. <sup>7)</sup>

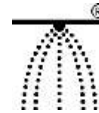
- 1) The partial safety factors for material resistance as regulated in the ETA-17/0624 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-17/0624.
- 2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
- 3) Hammer drilling resp. hollow drilling
- 4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.
- 5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.
- 6) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-17/0624.
- 7) The given loads refer to the European Technical Assessment ETA-17/0624, issue date 08/09/2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).
- 8) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \approx 0.3\text{mm}$ .

## The powerful concrete screw for top installation comfort

2 High Performance Steel Anchors



### CERTIFICATES



### ADVANTAGES

- Top flexibility with regard to load and fixture thickness due to up to three approved embedment depths.
- The special saw tooth geometry enables fast cutting into the concrete.
- No drill hole cleaning is required for installation in ceilings or floors, or use of hollow drills with suction
- The expansion-free anchorage (under-cut) ensures really low edge and axial clearances.
- The ETA approval covers applications in cracked concrete and seismic power categories C1 and C2.
- Approval-compliant adjustment allows the concrete screw to be undone twice and the fixture to be underlaid or adjusted.
- The national approval allows multiple usage for temporary anchorings (for example, formwork construction).

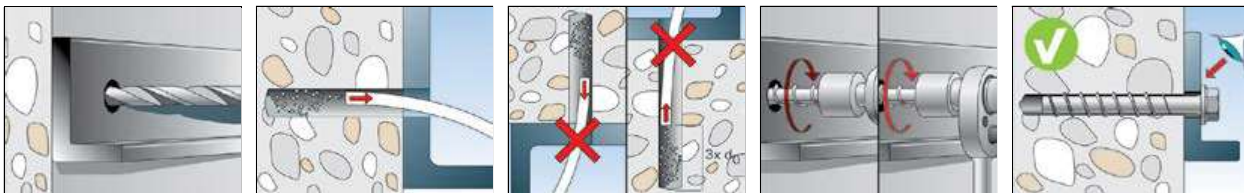
### BUILDING MATERIALS

- Approved for:**
- Concrete C20/25 to C50/60, cracked and non-cracked
- Also suitable for:**
- Concrete C12/15
  - Solid building materials
  - Masonry with a dense structure

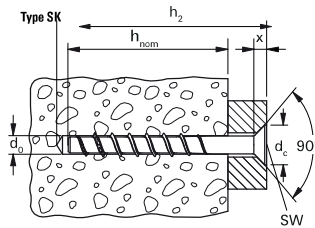
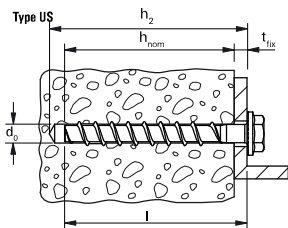
### VERSIONS

- Zinc-plated steel

### INSTALLATION



### INSTALLATION DATA - CONCRETE C20/25 - C50/60



	X [mm]	dc [mm]
ULTRACUT FBS II 8	6	20
ULTRACUT FBS II 10	7	23

Anchor Type			8	10	12	14
<b>Drill hole diameter</b>	d <sub>0</sub>	[mm]	8	10	12	14
<b>Nominal screw-in depth</b>	h <sub>nom1</sub>	[mm]	50	55	60	65
	h <sub>nom2</sub>	[mm]	-	65	75	85
	h <sub>nom3</sub>	[mm]	65	85	100	115
<b>Drill hole depth (push-through installation)</b>	h <sub>2</sub> ≥	[mm]	l + 10	l + 10	l + 10	l + 15
<b>Clearance hole diameter</b>	d <sub>i</sub>	[mm]	10,6 - 12	12,8 - 14	14,8 - 16	16,9 - 18
<b>Max. torque for installation with impact screw driver in concrete</b>	T <sub>imp,max</sub>	[Nm]	600	650	650	650
<b>Max. torque for manual installation in concrete</b>	T <sub>max</sub>	[Nm]	65	100	150	250
<b>Width across the flat</b>	SW	[mm]	13	15	17	21
<b>Drive</b>	T <sub>ork</sub>	-	T40 (SK a.US)	T50 (SK a.US)	-	-

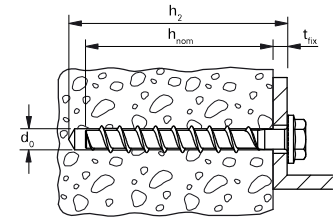
## INSTALLATION DATA - MASONRY

Building material	Compressive strength class [N/mm <sup>2</sup> ]	Size	[mm]	
			$h_{nom}$	
Solid clay brick (EN771-1)	$\geq 12$	$T_{inst}$	65	85
Solid sand-lime brick (EN771-2)	$\geq 12$	$T_{inst}$	15	15
Aerated concrete (ED771-4)	$\geq 6$	$T_{inst}$	5	10

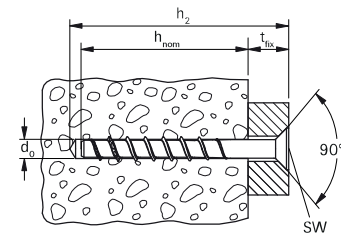
## TECHNICAL DATA



ULTRACUT FBS II US hexagon head with integral washer



ULTRACUT FBS II SK - countersunk head



Item	Art.-No.	Drill hole diameter $d_0$	Min. drill hole depth for through fixings $h_2$	Screw $d_a \times l_s$	Screw-in depth with fixture thickness $h_{nom1} / t_{fi,x}$	Screw-in depth with fixture thickness $h_{nom2} / t_{fi,x}$	Screw-in depth with fixture thickness $h_{nom3} / t_{fi,x}$	Drive $t_{fi,x}$	Sales unit
ULTRACUT FBS II 8x55 5/- US TX	536851	8	65	10 x 55	50 / 5	-	-	TX40/SW13	50
ULTRACUT FBS II 8x70 20/5 US TX	536852	8	80	10 x 70	50 / 20	-	65 / 5	TX40/SW13	50
ULTRACUT FBS II 8x80 30/15 US TX	536853	8	90	10 x 80	50 / 30	-	65 / 15	TX40/SW13	50
ULTRACUT FBS II 8x90 40/25 US TX	536854	8	100	10 x 90	50 / 40	-	65 / 25	TX40/SW13	50
ULTRACUT FBS II 8x100 50/35 US TX	536855	8	110	10 x 100	50 / 50	-	65 / 35	TX40/SW13	50
ULTRACUT FBS II 8x110 60/45 US TX	536856	8	120	10 x 110	50 / 60	-	65 / 45	TX40/SW13	50
ULTRACUT FBS II 8x130 80/65 US TX	536857	8	140	10 x 130	50 / 80	-	65 / 65	TX40/SW13	50
ULTRACUT FBS II 10x60 5/-/- US	536858	10	70	12 x 60	55 / 5	-	-	SW 15	50
ULTRACUT FBS II 10x70 15/5/- US	536859	10	80	12 x 70	55 / 15	65 / 5	-	SW 15	50
ULTRACUT FBS II 10x80 25/15/- US	536860	10	90	12 x 80	55 / 25	65 / 15	-	SW 15	50
ULTRACUT FBS II 10x90 35/25/5 US	536861	10	100	12 x 90	55 / 35	65 / 25	85 / 5	SW 15	50
ULTRACUT FBS II 10x100 45/35/15 US	536862	10	110	12 x 100	55 / 45	65 / 35	85 / 15	SW 15	50
ULTRACUT FBS II 10x120 65/55/35 US	536863	10	130	12 x 120	55 / 65	65 / 55	85 / 35	SW 15	50
ULTRACUT FBS II 10x140 85/75/55 US	536864	10	150	12 x 140	55 / 85	65 / 75	85 / 55	SW 15	50
ULTRACUT FBS II 10x160 105/95/75 US	536865	10	170	12 x 160	55 / 105	65 / 95	85 / 75	SW 15	50
ULTRACUT FBS II 10x200 145/135/115 US	536866	10	210	12 x 200	55 / 145	65 / 135	85 / 115	SW 15	20
ULTRACUT FBS II 10x230 175/165/145 US	536867	10	240	12 x 230	55 / 175	65 / 165	85 / 145	SW 15	20
ULTRACUT FBS II 10x260 205/195/175 US	536868	10	270	12 x 260	55 / 205	65 / 195	85 / 175	SW 15	20
ULTRACUT FBS II 12x70 10/-/- US	536869	12	80	14 x 70	60 / 10	-	-	SW 17	20
ULTRACUT FBS II 12x85 25/10/- US	536870	12	95	14 x 85	60 / 25	75 / 10	-	SW 17	20
ULTRACUT FBS II 12x110 50/35/10 US	536871	12	120	14 x 110	60 / 50	75 / 35	100 / 10	SW 17	20
ULTRACUT FBS II 12x130 70/55/30 US	536872	12	140	14 x 130	60 / 70	75 / 55	100 / 30	SW 17	20
ULTRACUT FBS II 12x150 90/75/50 US	536873	12	160	14 x 150	60 / 90	75 / 75	100 / 50	SW 17	20
ULTRACUT FBS II 14x75 10/-/- US	536874	14	90	16 x 75	65 / 10	-	-	SW 21	20
ULTRACUT FBS II 14x95 30/10/- US	536875	14	110	16 x 95	65 / 30	85 / 10	-	SW 21	20
ULTRACUT FBS II 14x100 35/15/- US	536876	14	115	16 x 100	65 / 35	85 / 15	-	SW 21	20
ULTRACUT FBS II 14x125 60/40/10 US	536877	14	140	16 x 125	65 / 60	85 / 40	115 / 10	SW 21	10
ULTRACUT FBS II 14x150 85/65/35 US	536878	14	165	16 x 150	65 / 85	85 / 65	115 / 35	SW 21	10
ULTRACUT FBS II 8x60 10/- SK	536880	8	70	10 x 80	50 / 30	-	-	TX40	50
ULTRACUT FBS II 8x80 30/15 SK	536881	8	90	10 x 90	50 / 40	-	65 / 15	TX40	50
ULTRACUT FBS II 8x90 40/25 SK	536882	8	100	12 x 65	55 / 10	-	65 / 25	TX50	50
ULTRACUT FBS II 10x65 10/-/- SK	536884	10	75	12 x 80	55 / 25	-	-	TX50	50
ULTRACUT FBS II 10x80 25/15/- SK	536885	10	90	12 x 95	55 / 40	65 / 15	-	TX50	50
ULTRACUT FBS II 10x95 40/30/10 SK	536886	10	105	12 x 100	55 / 45	65 / 30	85 / 10	TX50	50
ULTRACUT FBS II 10x100 45/35/15 SK	536887	10	110	12 x 120	55 / 65	65 / 35	85 / 15	TX50	50
ULTRACUT FBS II 10x120 65/55/35 SK	536888	10	130	10 x 60	50 / 10	65 / 65	85 / 35	TX40	50

Item	Art.-No.	Drill hole diameter $d_0$	Min. drill hole depth for through fixings $h_2$	Screw $d_s \times l_s$	Screw-in depth with fixture thickness $h_{nom1} / t_{fix}$	Screw-in depth with fixture thickness $h_{nom2} / t_{fix}$	Screw-in depth with fixture thickness $h_{nom3} / t_{fix}$	Drive $t_{fix}$	Sales unit
	gvz	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(pcs)
FBS II 6x30/5 P	546377	6	40	7.5 x 30	-	-	-	T30	100
FBS II 6x40/5 P	546378	6	50	7.5 x 40	-	-	-	T30	100
FBS II 6x40/5 LP	546379	6	50	7.5 x 40	-	-	-	T30	100
FBS II 6x60/5 P	546380	6	70	7.5 x 50	-	-	-	T30	100
FBS II 6x80/25 P	546381	6	90	7.5 x 80	-	-	-	T30	100
FBS II 6x30/5 SK	546382	6	40	7.5 x 30	-	-	-	T30	100
FBS II 6x40/5 SK	546383	6	50	7.5 x 40	-	-	-	T30	100
FBS II 6x60/5 SK	546384	6	70	7.5 x 50	-	-	-	T30	100
FBS II 6x80/25 SK	546385	6	90	7.5 x 80	-	-	-	T30	100
FBS II 6x100/45 SK	546386	6	110	7.5 x 100	-	-	-	T30	100
FBS II 6x120/65 SK	546387	6	130	7.5 x 120	-	-	-	T30	100
FBS II 6x140/85 SK	546388	6	150	7.5 x 140	-	-	-	T30	100
FBS II 6x160/105 SK	546389	6	170	7.5 x 160	-	-	-	T30	100
FBS II 6x40/5 US	546390	6	50	7.5 x 40	-	-	-	SW 10	100
FBS II 6x60/5 US	546391	6	70	7.5 x 50	-	-	-	SW 10	100
FBS II 6x80/25 US	546392	6	90	7.5 x 80	-	-	-	SW 10	100
FBS II 6x100/45 US	546393	6	110	7.5 x 110	55-25	-	-	SW 10	100
FBS II 6x120/65 US	546394	6	130	7.5 x 120	55-25	-	-	SW 10	100

ACCESSORIES



Item	Art.-No.	Internal diameter $D$ [mm]	Drive	Match	Sales unit [pcs]
Checking gauge FUP 10	537201	12,0	-	FBS II 10	1
Checking gauge FUP 12	537202	13,0	-	FBS II 12	1
Checking gauge FUP 14	537203	15,0	-	FBS II 14	1
Nut SW13	538578	-	1/2" / SW13	FBS II 8	1
Nut SW15	538579	-	1/2" / SW15	FBS II 10	1
Nut SW17	538580	-	1/2" / SW17	FBS II 12	1
Nut SW21	538581	-	1/2" / SW21	FBS II 14	1
Nut TX40	538575	-	1/2" - 1/4"	FBS II 8 / FBS II 8 SK	1
Nut TX50	538576	-	1/2" - 5/16"	FBS II 10 / FBS II 10 SK	1
FMB T40 Maxx Bit W 5	533159	-	TX40	FBS II 8 / FBS II 8 SK	10
FPB Profi-Bit T50 5/16"	538574	-	TX50	FBS II 10 SK	1

1) Suitable for FMB T40 Maxx Bit  
2) Suitable for FPB Profi-Bit T50 5/16"



Item	Art. No.	Internal diameter [mm]	External - $\emptyset$ $d$ [mm]	Product Match [mm]	Sales Unit [pcs]
FFD 26 x 12 x 6	538458	12,0	12,0	FBS II 8	4
FFD 30 x 14 x 6	538459	14,2	14,2	FBS II 10 / FBS II 12	4
FFD 38 x 19 x 7	538460	19,2	19,2	FBS II 14	4
Washer for FBS 10	520471	13,5	13,5	FBS II 10	50

## LOADS

### Concrete screw with hexagon head and washer FBS II US

& Counter sunk Head FBSII SK

Design & Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1)2)3)</sup>

Item	Screw in depth $h_{\text{rem}}$ (mm)	Permissible tension load $N_{\text{perm}}^{7)}$ (kN)	Permissible shear load $V_{\text{perm}}^{7)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)	Minimum spacings while reducing the load	
						Min. spacing $s_{\text{min}}^{8)}$ (mm)	Min. edge distance $c_{\text{min}}^{8)}$ (mm)
FBS II 6 <sup>5)</sup>	40	3.8	4.3	5.32	6.02	35	35
	45	4.8		6.72			
	50	5.7		7.98			
	55	6.4		8.96			
FBS II 8	50	6.1	6.1	8.54	8.54	35	35
	65	9.0	9.0	12.6	12.60		
FBS II 10	55	6.8	6.8	9.52	9.52	40	40
	65	8.8	14.0	12.32	19.60		
	85	13.5	16.6	18.9	23.24		
FBS II 12	60	7.7	15.2	10.78	21.28	50	50
	75	11.2		15.68			
	100	17.5		20.3			
FBS II 14	65	8.5	17.0	11.9	23.80	60	60
	85	13.2	22.1	18.48	30.94		
	115	21.6	29.4	30.24	41.16		

## LOADS

### Concrete screw with hexagon head and washer FBS II US

& Counter sunk Head FBSII SK

Design & Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1)2)3)10)</sup>

Item	Screw in depth $h_{\text{rem}}$ (mm)	Permissible tension load $N_{\text{perm}}^{7)}$ (kN)	Permissible shear load $V_{\text{perm}}^{7)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
	45	1.7	2.38		
	50	1.9	2.66		
	55	2.4	3.36		
FBS II 8	50	2.9	4.3	4.06	6.02
	65	5.7	9.0	7.98	12.60
FBS II 10	55	4.3	4.8	6.02	6.72
	65	5.7	12.5	7.98	17.50
	85	9.6	16.6	13.44	23.24
FBS II 12	60	5.5	11.0	7.70	15.40
	75	8.0	15.2	11.20	21.28
	100	12.5	20.3	17.50	28.42
FBS II 14	65	6.1	12.1	8.54	16.94
	85	9.4	18.8	13.16	26.32
	115	15.4	29.4	21.56	41.16

For the design the complete assessment ETA-15/0352 has to be considered. <sup>9)</sup>

1) The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{\text{ef}}$  and an edge distance  $c \geq 1.5 \cdot h_{\text{ef}}$ . Accurate data see ETA-15/0352.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

5) Diamond drilling not permitted.

6) Maximum allowable torque for installation with any tangential impact screw driver.

7) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

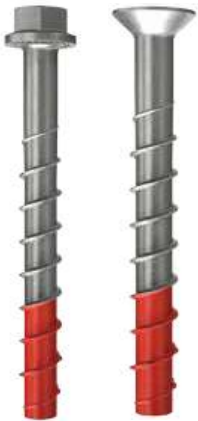
8) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

9) The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

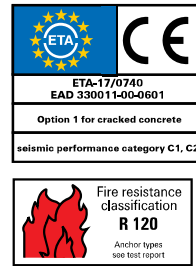
10) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0.3\text{mm}$ .

## The powerful concrete screw for top installation comfort

2 High Performance Steel Anchors



### CERTIFICATES



### ADVANTAGES

- The specially hardened red tip provides a faster and more secure installation.
- The stainless steel concrete screw guarantees a high level of corrosion resistance especially for wet rooms and external applications.
- No drill hole cleaning is required for installation in ceilings or floors, or use of hollow drills with suction.
- The expansion-free anchorage (under-cut) ensures really low edge and axial clearances.
- The ETA approval covers applications in cracked concrete and seismic power categories C1 and C2.
- After the installation, the concrete screw is fully removable and reusable.
- Underhead fluting for more hold and security during the installation.
- Different head shapes for a variety of applications.

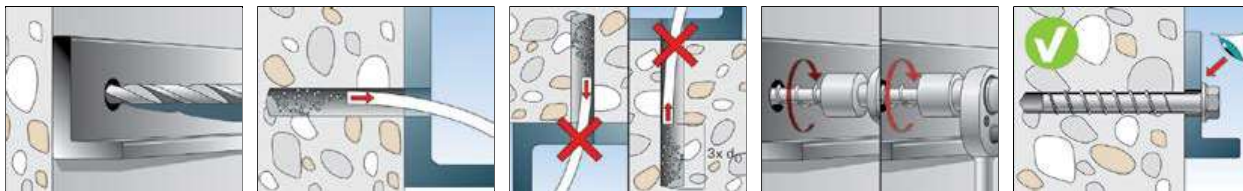
### BUILDING MATERIALS

- Approved for:**
- Concrete C20/25 to C50/60, cracked and non-cracked
- Also suitable for:**
- Concrete C12/15
  - Solid building materials
  - Solid masonry

### VERSIONS

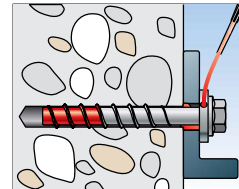
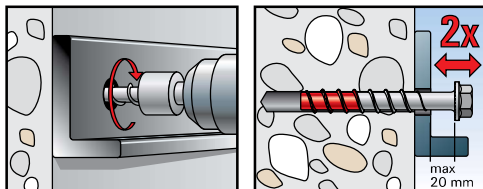
- Stainless Steel

### INSTALLATION



Fixture adjustment in accordance with the approval requirements

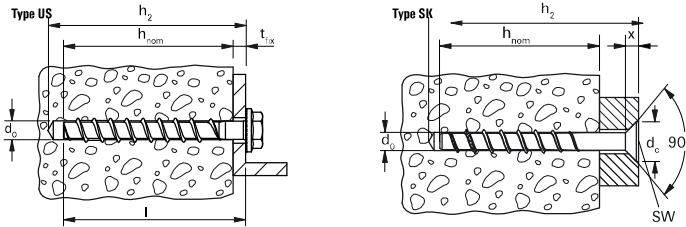
Also for seismic



### INSTALLATION DATA - MASONRY

Building material	Compressive strength class [N/mm <sup>2</sup> ]	Size	[mm]	
			h <sub>nom</sub>	T <sub>inst</sub>
Solid clay brick (EN771-1)	≥ 12		8	10
Solid sand-lime brick (EN771-2)	≥ 12		65	85
Aerated concrete (ED771-4)	≥ 6		10	10
			15	15
			5	5

## INSTALLATION DATA - CONCRETE C20/25 - C50/60



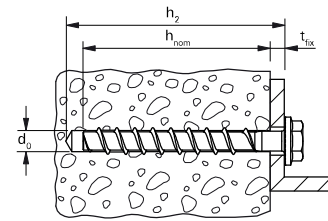
	X [mm]	d <sub>c</sub> [mm]
ULTRACUT FBS A4 II 8	6	20
ULTRACUT FBS A4 II 10	7	23

Anchor Type		8	10	12
Drill hole diameter	d <sub>0</sub> [mm]	8	10	12
Nominal screw-in depth	h <sub>nom</sub> [mm]	65	85	100
Drill hole depth (push-through installation)	h <sub>2</sub> ≥ [mm]	l + 10	l + 10	l + 10
Clearance hole diameter	d <sub>1</sub>	10,6 - 12	12,8 - 14	14,8 - 16
Max. torque for installation with impact screw driver in concrete	T <sub>imp,max</sub>	450	450	600
Width across the flat	SW	13	15	17
Drive	T <sub>drz</sub>	T40 (SK a.US)	T50 (SK)	-

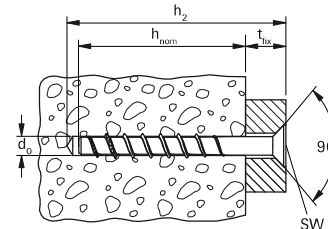
## TECHNICAL DATA



ULTRACUT FBS II A4 US - hexagon head with integral washer



ULTRACUT FBS II A4 SK - countersunk head



Item	Art. No.	Drill hole diameter d <sub>0</sub> [mm]	Min. drill hole depth for through fixings h <sub>2</sub> [mm]	Anchor length d <sub>a</sub> x l <sub>s</sub> [mm]	Screwing depth		Width across flat / Torx [SW/TX]	Sales unit [ pcs ]
					h <sub>nom</sub> [mm]	t <sub>fix</sub> [mm]		
FBS II 8x70 5/- US A4	543566	8	80	70	65	5	13	50
FBS II 8x80 15/- US A4	543567	8	90	80	65	15	13	50
FBS II 8x90 25/- US A4	543568	8	100	90	65	25	13	50
FBS II 10x90 5/- US A4	543572	10	100	90	85	5	15	50
FBS II 10x100 15/- US A4	543573	10	110	100	85	15	15	50
FBS II 10x120 35/- US A4	543574	10	130	120	85	35	15	50
FBS II 12x110 10/- US A4	543577	12	120	110	100	10	17	20
FBS II 12x130 30/- US A4	543578	12	140	130	100	30	17	20
FBS II 8x80 15/- SK A4	543580	8	90	80	65	15	T40	50
FBS II 8x90 25/- SK A4	543581	8	100	90	65	25	T40	50
FBS II 10x95 10/- SK A4	543584	10	105	95	85	10	T50	50
FBS II 10x100 15/- SK A4	543585	10	110	100	85	15	T50	50
FBS II 10x120 35/- SK A4	543586	10	130	120	85	35	T50	50

## ACCESSORIES



Filling disc FFD in A4

Item	Art. No.	Internal diameter [ mm ]	External diameter d [ mm ]	Match [ mm ]	Sales unit [ pcs ]
FFD 26 x 12 x 6 A4	541986	12	26	FBS II 8 A4	4
FFD 30 x 14 x 6 A4	541987	14	30	FBS II 10 A4 / FBS II 12 A4	4

**LOADS**

**Concrete screw with hexagon head and washer FBS II A4 US**

& counter sunk head FBSII A4 SK stainless steel A4

Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>

Item	Screw in depth $h_{nom}$ (mm)	Permissible tension load $N_{perm}^{5)}$ (kN)	Permissible shear load $V_{perm}^{5)}$ (kN)	Design Tension load $V_d$ (kN)	Design Shear Load $V_d$ (kN)	Minimum spacings while reducing the load	
						Min. spacing $s_{min}^{6)}$ (mm)	Min. edge distance $c_{min}^{6)}$ (mm)
FBS II 8x50	50	3.3	6.1	4.62	8.54	35	35
FBS II 8x65	65	6.7	9.0	9.38	12.6	35	35
FBS II 10x55	55	4.0	6.8	5.6	9.52	40	40
FBS II 10x65	65	6.7	8.8	9.38	12.32	40	40
FBS II 10x85	85	13.5	20.9	18.9	29.26	40	40
FBS II 12x60 US only	60	4.8	7.7	6.72	10.78	50	50
FBS II 12x75 US only	75	5.7	22.4	7.98	31.36	50	50
FBS II 12x100 US only	100	17.5	26.2	24.5	36.68	50	50

**LOADS**

**Concrete screw with hexagon head and washer FBS II A4 US**

& counter sunk head FBSII A4 SK stainless steel A4

Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 8)</sup>

Item	Screw in depth $h_{nom}$ (mm)	Permissible tension load $N_{perm}^{5)}$ (kN)	Permissible shear load $V_{perm}^{5)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)	Minimum spacings while reducing the load	
						Min. spacing $s_{min}^{6)}$ (mm)	Min. edge distance $c_{min}^{6)}$ (mm)
FBS II 8x50	50	1.9	4.3	2.66	6.02	35	35
FBS II 8x65	65	4.3	6.4	6.02	8.96	35	35
FBS II 10x55	55	2.1	4.8	2.94	6.72	40	40
FBS II 10x65	65	2.9	6.2	4.06	8.68	40	40
FBS II 10x85	85	7.6	19.2	10.64	26.88	40	40
FBS II 12x60	60	2.1	5.5	2.94	7.7	50	50
FBS II 12x75	75	5.2	15.9	7.28	22.26	50	50
FBS II 12x100	100	12.5	25.0	17.5	35	50	50

For the design the complete assessment ETA-17/0740 has to be considered. <sup>7)</sup>

- 1) The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-17/0740.
- 2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
- 3) Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-17/0740.
- 4) Maximum allowable torque for installation with any tangential impact screw driver.
- 5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.
- 6) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
- 7) The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).



## The push-through anchor for fixings with sophisticated design in cracked concrete



### APPROVALS



### ADVANTAGES

- The anchor construction allows for wide-ranging head shapes for fixing points with sophisticated design.
- The ideal interaction of screw shank and sleeve allows for a high shear loads. Thus fewer fixing points are required.
- The international approvals guarantee maximum safety and the best performance.
- The optimised geometry reduces the energy required for installation.
- The detachable screw connection allows for surface flush removal.

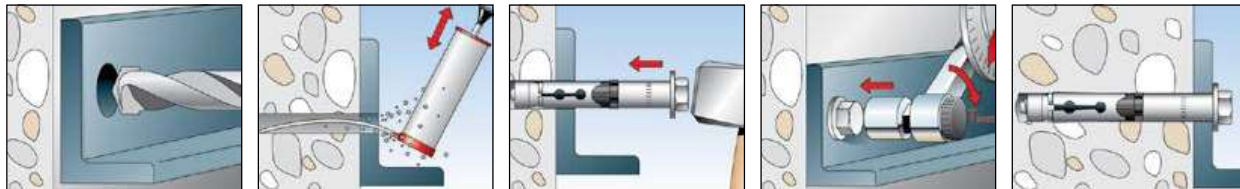
### BUILDING MATERIALS

- Approved for:**
- Concrete C20/25toC50/60
  - Cracked and non-cracked
  - Seismic conditions
- Also suitable for:**
- Concrete C12/15
  - Natural stone with dense structure

### VERSION

- Zinc-plated steel
- Stainless steel

### INSTALLATION



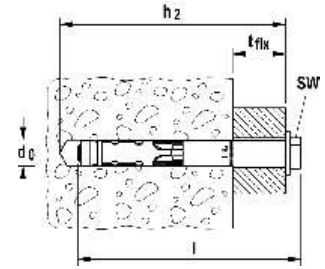
Anchor type	FH II 10 M6		FH II 12 M8		FH II 15 M10		FH II 18 M12		FH II 24 M16		FH II 28 M20		FH II 32 M24
	gvz	A4	gvz	A4	gvz	A4	gvz	A4	gvz	A4	gvz	gvz	
Diameter of thread	M 6	M 6	M 8	M 8	M 10	M 10	M 12	M 12	M 16	M 16	M 20	M 24	
Nominal drill hole diameter	do (mm)	10	10	12	12	15	15	18	18	24	24	28	32
Drill depth	h <sub>1</sub> (mm)	55	55	80	80	90	90	105	105	125	125	155	180
Effective anchorage depth	h <sub>ef</sub> (mm)	40	40	60	60	70	70	80	80	100	100	125	150
Clearance-hole in fixture to be attached	d <sub>1</sub> (mm)	12	12	14	14	17	17	20	20	26	26	31	35
Drill hole depth for through fixing	t <sub>1</sub> (mm)	t <sub>1</sub> = h <sub>1</sub> + t <sub>fix</sub>											
Required installation torque	type B	10	15	17.5	25	38	40	80	100	120	160	180	200
	type H	10	15	22.5	25	40	40	80	100	90	160	-	-
	type S	10	15	22.5	25	40	40	80	100	160	160	180	200
	type SK	10	10	22.5	25	40	40	80	100	-	-	-	-
Minimum thickness of concrete member	h <sub>min</sub> (mm)	80	80	120	120	140	140	160	160	200	200	250	300
<b>Non-cracked concrete<sup>(2)</sup></b>													
Minimum spacing	S <sub>min</sub> (mm)	40	40	60	60	70	70	80	80	100	100	120	160
For required edge distances	for c (mm)	70	70	100	100	100	100	160	160	200	200	220	360
Minimum edge distances	C <sub>min</sub> (mm)	40	40	60	60	70	70	80	80	100	100	120	180
For required spacing	for s (mm)	70	70	100	100	140	140	200	200	220	220	240	380
<b>Cracked concrete<sup>(2)</sup></b>													
Minimum spacing	S <sub>min</sub> (mm)	40	40	50	50	60	60	70	70	80	80	100	120
For required edge distances	for c (mm)	40	40	80	80	120	120	140	140	180	180	200	260
Minimum edge distances	C <sub>min</sub> (mm)	40	40	50	50	60	60	70	70	80	80	100	120
For required spacing	for s (mm)	40	40	80	80	120	120	160	160	200	200	220	280

(1) Internal hexagon. (2) Intermediate values by linear interpolation.

TECHNICAL DATA



High performance anchor **FH II-S** - with hexagonal head



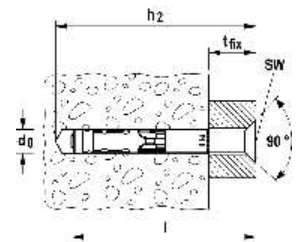
2

High Performance Steel Anchors

Item	Zinc-plated steel	Stainless steel	Drill hole diameter $d_0$ (mm)	Min. drill hole depth for through fixing $h_2$ (mm)	Anchor length $l$ (mm)	Max. fixture thickness $t_{fix}$ (mm)	Thread  M	Width across nut $\varnothing_{SW}$ (mm)	Sales unit  (pcs)
	Art-No.	Art-No.							
	gvz	A4							
FH II 10/10 S	503133	—	10	65	70	10	M 6	10	50
FH II 10/10 S	—	510923	10	65	69	10	M 6	10	50
FH II 10/25 S	503134	—	10	80	85	25	M 6	10	50
FH II 10/25 S	—	510924	10	80	84	25	M 6	10	50
FH II 10/50 S	503135	—	10	105	110	50	M 6	10	50
FH II 12/10 S	044884	—	12	90	90	10	M 8	13	50
FH II 12/10 S	—	510925	12	90	90	10	M 8	13	50
FH II 12/25 S	044885	—	12	105	105	25	M 8	13	50
FH II 12/25 S	—	510926	12	105	105	25	M 8	13	20
FH II 12/50 S	044886	—	12	130	130	50	M 8	13	25
FH II 15/10 S	044887	—	15	100	106	10	M 10	17	25
FH II 15/10 S	—	510927	15	100	107	10	M 10	17	50
FH II 15/25 S	044888	—	15	115	121	25	M 10	17	25
FH II 15/25 S	—	510928	15	115	122	25	M 10	17	20
FH II 15/50 S	044889	—	15	140	146	50	M 10	17	25
FH II 18/10 S	046847	—	18	115	118	10	M 12	19	20
FH II 18/25 S	044894	—	18	130	132	25	M 12	19	20
FH II 18/25 S	—	510929	18	130	133	25	M 12	19	10
FH II 18/50 S	044896	—	18	155	157	50	M 12	19	20
FH II 24/25 S	044898	—	24	150	160	25	M 16	24	10
FH II 24/25 S	—	502711	24	150	160	25	M 16	24	8
FH II 24/50 S	044900	—	24	175	185	50	M 16	24	10
FH II 28/30 S	044901	—	28	185	192	30	M 20	30	4
FH II 28/60 S	044902	—	28	215	222	60	M 20	30	4
FH II 32/30 S	044903	—	32	210	215	30	M 24	36	4
FH II 32/60 S	044904	—	32	240	245	60	M 24	36	4



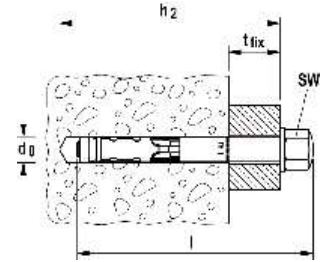
High performance anchor **FH II-SK** with countersunk head



Item	Zinc-plated steel	Stainless steel	Drill hole diameter $d_0$ (mm)	Min. drill hole depth for through fixing $h_2$ (mm)	Anchor length $l$ (mm)	Max. fixture thickness $t_{fix}$ (mm)	Thread  M	Width across nut $\varnothing_{SW}$ (mm)	Sales unit  (pcs)
	Art-No.	Art-No.							
	gvz	A4							
FH II 10/15 SK	503136	—	10	70	65	15	M 6	4	50
FH II 10/25 SK	503137	—	10	80	75	25	M 6	4	50
FH II 10/50 SK	503138	—	10	105	100	50	M 6	4	50
FH II 12/15 SK	044917	—	12	95	90	15	M 8	5	25
FH II 12/15 SK	—	510931	12	95	90	15	M 8	6	25
FH II 12/25 SK	044918	—	12	105	100	25	M 8	5	25
FH II 12/30 SK	—	510932	12	110	105	30	M 8	6	25
FH II 12/50 SK	044919	—	12	130	125	50	M 8	5	25
FH II 12/50 SK	—	510933	12	130	125	50	M 8	6	25
FH II 15/15 SK	044920	—	15	105	100	15	M 10	6	25
FH II 15/15 SK	—	510934	15	105	100	15	M 10	6	25
FH II 15/25 SK	044921	—	15	115	110	25	M 10	6	25
FH II 15/50 SK	044922	—	15	140	135	50	M 10	6	25
FH II 18/15 SK	044923	—	18	120	115	15	M 12	8	20
FH II 18/25 SK	044924	—	18	130	125	25	M 12	8	20
FH II 18/30 SK	—	510935	18	135	130	30	M 12	8	20
FH II 18/50 SK	044925	—	18	135	150	30	M 12	8	20



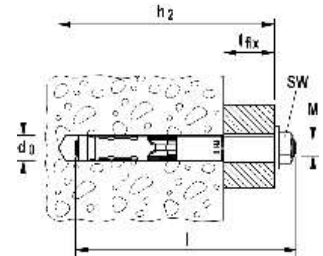
High performance anchor **FH II-H** with cap nut



Item	Zinc-plated steel Art-No.	Drill hole diameter $d_g$ (mm)	Min. drill hole depth for through fixing $h_2$ (mm)	Anchor length $l$ (mm)	Max. fixture thickness $t_{fix}$ (mm)	Thread M	Width across nut $\varnothing_{SW}$ (mm)	Sales unit (pcs)
	gvz							
FH II 10/10 H	503139	10	65	70	10	M 6	13	50
FH II 10/25 H	503140	10	80	90	25	M 6	13	50
FH II 10/50 H	503141	10	105	115	50	M 6	13	50
FH II 12/10 H	044905	12	90	100	10	M 8	17	50
FH II 12/25 H	044906	12	105	115	25	M 8	17	50
FH II 12/50 H	044907	12	130	140	50	M 8	17	25
FH II 15/10 H	044908	15	100	115	10	M 10	17	25
FH II 15/25 H	044909	15	115	130	25	M 10	17	25
FH II 15/50 H	044910	15	140	155	50	M 10	17	25
FH II 18/25 H	044915	18	130	145	25	M 12	19	20
FH II 18/50 H	044916	18	155	170	50	M 12	19	20



High performance anchor **FH II-B** with hexagon nut and threaded bolt



Item	Zinc-plated steel Art-No.	Drill hole diameter $d_g$ (mm)	Min. drill hole depth for through fixing $h_2$ (mm)	Anchor length $l$ (mm)	Max. fixture thickness $t_{fix}$ (mm)	Thread M	Width across nut $\varnothing_{SW}$ (mm)	Sales unit (pcs)
	gvz							
FH II 10/10 B	503142	10	65	70	10	M 6	10	50
FH II 10/25 B	503143	10	80	85	25	M 6	10	50
FH II 10/50 B	503144	10	105	110	50	M 6	10	50
FH II 12/10 B	048773	12	90	95	10	M 8	13	50
FH II 12/25 B	048774	12	105	110	25	M 8	13	50
FH II 12/50 B	048775	12	130	135	50	M 8	13	25
FH II 12/100 B	046832	12	180	185	100	M 8	13	25
FH II 15/10 B	048776	15	100	110	10	M 10	17	25
FH II 15/25 B	048777	15	115	125	25	M 10	17	25
FH II 15/50 B	048778	15	140	150	50	M 10	17	25
FH II 15/100 B	046835	15	190	200	100	M 10	17	20
FH II 18/25 B	048779	18	130	140	25	M 12	19	20
FH II 18/50 B	048780	18	155	165	50	M 12	19	20
FH II 18/100 B	046841	18	205	215	100	M 12	19	10
FH II 24/25 B	048886	24	150	167	25	M 16	24	10
FH II 24/50 B	048887	24	175	192	50	M 16	24	10
FH II 24/100 B	046842	24	225	242	100	M 16	24	5
FH II 28/30 B	047547	28	185	299	30	M 20	30	4
FH II 28/60 B	047548	28	215	229	60	M 20	30	4
FH II 28/100 B	506630 <sup>1)</sup>	28	255	271	100	M 20	30	4
FH II 32/30 B	047549	32	210	231	30	M 24	36	4
FH II 32/60 B	047550	32	240	261	60	M 24	36	4

**LOADS**

**High performance anchor FH II-B, FH II-S, FH II-H and FH II-SK**

zinc plated steel / stainless steel

Design & Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25)<sup>2) 3) 11)</sup>

Item	Material fixing element	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load <sup>1)</sup> $N_{perm}^{4)}$ (kN)	Permissible shear load <sup>1)</sup> $V_{perm}^{4)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
FH II 10	gvz	40	3,6	4,3	5,04	6,02
	A4					
FH II 12	gvz	60	5,7	15,4 <sup>10)</sup> / 15,9	7,98	21,56/22,26
	A4					
FH II 15	gvz	70	7,6	20,1	10,64	28,14
	A4					
FH II 18	gvz	80	11,9	24,5	16,66	34,3
	A4					
FH II 24	gvz	100	17,1	34,3	23,94	48,02
	A4					
FH II 28	gvz	125	24,0	47,9	33,6	67,06
FH II 32	gvz	150	31,5	63,0	44,1	88,2

For the design the complete assessment ETA-07/0025 has to be considered.<sup>8)</sup>

- 1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.
- 2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
- 3) Drill method Hammer drilling resp. hollow drilling.
- 4) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.
- 5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
- 6) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).
- 7) Only valid for FH II-S A4.
- 8) Only valid for FH II-B.
- 9) Only valid for FH II-S, -SK and -H.
- 10) Only valid for FH II-B and -H.
- 11) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0,3mm$ .
- 12) Only valid for FH II-S A4 and -SK A4.

**LOADS**

**High performance anchor FH II-B, FH II-S, FH II-H and FH II-SK**

zinc plated steel / stainless steel

Design & Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25)<sup>1) 2)</sup>

Item	Material fixing element	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load <sup>1)</sup> $N_{perm}^{3)}$ (kN)	Permissible shear load <sup>1)</sup> $V_{perm}^{3)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
FH II 10	gvz	40	6,1	6,1	8,54	8,54
	A4					
FH II 12	gvz	60	11,2	15,4 <sup>9)</sup> / 18,9 <sup>9)</sup>	15,68	21,56 / 26,46
	A4		9,5	16,0	13,3	22,4
FH II 15	gvz	70	14,1	23,4 <sup>9)</sup> / 28,2 <sup>9)</sup>	19,74	32,76 / 39,48
	A4			11,4 <sup>10)</sup> / 24,6 <sup>10)</sup>		15,96 / 34,44
FH II 18	gvz	80	17,2	34,4	24,08	48,16
	A4					
FH II 24	gvz	100	24,0	48,1	33,6	67,34
	A4					
FH II 28	gvz	125	33,6	67,2	47,04	94,08
FH II 32	gvz	150	44,2	88,4	61/88	123,76

For the design the complete assessment ETA-07/0025 has to be considered.

- 1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As a single anchor count e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.
- 2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible and drill method Hammer drilling resp. hollow drilling.
- 3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.
- 4) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
- 5) Only valid for FH II-S A4.
- 6) Only valid for FH II-B.
- 7) Only valid for FH II-S, -SK and -H.
- 8) Only valid for FH II-B and -H.
- 9) Only valid for FH II-S, -SK.
- 10) Only valid for FH II-SK A4.
- 11) Only valid for FH II-S A4 and -SK A4.

## The intelligent internally threaded anchor with easy mounting for fixings in cracked concrete



### APPROVALS



### ADVANTAGES

- The functional principle of the FH II-I enables fast, deformation controlled expansion with a hexagon wrench, thus ensuring top installation comfort.
- The visual setting control with a predefined gap “U” between the anchor and the concrete surface allows a compliant approved setting process without a torque wrench.
- The metric internal thread allows for the use of standard screws and threaded rods for perfect adaptation in line with the attachment.
- He FH II-I enables surface flush removal and the reuse of the undamaged fixing point, thus offering optimum flexibility.
- Furthermore, the FH II-I offers all of the benefits of the FH II.
- The material of the steel is 8.8 grade in zinc plated version.

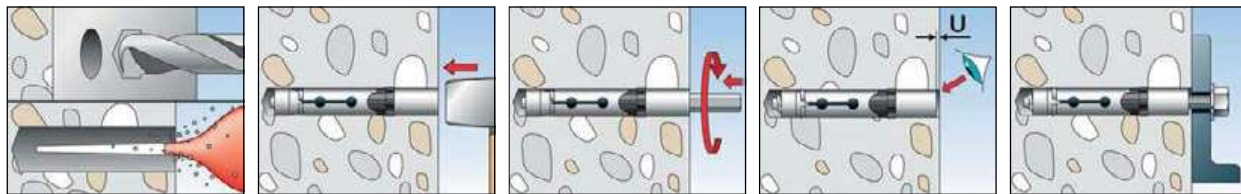
### BUILDING MATERIALS

- Approved for:**
- Concrete C20/25toC50/60
  - Cracked and non-cracked
- Also suitable for:**
- Concrete C12/15
  - Natural stone with dense structure

### VERSION

- Zinc-plated steel
- Stainless steel

### INSTALLATION

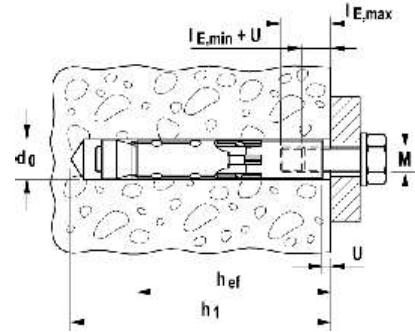


Anchor type		FH II 12 M6 I	FH II 12 M8 I	FH II 15 M10	FH II 18 M12
Diameter of thread	M (mm)	6	8	10	12
Nominal drill hole diameter	d <sub>n</sub> (mm)	12	12	15	15
Drill depth	h <sub>i</sub> (mm)	85	85	95	95
Effective anchorage depth	h <sub>ef</sub> (mm)	60	60	70	70
Clearance-hole in fixture to be attached	d <sub>i</sub> (mm)	7	9	12	14
Required installation torque of the anchor <sup>(1)</sup>	T <sub>inst</sub> (mm)	15	15	25	25
Maximum installation torque on the fixture	T <sub>max</sub> (mm)	3	8	15	20
Required gap after torquing	u (mm)	3-5			
Minimum thickness of concrete member	h <sub>min</sub> (mm)	125	125	150	150
<b>Non-cracked concrete <sup>(2)</sup></b>					
Minimum spacing	S <sub>min</sub> (mm)	60	60	70	70
For required edge distances	for c (mm)	100	100	100	100
Minimum edge distances	C <sub>min</sub> (mm)	60	60	70	70
For required spacing	for c (mm)	100	100	140	140
<b>Cracked concrete</b>					
Minimum spacing	S <sub>min</sub> (mm)	50	50	60	60
For required edge distances	for c (mm)	80	80	120	120
Minimum edge distances	C <sub>min</sub> (mm)	50	50	60	60
For required spacing	for c (mm)	80	80	120	120

(1) Only one of both requirements has to be fulfilled.

(2) Intermediate values by linear interpolation.

TECHNICAL DATA



2

High performance anchor FH II-I

High Performance Steel Anchors

Item	Zinc-plated steel Art-No. gvz	Stainless steel Art-No. A4	Drill hole diameter $d_0$ (mm)	Min. drill hole depth for pre-position installation $h_1$ (mm)	Anchor length $l$ (mm)	Thread M	Min. bolt penetration $l_{E,min}$ (mm)	Max. bolt penetration $l_{E,max}$ (mm)	Sales unit (pcs)
FH II 12/M6 I	520358	520360	12	85	77.5	M 6	11 + U	25	25
FH II 12/M8 I	520359	520361	12	85	77.5	M 8	13 + U	25	25
FH II 15/M10 I	519014	519018	15	95	90	M 10	10 + U	25	25
FH II 15/M12 I	519015	519019	15	95	90	M 12	12 + U	25	20

ACCESSORIES



Setting tool FH II-I

Item	Art-No.	Matching anchor type	Sales unit (pcs)
Setting tool FH II-I M6-M10	532780	FH II 12/M6 I, FH II 15/M 10 I	10
Setting tool FH II-I M8-M12	532781	FH II 12/M8 I, FH II 15/M 12 I	10

LOADS

High performance anchor with internal thread FH II-I

zinc plated steel / stainless steel

Design & Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25)<sup>2) 3) 6)</sup>

Item	Screw material resp. screw surface	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load <sup>3)</sup> $N_{perm}$ <sup>4)</sup> (kN)	Permissible shear load <sup>3)</sup> $V_{perm}$ <sup>4)</sup> (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
FH II 12/M 6 I	5.8	60	4.3	2.9	6.02	4.06
	8.8			4.6		6.44
	A4 - 70			3.2		4.48
FH II 12/M 8 I	5.8	60	4.3	5.1	6.02	7.14
	8.8			8.0		11.2
	A4 - 70			6.0		8.4
FH II 15/M 10 I	5.8	70	5.7	8.6	7.98	12.04
	8.8			13.1		18.34
	A4 - 70			9.2		12.88
FH II 15/M 12 I	5.8	70	5.7	12.0	7.98	16.8
	8.8			13.7		19.18
	A4 - 70					

For the design the complete assessment ETA-07/0025 has to be considered.<sup>5)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_F = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-07/0025.

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method Hammer drilling resp. hollow drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.

<sup>5)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

<sup>6)</sup> A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0.3\text{mm}$  begrenzt.

## LOADS

### High performance anchor with internal thread FH II-I

zinc plated steel / stainless steel

Design & permissible loads of single anchor in non-cracked concrete (concrete compression zone) of strength class C20/25 (~B25)<sup>2)</sup>

Item	Screw material resp. screw surface	Effective anchorage depth  $h_{ef}$ (mm)	Permissible tension load	Permissible shear load	Design Tension load	Design Shear Load
			$N_{perm}^{4)}$ (kN)	$V_{perm}^{4)}$ (kN)	$N_d$ (kN)	$V_d$ (kN)
FH II 12/ M 6 I	5.8	60	4.8	2.9	6.72	4.06
	8.8		7.6	4.6	10.64	6.44
	A4 - 70		5.3	3.2	7.42	4.48
FH II 12/ M 8 I	5.8	60	9.0	5.1	12.6	7.14
	8.8		9.5	8.0	13.3	11.2
	A4 - 70			6.0		8.4
FH II 15/ M 10 I	5.8	70	13.8	8.6	19.32	12.04
	8.8		14.1	13.1	19.74	18.34
	A4 - 70			9.2		12.88
FH II 15/ M 12 I	5.8	70		12.0		16.8
	8.8		14.1		19.74	
	A4 - 70			13.7		19.18

For the design the complete assessment ETA-07/0025 has to be considered.<sup>5)</sup>

<sup>1)</sup> The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of  $\gamma_F = 1,4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1,5 \cdot h_{ef}$ . Accurate data see ETA-07/0025..

<sup>2)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>3)</sup> Drill method Hammer drilling resp. hollow drilling.

<sup>4)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.

<sup>5)</sup> The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## The efficient fixing for flexible use in non-cracked concrete

2

High Performance Steel Anchors



Column bases

### APPROVALS



### ADVANTAGES

- The standard anchorage depth achieves the maximum load-bearing capacities. Thus fewer fixing points and smaller anchor plates are required.
- The reduced anchorage depth reduces the drill hole depth. This minimises the amount of time needed for installation while increasing flexibility.
- The long thread balances component tolerances and allows for stand-off installations, thus increasing flexibility.
- Few hammer blows and minimal torque slippage allow for a noticeably simpler installation.
- The drive-in pin protects the thread from damage, and thus ensures a faster installation and dismantling of the attachment.

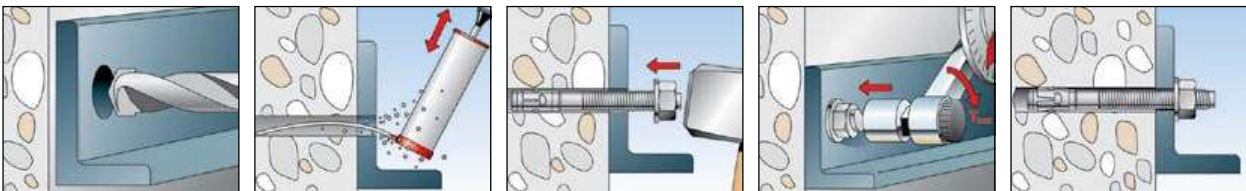
### BUILDING MATERIALS

- Approved for:**
- Concrete C20/25 to C50/60
  - Non-cracked
- Also suitable for:**
- Concrete C12/15
  - Natural stone with dense structure

### VERSION

- Zinc-plated steel
- Stainless steel
- Hot-dip galvanised

### INSTALLATION



Anchor Type	FBN II M 6		FBN II M 8		FBN II M 10		FBN II M 12		FBN II M 16		FBN II M 20		
	gvz	A4	gvz	A4	gvz	A4	gvz	A4	gvz	A4	gvz	A4	
drill hole diameter $d_o$ (mm)	6		8		10		12		16		20		
hef,min (mm)	-		30		40		50		65		80		
Minimum member thickness <sup>1)</sup> (mm)	-		100		100		100		120		160		
hef,max (mm)	30		40		50		65		80		105		
Minimum member thickness <sup>1)</sup> (mm)	100		100		100		120		160		200		
Torque moment $T_{inst}$ (Nm)	4,0		15,0	10,0	30,0	20,0	50,0	35,0	100,0	80,0	200,0	150,0	
Non-cracked Concrete	Min. spacing $S_{min}^{2)}$ (mm)	40	40	40	50 <sup>3)</sup> /40 <sup>6)</sup>	50	50 <sup>3)</sup> /70 <sup>6)</sup>	70	70	90	90 <sup>3)</sup> /120 <sup>6)</sup>	120	140 <sup>3)</sup> /120 <sup>6)</sup>
	Min. edge distance $C_{min}^{2)}$ (mm)	40	40	40	45	80 <sup>3)</sup> /50 <sup>4)</sup>	80 <sup>3)</sup> /55 <sup>4)</sup>	100 <sup>3)</sup> /70 <sup>4)</sup>	100 <sup>3)</sup> /70 <sup>4)</sup>	120 <sup>3)</sup> /90 <sup>4)</sup>	120 <sup>3)</sup> /80 <sup>4)</sup>	120	120

(1) According to approval the minimum member thickness ( $t_{min} \geq 2 \times hef$ ) can be reduced under specific conditions.  
 (2) Minimum possible axial spacings resp. edge distance while reducing the permissible load for the minimum member thickness ( $t_{min} \geq 2 \times hef$ ). The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according to approval.  
 (3) Min. edge distance for  $hef_{min}$ .  
 (4) Min. edge distance for  $hef_{max}$ .  
 (5) Min. spacing for  $hef_{min}$ .  
 (6) Min. spacing for  $hef_{max}$ .





Item	Zinc-plated steel Art-No. gvz	Stainless steel Art-No. A4	Hot-dip galvanised steel Art-No. C	Letter code marking	Drill hole diameter $d_f$ (mm)	Anchor length $l$ (mm)	Drill hole depth for pre-position fixing Stand/Red. $h_1$ (mm)	Drill hole depth for through fixing $h_2$ (mm)	Max. usable length hef stand/hef,red $t_{br}$ (mm)	Thread $\emptyset$ length (mm)	Width across nut $\emptyset$ SW (mm)	Sales unit (pcs)
FBN II 16/15 K	045571	508745	507597	C	16	120	89	104	-/15	M 16 x 64	24	10
FBN II 16/25 K	045572	—	507597	E	16	130	89	114	-/25	M 16 x 74	24	10
FBN II 20/10 K	045577	—	—	B	20	142	110	120	-/10	M 20 x 50	30	10

**LOADS**

**Bolt anchor FBN II zinc plated steel / stainless steel A4 / hot dip galvanised steel**

Design & Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25)<sup>2) 3)</sup>

Item	Material fixing element	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load $N_{perm}^{6)}$ (kN)	Permissible shear load $V_{perm}^{6)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
FBN II 8 <sup>5)</sup>	galv.	30 <sup>4)</sup>	2.9	7.1	4.06	9.94
	A4					
	fvz					
FBN II 8	galv.	40	6.1	7.6	8.54	10.64
	A4			7.3		10.22
	fvz			7.5		10.64
FBN II 8 <sup>5)</sup>	galv.	40	6.1	12.0	8.54	16.80
	A4			11.6		16.24
	fvz			12.0		16.80
FBN II 10 <sup>5)</sup>	galv.	40	6.1	12.0	8.54	16.80
	A4			11.6		16.24
	fvz			12.0		16.80
FBN II 10	galv.	50	8.5	12.0	11.90	16.80
	A4			11.6		16.24
	fvz			12.0		16.80
FBN II 10 <sup>5)</sup>	galv.	50	8.5	12.0	11.90	16.80
	A4			17.9		25.06
	fvz			15.7		21.98
FBN II 12 <sup>5)</sup>	galv.	50	8.5	17.9	11.90	25.06
	A4			15.7		21.98
	fvz			17.9		25.06
FBN II 12	galv.	65	12.6	17.9	17.64	25.06
	A4			15.7		21.98
	fvz			17.9		25.06
FBN II 12 <sup>5)</sup>	galv.	65	12.6	17.9	17.64	25.06
	A4			15.7		21.98
	fvz			17.9		25.06
FBN II 16 <sup>5)</sup>	galv.	65	12.6	29.0	17.64	40.60
	A4			31.5		44.10
	fvz			29.1		40.74
FBN II 16	galv.	80	17.2	31.5	24.08	44.10
	A4			29.1		40.74
	fvz			31.5		44.10
FBN II 16 <sup>5)</sup>	galv.	80	17.2	38.3	24.08	53.62
	A4			39.6		55.44
	fvz			38.3		53.62
FBN II 20 <sup>5)</sup>	galv.	80	17.2	38.3	24.08	53.62
	A4			39.6		55.44
	fvz			38.3		53.62
FBN II 20	galv.	105	25.9	38.3	36.26	53.62
	A4			49.1		68.74
	fvz			38.3		53.62
FBN II 20 <sup>5)</sup>	galv.	105	25.9	38.3	36.26	53.62
	A4			49.1		68.74
	fvz			38.3		53.62

For the design the complete assessment ETA-07/0211 has to be considered.<sup>8)</sup>

- 1) The partial safety factors for material resistance as regulated in the ETA-07/0211 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-07/0211.
- 2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
- 3) Hammer drilling resp. hollow drilling
- 4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.
- 5) Hollow drilling is not permitted for this size.
- 6) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.
- 7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
- 8) The given loads refer to the European Technical Assessment ETA-07/0211, issue date 19/05/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## Cost efficient fixing with ETA approval for non-cracked concrete



2

### ADVANTAGES

- The standard anchorage depth achieves the maximum load-bearing capacities. Thus fewer fixing points and smaller anchor plates are required.
- Few hammer blows and minimal torque slippage, installation is a simple process.
- The drive-in pin protects the thread from damage, and thus ensures a faster installation and dismantling of the attachment.

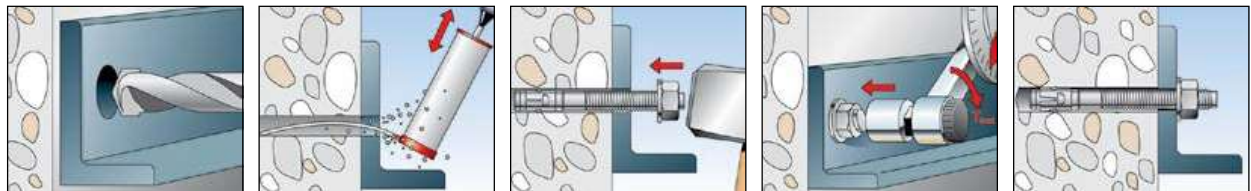
### BUILDING MATERIALS

- Approved for:**
- Concrete C20/25 to C50/60
  - Non-cracked
- Also suitable for:**
- Concrete C12/15
  - Natural stone with dense structure

### VERSION

- Zinc-plated steel
- Stainless steel

### INSTALLATION



Anchor Type	FXA M 8		FXA M 10		FXA M 12		FXA M 16		
	gvz	A4	gvz	A4	gvz	A4	gvz	A4	
drill hole diameter $d_o$ (mm)	8		10		12		16		
Effective anchorage depth $h_{ef}$ (mm)	40		50		65		80		
Minimum member thickness <sup>(1)</sup> $h_{min}$ (mm)	100		100		120		160		
Torque moment $T_{inst}$ (Nm)	15	10	30	20	50	35	100	80	
Non-cracked Concrete	Min. spacing $S_{min}^{(2)}$ (mm)	40	40	70	70	70	70	120	120
	Min. edge distance $C_{min}^{(2)}$ (mm)	45	45	55	55	70	70	90	90

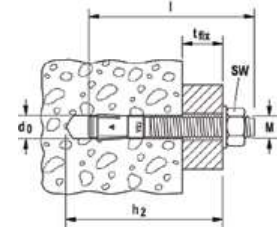
(1) According approval the minimum member thickness ( $h_{min} \geq 2 \times h_{ef}$ ) can be reduced under specific conditions.  
 (2) Minimum possible axial spacings resp. edge distance while reducing the permissible load for the minimum member thickness ( $h_{min} \geq 2 \times h_{ef}$ ). The combination of the given min. spacing and min. edge distance is not possible. One of them has to be increased according approval.

High Performance Steel Anchors

**TECHNICAL DATA**



Through bolt **FXA**



2

High Performance Steel Anchors

Item	Zinc-plated steel	Stainless steel	Drill hole diameter	Anchor length	Min. drill hole depth for through fixings	Max. usable length	Thread	Width across nut	Sales unit
	Art-No.	Art-No.	d <sub>0</sub> (mm)	l (mm)	h <sub>2</sub> (mm)	t <sub>fix</sub> (mm)	Ø length (mm)	SW (mm)	(pcs)
	gvz	A4							
FXA 8/5	523129	-	8	66	61	5	M 8 x 34	13	50
FXA 8/10	523131	523270	8	71	66	10	M 8 x 39	13	50
FXA 8/30	523132	523271	8	91	86	30	M 8 x 59	13	50
FXA 8/50	523222	523272	8	111	106	50	M 8 x 79	13	50
FXA 10/10	523133	523273	10	86	78	10	M 10 x 46	17	50
FXA 10/20	523134	523274	10	96	88	20	M 10 x 56	17	50
FXA 10/30	523223	-	10	106	98	30	M 10 x 66	17	50
FXA 10/50	523135	523276	10	126	118	50	M 10 x 86	17	20
FXA 10/100	523136	-	10	176	168	100	M 10 x 136	17	20
FXA 12/10	523137	523277	12	106	95	10	M 12 x 59	19	20
FXA 12/20	523138	523278	12	116	105	20	M 12 x 69	19	20
FXA 12/30	523139	-	12	126	115	30	M 12 x 79	19	20
FXA 12/50	523141	523304	12	146	135	50	M 12 x 99	19	20
FXA 12/100	523142	-	12	196	185	100	M 12 x 149	19	20
FXA 16/25	523143	523305	16	145	129	25	M 16 x 89	24	10
FXA 16/50	523144	523306	16	170	154	50	M 16 x 105	24	10
FXA 16/100	523145	-	16	220	204	100	M 16 x 164	24	10

**LOADS**

**Bolt anchor FXA zinc plated steel / stainless steel A4**

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) <sup>1) 2) 3)</sup>

Item	Material fixing element	Effective anchorage depth	Permissible tension load	Permissible shear load	Design Tension load	Design Shear Load
		h <sub>ef</sub> (mm)	N <sub>perm</sub> <sup>4)</sup> (kN)	V <sub>perm</sub> <sup>4)</sup> (kN)	N <sub>d</sub> (kN)	V <sub>d</sub> (kN)
FXA 8	galv.	40	4.8	6.1	6.72	8.54
	A4					
FXA 10	galv.	50	6.3	8.5	8.82	11.9
	A4					
FXA 12	galv.	65	9.9	14.3	13.86	20.02
	A4					
FXA 16	galv.	80	16.7	26.9	23.38	37.66
	A4					

For the design the complete assessment ETA-13/0772 has to be considered. <sup>4)</sup>

1) The partial safety factors for material resistance as regulated in the ETA-13/0772 as well as a partial safety factor for load actions of γ<sub>L</sub> = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1.5·hef. Accurate data see ETA-13/0772.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

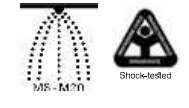
6) The given loads refer to the European Technical Assessment ETA-13/0772, issue date 27/09/2017. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

## The fixing system with the highest safety in cracked concrete



Installations in tunnels

### APPROVALS



### ADVANTAGES

- The special ZYKON undercut technology allows for a positive fit connection and ensures maximum safety, even in large cracks.
- The almost expansion-free installation of the anchor allows small edge distances and axial spacing, and thereby enables flexible use.
- The FZUB special drill allows for a fast installation by creating the undercut without having to change tools.
- The drill hole geometry allows for a very low setting energy, thus reducing the energy required for installation.
- The ideal interaction of threaded bolts and sleeve with FZA-D allows for a high shear load and therefore fewer fixing points.
- The material of the steel is 8.8 grade in zinc plated version.

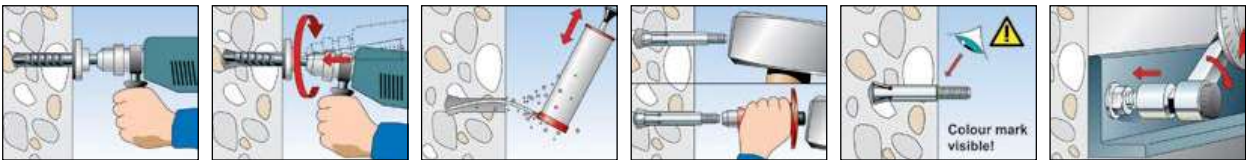
### BUILDING MATERIALS

- Approved for:**
- Concrete C20/25toC50/60
  - Cracked and non-cracked
- Also suitable for:**
- Concrete C12/15
  - Natural stone with dense structure

### VERSION

- Zinc-plated steel
- Stainless steel
- High corrosion-resistant steel

### INSTALLATION



### ANCHOR INSTALLATION DATA

#### Zykon Bolt anchor FZA

Anchor type	FZA 10x40 M 6	FZA 12x40 M 8	FZA 14x40 M 10	FZA 12x50 M 8	FZA 14x60 M 10	FZA 18x80 M 12	FZA 22x100 M 16	FZA 22x125 M 16
Diameter of thread	M 6	M 8	M 10	M 8	M 10	M 12	M 16	M 16
Nominal drill hole diameter	$d_0$ (mm)	10	12	14	12	14	18	22
Drill depth	$h_0$ (mm)	43	43	43	54	63	83	103
Effective anchorage depth	$h_{ef}$ (mm)	40	40	40	50	60	80	100
Clearance-hole in fixture to be attached	$d_f$ (mm)	$\leq 7$	$\leq 9$	$\leq 12$	$\leq 9$	$\leq 12$	$\leq 14$	$\leq 18$
Wrench size	SW (mm)	10	13	17	13	17	19	24
Required torque	$T_{inst}$ (Nm)	8,5	20	40	20	40	60	100
Minimum thickness of concrete member	$h_{min}$ (mm)	100	100	100	110	130	160	200
Minimum spacing	$S_{min}$ (mm)	40	40	70	50	60	80	100
Minimum edge distances	$C_{min}$ (mm)	35	40	70	45	55	70	100

#### Zykon Through anchor FZA-D

Anchor type	FZA 12x50 M 8 D	FZA 12x60 M 8 D	FZA 12x80 M 8 D	FZA 14x80 M 10 D	FZA 14x100 M 10 D	FZA 18x100 M 12 D	FZA 18x130 M 12 D	FZA 22x125 M 16 D
Diameter of thread	M 8	M 8	M 8	M 10	M 10	M 12	M 12	M 16
Nominal drill hole diameter	$d_0$ (mm)	12	12	12	14	14	18	22
Drill depth	$h_0$ (mm)	43	53	53	63	63	83	105
Effective anchorage depth	$h_{ef}$ (mm)	40	50	50	60	60	80	100
Clearance-hole in fixture to be attached	$d_f$ (mm)	$\leq 14$	$\leq 14$	$\leq 14$	$\leq 16$	$\leq 16$	$\leq 20$	$\leq 24$
Wrench size	SW (mm)	13	13	13	17	17	19	24
Required torque	$T_{inst}$ (Nm)	20	20	20	40	40	60	100
Minimum thickness of concrete member	$h_{min}$ (mm)	100	110	110	130	130	160	200
Minimum spacing	$S_{min}$ (mm)	40	50	50	60	60	80	100
Minimum edge distances	$C_{min}$ (mm)	35	45	45	55	55	70	100



## ZYKON Internally-threaded anchor FZA-I

2 High Performance Steel Anchors

Anchor type		FZA 12x40	FZA 12x50	FZA 14x60	FZA 18x80	FZA 22x100	FZA 22x125
		M 6 I	M 6 I	M 8 I	M 10 I	M 12 I	M 12 I
		gvz   A4	gvz   A4	gvz   A4	gvz   A4	gvz   A4	gvz   A4
Diameter of thread		M 6	M 6	M 8	M 10	M 12	M 12
Nominal drill hole diameter	$d_b$ (mm)	12	12	14	18	22	22
Drill depth	$h_b$ (mm)	43	53	63	83	103	127
Effective anchorage depth	$h_{ef}$ (mm)	40	50	60	80	100	125
Clearance-hole in fixture to be attached	$d_i$ (mm)	≤ 7	≤ 7	≤ 9	≤ 12	≤ 14	≤ 14
Screw penetration depth	$e_{min}/e_{max}$ (mm)	8/13	8/13	11/17	13/21	15/25	15/25
Required torque	$T_{inst}$ (Nm)	8,5	8,5	15	30	60	60
Gap	U (mm)	0-4,0	0-4,0	0-4,0	0-4,5	0-4,5	0-4,5
Minimum thickness of concrete member	$h_{min}$ (mm)	100	100	130	160	200	250
Minimum spacing	$S_{min}$ (mm)	40	50	60	80	100	125
Minimum edge distances	$C_{min}$ (mm)	35	45	55	70	10	125

Intermediate values by linear interpolation.

### ACCESSORIES

Drilling and setting tools	Item	Art-No.	Suitable for fixing types Materials: zinc plated, passivated steel, stainless steel A4 and high corrosion resistant steel 1.4529			Shear (pcs)
			Bolt anchor	Push-through anchor	Internal thread anchor	
 Drill bit FZUB	FZUB 10 x 40	060622	FZA 10 x 40 M 6	—	—	1
	FZUB 12 x 40	060623	FZA 12 x 40 M 8	—	FZA 12 x 40 M 6 I	1
	FZUB 12 x 50	060627	FZA 12 x 50 M 8	FZA 12 x 50 M 8 D/10	FZA 12 x 50 M 6 I	1
	FZUB 12 x 60	060625	—	FZA 12 x 60 M 8 D/10	—	1
	FZUB 12 x 80	060626	—	FZA 12 x 80 M 8 D/30	—	1
	FZUB 14 x 40	060624	FZA 14 x 40 M 10	—	—	1
	FZUB 14 x 60	060628	FZA 14 x 60 M 10	—	FZA 14 x 60 M 8 I	1
	FZUB 14 x 80	060629	—	FZA 14 x 80 M 10 D/20	—	1
	FZUB 14 x 100	060630	—	FZA 14 x 100 M 10 D/40	—	1
	FZUB 18 x 80	060634	FZA 18 x 80 M 12	—	FZA 18 x 80 M 10 I	1
	FZUB 18 x 100	060632	—	FZA 18 x 100 M 12 D/20	—	1
	FZUB 18 x 130	060633	—	FZA 18 x 130 M 12 D/50	—	1
	FZUB 22 x 100	060636	FZA 22 x 100 M 16	—	FZA 22 x 100 M 12 I	1
	FZUB 22 x 125	060638	FZA 22 x 125 M 16	FZA 22 x 125 M 16 D/25	FZA 22 x 125 M 12 I	1
 Setting tool FZE plus	FZE 10 plus <sup>1)</sup>	044637	FZA 10 x ... M 6	—	—	1
	FZE 12 plus	044638	FZA 12 x ... M 8	FZA 12 x ... M 8 D	FZA 12 x ... M 6 I	1
	FZE 14 plus	044639	FZA 14 x ... M 10	FZA 14 x ... M 10 D	FZA 14 x ... M 8 I	1
	FZE 18 plus	044640	FZA 18 x ... M 12	FZA 18 x ... M 12 D	FZA 18 x ... M 10 I	1
	FZE 22 plus	044641	FZA 22 x ... M 16	FZA 22 x ... M 16 D	FZA 22 x ... M 12 I	1

(1) Without centering pin.

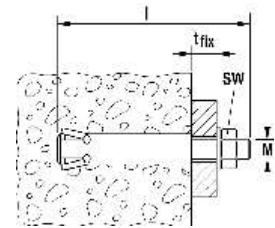
### TECHNICAL DATA



ZYKON Bolt anchor FZA



Zykon anchor for fixing step irons FZA ST A4



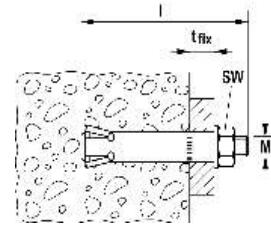
Item	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Required drill bit FZUB	Required setting tool FZE plus	Bolt length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art-No. gvz	Art-No. A4	Art-No. C			l (mm)	t <sub>fix</sub> (mm)	M	○SW (mm)	(pcs)
FZA 10 x 40 M6/10	060712	060772	096214 <sup>1)</sup>	10 x 40	FZE 10 plus	60	10	M 6	10	25
FZA 10 x 40 M6/35	—	—	096361 <sup>1)</sup>	10 x 40	FZE 10 plus	85	35	M 6	10	25
FZA 12 x 40 M 8/15	060715	060775	096215 <sup>1)</sup>	12 x 40	FZE 12 plus	69	15	M 8	13	25
FZA 12 x 50 M 8/15	060716	060776	096227 <sup>1)</sup>	12 x 50	FZE 12 plus	79	15	M 8	13	20
FZA 12 x 50 M 8/50	—	060774	096362 <sup>1)</sup>	12 x 50	FZE 12 plus	114	50	M 8	13	20
FZA 14 x 40 M10/25	060718	—	—	14 x 40	FZE 14 plus	79	25	M 10	17	25
FZA 14 x 40 M10/25	—	060778	096228 <sup>1)</sup>	14 x 40	FZE 14 plus	79	25	M 10	17	20
FZA 14 x 60 M10/25	060719	060779	096216 <sup>1)</sup>	14 x 60	FZE 14 plus	102	25	M 10	17	10
FZA 14 x 60 M10/50	—	060766	096358 <sup>1)</sup>	14 x 60	FZE 14 plus	126	50	M 10	17	10
FZA 18 x 80 M12/25	060721	060781	096315 <sup>1)</sup>	18 x 80	FZE 18 plus	126	25	M 12	19	10
FZA 18 x 80 M12/55	—	060767	096359 <sup>1)</sup>	18 x 80	FZE 18 plus	156	55	M 12	19	10
FZA 22 x 100 M16/25	—	—	033800 <sup>1)</sup>	22 x 100	FZE 22 plus	151	25	M 16	24	10
FZA 22 x 100 M16/30	—	—	024523 <sup>1)</sup>	22 x 100	FZE 22 plus	156	30	M 16	24	10
FZA 22 x 100 M16/60	060724	060782	096364 <sup>1)</sup>	22 x 100	FZE 22 plus	184	60	M 16	24	10
FZA 22 x 125 M16/60	060725	060768	096360 <sup>1)</sup>	22 x 125	FZE 22 plus	209	60	M 16	24	6
FZA 14 x 40 ST A4	—	060686 <sup>2)</sup>	—	14 x 40	FZE 14 plus	—	30	M 10	16	20
FZA 14 x 60 ST A4	—	060687 <sup>2)</sup>	—	14 x 60	FZE 14 plus	—	30	M 10	16	20

(1) Delivery time on request.

(2) According to DIN 1211GS/1212GS.



ZYKON Through anchor **FZA-D**

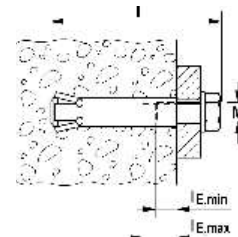


Item	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Required drill bit FZUB	Required setting tool FZE plus	Bolt length l (mm)	Max. fixture thickness t <sub>fix</sub> (mm)	Thread M	Width across nut SW (mm)	Sales unit (pcs)
	Art-No.	Art-No.	Art-No.							
	gvz	A4	C							
FZA 12 x 50 M 8 D/10	060652	060664	—	12 x 50	FZE 12 plus	69	10	M 8	13	25
FZA 12 x 50 M 8 D/10	—	—	096319 <sup>1)</sup>	12 x 50	FZE 12 plus	69	10	M 8	13	20
FZA 12 x 60 M 8 D/10	060653	060665	—	12 x 60	FZE 12 plus	79	10	M 8	13	25
FZA 12 x 80 M 8 D/30	060654	060666	—	12 x 80	FZE 12 plus	99	30	M 8	13	25
FZA 12 x 80 M 8 D/30	—	—	096354 <sup>1)</sup>	12 x 80	FZE 12 plus	99	30	M 8	13	20
FZA 14 x 80 M 10 D/20	060657	060669	096355 <sup>1)</sup>	12 x 80	FZE 14 plus	102	20	M 10	17	10
FZA 14 x 100 M 8 D/30	060658	060670	—	14 x 100	FZE 14 plus	126	40	M 10	17	10
FZA 18 x 100 M 12 D/20	060684	060672	096356 <sup>1)</sup>	18 x 100	FZE 18 plus	126	20	M 12	19	10
FZA 18 x 130 M 12 D/50	060685	060673	096357 <sup>1)</sup>	18 x 130	FZE 18 plus	156	50	M 12	19	10
FZA 22 x 125 M 16 D/25	060663	060675	—	22 x 125	FZE 22 plus	156	25	M 16	24	10

(1) Delivery time on request.



ZYKON Internally-threaded anchor **FZA-I**



Item	Zinc-plated steel	Stainless steel	Required drill bit FZUB	Required setting tool FZE plus	Internal thread M	Min. bolt penetration l <sub>E,min</sub> (mm)	Max. bolt penetration l <sub>E,max</sub> (mm)	Sales unit (pcs)
	Art-No.	Art-No.						
	gvz	A4						
FZA 12 x 40 M 6 I	060758	060783	12 x 40	FZE 12 plus	M 6	8	13	25
FZA 12 x 50 M 6 I	—	060784	12 x 50	FZE 12 plus	M 6	8	13	25
FZA 14 x 60 M 8 I	060760	060786	14 x 60	FZE 14 plus	M 8	11	17	20
FZA 18 x 80 M 10 I	060761	060787	18 x 80	FZE 18 plus	M 10	13	21	10
FZA 22 x 100 M 12 I	060763	060788	22 x 100	FZE 22 plus	M 12	15	25	10
FZA 22 x 125 M 12 I	060769	060770	22 x 125	FZE 22 plus	M 12	15	25	10

LOADS

Zykon Bolt anchor FZA

zinc plated steel / stainless steel A4 / high corrosion resistant steel C / hot dip galvanised steel

Design & Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) <sup>1) 2) 3) 7)</sup>

2

High Performance Steel Anchors

Item	Material fixing element	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load $N_{perm}^{4)}$ (kN)	Permissible shear load $V_{perm}^{4)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
FZA 10x40 M6	galv.	40	2.4	4.6	3.36	6.44
	A4			3.2		4.48
	C			4.0		5.60
FZA 12x40 M8	galv.	40	2.4	5.6	3.36	7.84
	A4					
	C					
	fvz					
FZA 12x50 M8	galv.	50	4.3	7.9	6.02	11.06
	A4			5.9		8.26
	C			7.3		10.22
	fvz			7.9		11.06
FZA 14x40 M10	galv.	40	2.4	5.6	3.36	7.84
	A4					
	C					
	fvz					
FZA 14x60 M10	galv.	60	5.7	13.3	7.98	18.62
	A4			9.3		13.02
	C			11.6		16.24
	fvz			13.3		18.62
FZA 18x80 M12	galv.	80	9.5	19.3	13.3	27.02
	A4			13.5		18.90
	C			16.9		23.66
	fvz			19.3		27.02
FZA 22x100 M16	galv.	100	17.1	34.3	23.94	48.02
	A4			25.2		35.28
	C			31.4		43.96
	fvz			34.3		48.02
FZA 22x125 M16	galv.	125	19.0	35.9	26.60	50.26
	A4			25.2		35.28
	C			31.4		43.96
FZA 12X50 M8 D	galv.	40	2.4	5.6	3.36	7.84
	A4					
	C					
FZA 12X60 M8 D	galv.	50	4.3	7.9	6.02	11.06
	A4			5.9		8.26
	C			7.3		10.22
FZA 14X80 M10 D	galv.	60	5.7	13.3	7.98	18.62
	A4			9.3		13.02
	C			11.6		16.24
FZA 18X100 M12 D	galv.	80	9.5	19.3	13.30	27.02
	A4			13.5		18.90
	C			16.9		23.66
FZA 22X125 M16 D	galv.	100	17.1	34.3	23.94	48.02
	A4			25.2		35.28
FZA 12x40 M6 I	8.8	40	2.4	4.1	3.36	5.74
	A4-70			3.2		4.48
FZA 12X50 M6 I	8.8	50	4.3	3.2	6.02	4.48
	A4-70			5.4		7.56
FZA 14x60 M8 I	8.8	60	5.7	4.3	7.98	6.02
	A4-70			5.6		7.84
FZA 18x80 M10 I	8.8	80	9.5	5.6	13.30	7.84
	A4-70		9.0	5.4	12.60	7.56
FZA 22x100 M12 I	8.8	100	17.1	13.2	23.94	18.48
	A4-70			12.7		17.78
FZA 22x125 M12 I	8.8	125	19.0	13.2	26.60	18.48
	A4-70			12.7		17.78

For the design the complete assessment ETA-98/0004 has to be considered. <sup>6)</sup>

- The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-98/0004.
- For higher concrete strength classes up to C50/60 higher permissible loads may be possible.
- Drill method hammer drilling.
- For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.
- Minimum possible axial spacings resp. edge distance while reducing the permissible load.
- The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).
- A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0.3\text{mm}$ .



## LOADS

### Zykon Bolt anchor FZA

zinc plated steel / stainless steel A4 / high corrosion resistant steel C / hot dip galvanised steel

Design & Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25)<sup>2)3)</sup>

Item	Material fixing element	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load $N_{perm}^{(4)}$ (kN)	Permissible tension load $N_{perm}^{(4)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
FZA 10x40 M6	galv.	40	3,6	4,6	5,04	6,44
	A4			3,2		4,48
	C			4,0		5,6
FZA 12x40 M8	galv.	40	3,6	7,9	5,04	11,06
	A4			5,9		8,26
	C			7,3		10,22
	fvz			7,9		11,06
FZA 12x50 M8	galv.	50	5,7	8,4	7,98	11,76
	A4			5,9		8,26
	C			7,3		10,22
	fvz			8,4		11,76
FZA 14x40 M10	galv.	40	3,6	7,9	5,04	11,06
	A4					
	C					
	fvz					
FZA 14x60 M10	galv.	60	9,5	13,3	13,30	18,62
	A4			9,3		13,02
	C			11,6		16,24
	fvz			13,3		18,62
FZA 18x80 M12	galv.	80	14,3	19,3	20,02	27,02
	A4			13,5		18,9
	C			16,9		23,66
	fvz			19,3		27,02
FZA 22x100 M16	galv.	100	19,0	35,9	26,60	50,26
	A4			25,2		35,28
	C			31,4		43,96
	fvz			35,9		50,26
FZA 22x125 M16	galv.	125	19,0	35,9	26,60	50,26
	A4			25,2		35,28
	C			31,4		43,96
	fvz			35,9		50,26
FZA 12x50 M8 D	galv.	40	3,7	7,9	5,04	11,06
	A4			5,9		8,26
	C			7,3		10,22
FZA 12x60 M8 D	galv.	50	5,7	8,4	7,98	11,76
	A4			5,9		8,26
	C			7,3		10,22
FZA 14x80 M10 D	galv.	60	9,5	13,3	13,30	18,62
	A4			9,3		13,02
	C			11,6		16,24
FZA 18x100 M12 D	galv.	80	14,3	19,3	20,02	27,02
	A4			13,5		18,9
	C			16,9		23,66
FZA 22x125 M16 D	galv.	100	19,0	35,9	26,60	50,26
	A4			25,2		35,28
FZA 12x40 M6 I	8,8	40	3,6	4,1	5,04	5,74
	A4-70			3,2		4,48
FZA 12x50 M6 I	8,8	50	5,4	3,2	7,56	4,48
	A4-70			9,3		5,4
FZA 14x60 M8 I	8,8	60	7,1	4,3	9,94	6,02
	A4-70			9,6		5,6
FZA 18x80 M10 I	8,8	80	9,0	5,4	12,60	7,84
	A4-70			9,0		5,4
FZA 22x100 M12 I	8,8	100	19,0	13,2	26,60	18,48
	A4-70			12,7		17,78
FZA 22x125 M12 I	8,8	125	19,0	13,2	26,60	18,48
	A4-70			12,7		17,78

For the design the complete assessment ETA-98/0004 has to be considered.

1) The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-98/0004.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

6) The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The internally threaded anchor with low anchoring depth for individual fixings in cracked concrete

2 High Performance Steel Anchors



APPROVALS



ADVANTAGES

- The combination of hammerset and ZYKON undercut anchor allows for individual fixings in cracked concrete.
- The special ZYKON undercut technology reduces the energy required for installation.
- The FZUB special drill allows for a fast installation by creating the undercut without having to change tools.
- The almost expansion-free installation of the anchor allows small edge distances and axial spacing, thereby enabling flexible use.

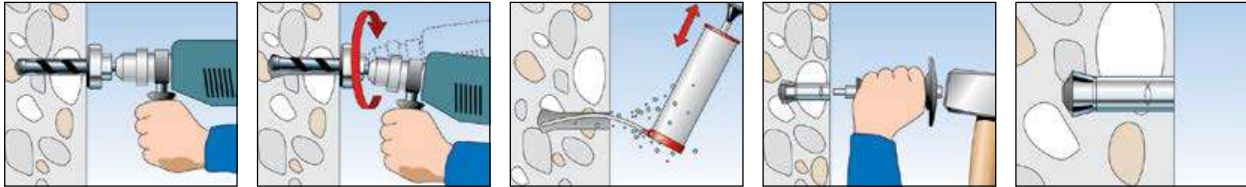
BUILDING MATERIALS

- Approved for:**
- Concrete C20/25 to C50/60
  - Cracked and non-cracked
- Also suitable for:**
- Concrete C12/15
  - Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

INSTALLATION



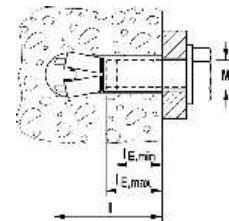
Anchor size	FZEA II 10 x 40 M8			FZEA II 12 x 40 M10			FZEA II 14 x 40 M12		
	gvz	A4	C	gvz	A4	C	gvz	A4	C
Effective anchorage depth $h_{ef}$ (mm)	40	40	40	40	40	40	40	40	40
Minimum member thickness $h_{min}$ (mm)	80	80	80	80	80	80	80	80	80
Installation Torque $T_{inst}$ (Nm)	10,0	15,0	15,0	15,0	20	20,0	20	40,0	40,0
Cracked Concrete	Min. spacing $S_{min}^{(1)}$ (mm)	40	40	40	45	45	45	50	50
	Min. edge distance $C_{min}^{(1)}$ (mm)	40	40	40	45	45	45	50	50
Non-cracked Concrete	Min. spacing $S_{min}^{(1)}$ (mm)	40	40	40	45	45	45	50	50
	Min. edge distance $C_{min}^{(1)}$ (mm)	40	40	40	45	45	45	50	50

(1) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

TECHNICAL DATA



Zykon-Hammerset anchor FZEA II



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Highly corrosion resistant steel Art-No.	Required drill bit FZUB	Required setting tool FZED plus	Length l (mm)	Internal thread M	Max. bolt penetration $I_{E,max}$ (mm)	Min. bolt penetration $I_{E,min}$ (mm)	Sales unit (pcs)
FZEA II 10 x 40 M 8	047303	047306	047309	10 x 40	FZED 10 plus	43	M 8	17	11	100
FZEA II 12 x 40	047304	047307	047310	12 x 40	FZED 12 plus	43	M 10	19	13	100
M10FZEA II 14 x 40 M12	047305	047308	047311	14 x 40	FZED 14 plus	43	M 12	21	15	50

## ACCESSORIES



Drill bit **FZUB**



Setting tool **FZED plus**

Item	Art-No.	Fits anchor	Sales unit (pcs)
FZED 10 plus	044642	FZEA II 10 x 40	1
FZED 12 plus	044643	FZEA II 12 x 40	1
FZED 14 plus	044644	FZEA II 14 x 40	1
FZUB 10 x 40	060622	FZEA II 10 x 40	1
FZUB 12 x 40	060623	FZEA II 12 x 40	1
FZUB 14 x 40	060624	FZEA II 14 x 40	1

## LOADS

### ZYKON Hammerset Anchor FZEA II

zinc plated steel / stainless steel / high corrosion resistant steel

Design & Permissible loads of a single anchor in **cracked normal concrete** (concrete tension zone) of strength class C20/25 (~B25)<sup>6)</sup>

Item	Screw material resp. screw surface	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load $N_{perm}^{2)}$ (kN)	Permissible shear load $V_{perm}^{2)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
FZEA II 10 x 40 M8	5,6	40	1,6	3,7	2,24	5,18
	5,8			4,7		6,58
	8,8			5,6		7,84
	A4 - 70					
	C - 70					
FZEA II 12 x 40 M10	5,6	40	3,0	5,6	4,2	7,84
	5,8					
	8,8					
	A4 - 70					
	C - 70					
FZEA II 14 x 40 M12	5,6	40	3,6	5,6	5,04	7,84
	5,8					
	8,8					
	A4 - 70					
	C - 70					

### ZYKON Hammerset Anchor FZEA II

zinc plated steel / stainless steel / high corrosion resistant steel

Design & Permissible loads of a single anchor in **non-cracked normal concrete** (concrete compression zone) of strength class C20/25 (~B25)

Item	Screw material resp. screw surface	Effective anchorage depth $h_{ef}$ (mm)	Permissible tension load $N_{perm}^{2)}$ (kN)	Permissible shear load $V_{perm}^{2)}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
FZEA II 10 x 40 M8	5,6	40	3,6	3,7	5,04	5,18
	5,8			4,7		6,58
	8,8			5,7		7,98
	A4 - 70					
	C - 70					
FZEA II 12 x 40 M10	5,6	40	3,6	6,1	5,04	8,54
	5,8			7,8		10,92
	8,8			7,9		11,06
	A4 - 70					
	C - 70					
FZEA II 14 x 40 M12	5,6	40	3,6	7,9	5,04	11,06
	5,8					
	8,8					
	A4 - 70					
	C - 70					

For the design the complete assessment ETA-06/0271 has to be considered.

- 1) The partial safety factors for material resistance as regulated in the ETA-06/0271 as well as a partial safety factor for load actions of  $\gamma_F = 1.4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \cdot h_{ef}$  and an edge distance  $c \geq 1.5 \cdot h_{ef}$ . Accurate data see ETA-06/0271. For higher concrete strength classes up to C50/60 higher permissible loads may be possible. Drill method hammer drilling.
- 2) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-06/0271.
- 3) Minimum possible axial spacings resp. edge distance while reducing the permissible load.
- 4) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-06/0271.
- 5) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at  $w_k \sim 0.3\text{mm}$ .

The internally threaded anchor with rim for simple hammer-set installation

2

High Performance Steel Anchors



APPROVALS



ADVANTAGES

- The embossed rim prevents the anchor sleeve from slipping, thus ensuring a trouble-free hammer-set installation.
- The metric internal thread means that it is possible to use standard screws or threaded rods for the ideal adaptation to suit the intended use.
- The EMS machine setting tool allows for effortless installation, particularly in the case of series installations.
- The embossing that is applied when expanding with the EHS Plus setting tool offers a simple control of the anchoring and provides increased safety.
- Fixing point at hef 25 mm prevents anchor from falling out of the drill hole before being expanded.

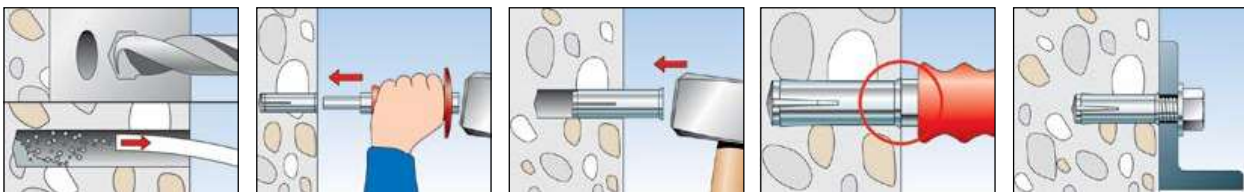
BUILDING MATERIALS

- Approved for:**
- Concrete C20/25 to C50/60, cracked, for the multiple fixings of non-load-bearing systems
  - Approved for pre-stressed hollow core slabs
  - Concrete C20/25 to C50/60
  - Non-cracked
- Also suitable for:**
- Concrete C12/15
  - Natural stone with dense structure

VERSION

- Zinc-plated steel
- Stainless steel

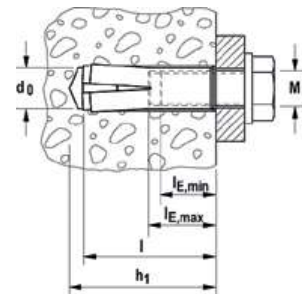
INSTALLATION



TECHNICAL DATA



Hammerset anchor EA II & EA II - Short



Item	Zinc-plated stell gvz Art-No.	Stainless stell A4 Art-No.	Drill hole diameter d <sub>0</sub> (mm)	Anchor length l (mm)	Internal Thread M (mm)	Sales unit (pcs.)
EA II M 6 x 25	532230	-	8	25	M 6	100
EA II M 6 x 30	048264	48410	8	30	M 6	100
EA II M 8 x 25	532231	-	10	25	M 8	100
EA II M 8 x 30	048284	48411	10	30	M 8	100
EA II M 8 x 40	048323	48412	10	40	M 8	100
EA II M 10 x 25	532232	-	12	25	M 10	50
EA II M 10 x 30	048332	-	12	30	M 10	50
EA II M 10 x 40	048339	48414	12	40	M 10	50

Item	Zinc-plated steel gvz Art-No.	Stainless steel A4 Art-No.	Drill hole diameter $d_o$ (mm)	Anchor length $l$ (mm)	Internal Thread $M$ (mm)	Sales unit (pcs.)
EA II M 12 x 25	532233	-	15	25	M 12	50
EA II M 12 x 50	048406	48415	25	50	M 12	50
EA II M 16 x 65	048408	48416	20	65	M 16	25
EA II M 20 x 80	048409	48417	25	80	M 20	25
EA II M 12 D	048407	-	16	50	M 12	25

Associated setting tool for manual installation (EAW H plus), for installation with hammer drill (EA II-S-SDS)

## ACCESSORIES



Setting tool **EHS H Plus** hand impact protection for your safety and embossing tool.



Setting tool **EA-ST**



Machine setting tool **EMS**

Item	Art-No.	Match	Sales unit (pcs)
EHS H 6 Plus	044630	EA II M 6 x 25, EA II M 6 x 30	1
EHS H 8 Plus	044631	EA II M 8 x 25, EA II M 8 x 30	1
EHS H 8 x 40 Plus	044632	EA II M 8 x 40	1
EHS H 10 Plus	044633	EA II M 10 x 40	1
EHS H 10 x 30 Plus	048487	EA II M 10 x 25, EA II M 10 x 30	1
EHS H 12 Plus	044634	EA II M 12, EA II M 12 D	1
EHS H 16 Plus	044635	EA II M 16	1
EHS H 20 Plus	044636	EA II M 20	1
EHS H 12x25 Plus	532568	EA II M 12 x 25	1
EA-ST 12	504585	EA II M 6	1
EMS M 6 x 25/30	048065	EA II M 6 x 25, EA II M 6 x 30	1
EMS M 8 x 25/30	048066	EA II M 8 x 25, EA II M 8 x 30	1
EMS M 8 x 40	048067	EA II M 8 x 40	1
EMS M 10 x 25/30	048068	EA II M 10 x 25, EA II M 10 x 30	1
EMS M 10 x 40	048070	EA II M 10 x 40	1
EMS M 12 x 25	532569	EA II M 12 x 25	1
EMS M 12 x 50	048071	EA II M 12 x 50 D / EA II M 12 x 50 / EA M 12 x 50 N D	1
EMS M 16 x 65	048072	EA II M 16 x 65	1
EMS M 20 x 80	048073	EA II M 20 x 80	1



Stop drill **EBB**

Item	Art-No.	Tool holder	Drill hole diameter $d_o$ (mm)	Drill hole depth $h_o$ (mm)	Match
EBB 8 x 25	532607	SDS plus	8	27	EA II M 6 x 25
EBB 10 x 25	532608	SDS plus	10	27	EA II M 8 x 25
EBB 12 x 25	532609	SDS plus	12	27	EA II M 10 x 25
EBB 15 x 25	532610	SDS plus	15	27	EA II M 12 x 25

## LOADS

### Hammerset anchor EA II (screw property class 4.6)

Design <sup>2)</sup> and Recommended loads <sup>1)</sup> for a single anchor for multiple use for non structural applications in pre stressed hollow core slabs<sup>4)</sup> For the design the complete approval ETA-07/O142 has to be considered.

Item	Bottom flange thickness (mm)	Effective anchorage depth $h_{ef}$ (mm)	Maximum torque moment $T_{max}$ (Nm)	Recommended load $F_{res}$ (kN)	Design load $F_d$ (kN)	Min. spacing $S_{min}^{(3)}$ (mm)	Min. edge distance $C_{min}^{(3)}$ (mm)
EA II M 6 x 25	≥35 <sup>5)</sup>	25	4.0	1.0	1.4	200	150
EA II M 8 x 25			8.0	1.4	1.9		
EA II M 10 x 25			15.0	1.9	2.7		
EA II M 12 x 25			35.0	1.9	2.7		

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1.5 \times h_{ef}$ . Accurate data see approval.

(2) The required safety factor for material is considered.

(3) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

(4) Concrete strength class C30/37 up to C50/60

(5) The anchor may be used in a flange thicknessed  $dh = 30$  mm with the same characteristic resistance, but the drill hole must not cut a cavity.

**Hammerset anchor EA II (screw property class 8.8/A4 - 70)**

Design <sup>2)</sup> and Recommended loads <sup>1)</sup> for a single anchor in non-cracked concrete C20/25<sup>4)</sup>. For the design the complete approval ETA - 07/0135 has to be considered.

Item	Non-cracked concrete								
	Effective anchorage depth	Minimum member thickness	Maximum torque moment	Recommended tensile load	Design tensile load	Recommended shear load	Design shear load	Min. spacing	Min. edge distance
	h <sub>ef</sub> (mm)	h <sub>min</sub> (mm)	T <sub>inst</sub> (Nm)	N <sub>rec</sub> (kN)	N <sub>d</sub> (kN)	V <sub>rec</sub> (kN)	V <sub>d</sub> (kN)	s <sub>min</sub> <sup>3)</sup> (mm)	c <sub>min</sub> <sup>4)</sup> (mm)
EA II M 6 x 30 <sup>5)</sup>	30	120	4.0	4.0	5.6	3.9	5.6	65	115
EA II M 8 x 30 <sup>5)</sup>	30	120	8.0	4.0	5.6	4.9	6.8	70	115
EA II M 8 x 40	40	120	8.0	6.1	8.5	4.9	6.8	70	115
EA II M 10 x 30 <sup>5)</sup>	30	120	15.0	4.0	5.6	6.2	8.6	85	140
EA II M 10 x 40	40	120	15.0	6.1	8.5	6.2	8.6	95	150
EA II M 12 x 50	50	120	35.0	8.5	11.9	11.3	15.8	145	200
EA II M 12D x 50	50	120	35.0	8.5	11.9	15.4	22.1	145	200
EA II M 16 x 65	65	160	60.0	12.6	17.6	18.3	25.6	180	240
EA II M 20 x 80	80	200	120.0	17.2	24.0	29.1	40.7	190	280
EA II M 6 x 30 A4 <sup>5)</sup>	30	120	4.0	4.0	5.6	3.2	4.4	65	115
EA II M 8 x 30 A4 <sup>5)</sup>	30	120	8.0	4.0	5.6	5.6	7.8	70	115
EA II M 8 x 40 A4	40	120	8.0	6.1	8.5	5.6	7.8	70	115
EA II M 10 x 30 A4 <sup>5)</sup>	30	120	15.0	4.0	5.6	6.9	9.6	85	140
EA II M 10 x 40 A4	40	120	15.0	6.1	8.5	7.1	9.9	95	150
EA II M 12 x 50 A4	50	120	35.0	8.5	11.9	12.9	18.6	145	200
EA II M 12 D x 50 A4	50	120	35.0	8.5	11.9	13.5	18.9	145	200
EA II M 16 x 65 A4	65	160	60.0	12.6	17.9	21.1	29.5	180	240
EA II M 20 x 80 A4	80	200	120.0	17.2	24.8	33.7	47.1	190	280

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1.5 \times h_{ef}$ . Accurate data see approval.

(2) The required safety factor for material is considered.

(3) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

(4) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

(5) Only for multiple use of non structural applications.

**Hammerset anchor EA II (screw/threaded rod property class  $\geq 4.6$ )**

Design <sup>2)</sup> and Recommended loads <sup>1)</sup> for a single for multiple use for non-structural applications in cracked concrete (redundant fixing) C20/25 up to C50/60<sup>5)</sup>. For the design the complete approval ETA - 07/0142 has to be considered.

Item	Cracked Non-cracked concrete						
	Effective anchorage depth	Minimum member thickness	Maximum torque moment	Recommended load	Design load	Min. spacing	Min. edge distance
	h <sub>ef</sub> (mm)	h <sub>min</sub> <sup>4)</sup> (mm)	T <sub>inst,max</sub> (Nm)	N <sub>rec</sub> (kN)	N <sub>d</sub> (kN)	s <sub>min</sub> <sup>3)</sup> (mm)	c <sub>min</sub> <sup>3)</sup> (mm)
EA II M 6 x 25	25	80	4.0	1.0	1.4	30	60
EA II M 6 x 30	30	80	4.0	1.2	1.7	65	115
EA II M 8 x 25	25	80	8.0	1.4	1.9	50	100
EA II M 8 x 30	30	80	8.0	2.0	2.8	70	115
EA II M 8 x 40	40	80	8.0	2.0	2.8	70	115
EA II M 10 x 25	25	80	15.0	1.9	2.7	60	100
EA II M 10 x 30	30	80	15.0	2.0	2.8	85	140
EA II M 10 x 40	40	80	15.0	3.0	4.2	95	150
EA II M 12 x 25	25	80	35.0	1.9	2.7	100	110
EA II M 12 x 50	50	100	35.0	4.3	6.0	145	200

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1.5 \times h_{ef}$ . Accurate data see approval.

(2) The required safety factor for material is considered.

(3) Minimum possible axial spacings resp. edge distances while increasing the member thickness. The combination of minimum axial spacing and minimum edge distance with the minimum member thickness is not possible. Exact data see approval.

(4) Minimum possible member thickness while increasing the axial spacings and edge distances. The combination of minimum axial spacing and minimum edge distance with the minimum member thickness is not possible. Exact data see approval.

(5) Further data for concrete C12/15 see approval.

## Drop-in anchor in zinc-plated steel for suitable hammer-set installation.



EA-N



Pipe line support

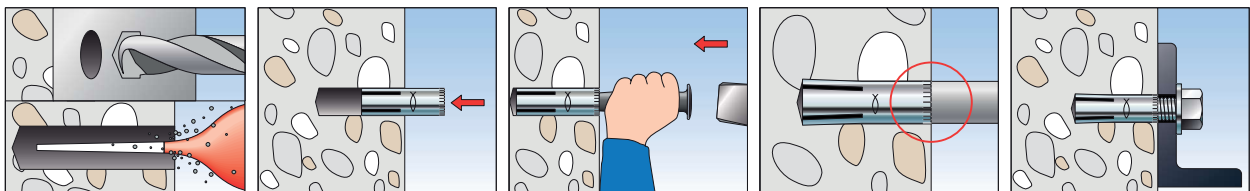
### ADVANTAGES

- Hammer-set anchor with internal thread for prepositioned installation.
- When the expander plug is driven in with EAW H setting tool, the anchor sleeve is expanded and is tensioned against the hole wall.
- Suitable for all screws or studs with metric threads.
- Low anchoring depth reduces drilling time and thus allows cost-efficient installation.
- Surface-flush anchor allows the attached item to be removed and refitted several times.
- Internal thread diameter 6 to 20 mm.
- Zinc-plated steel version for indoor use.
- EA - ND hammer-set anchor is suitable for diamond drilling machines and diamond saws.

### Suitable for:

- Non-cracked concrete  $\geq$  C 20/25.
- Natural stone with dense structure.
- Anchoring light ceiling linings and suspended ceilings.

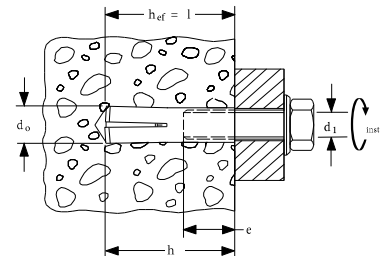
### INSTALLATION



### TECHNICAL DATA



EA-N



Item	Art-No.	Thread d1 M (mm)	Nominal drill-Ø d_o (mm)	Min. drill depth at prior insertion mode h_o (mm)	Min. anchorage depth h_ef (mm)	Min. bolt penetration e1 (mm)	Max. bolt penetration e2 (mm)	Total length l (mm)	Installation torque T_inst (Nm)	Related setting tool (mm)	Qty. per box (pcs)
<b>Zinc-plated steel</b>											
EA M6 N	531582	6	8	25	25	6	12	25	4	504573 EA-ST 6	100
EA M8 N	531583	8	10	30	30	8	13	30	8	504576 EA-ST 8	100
EA M10 N	531584	10	12	40	40	10	17	40	15	504584 EA-ST 10	50
EA M12 N	531586	12	15	50	50	12	22	50	35	504585 EA-ST 12	50
EA M12 N D	500872	12	16	50	50	12	22	50	35	504585 EA-ST 12	50
EA M16 N	531587	16	20	65	65	16	27	65	60	504586 EA-ST 16	25
EA M20 N	531588	20	25	80	80	20	34	80	120	504587 EA-ST 20	25

ACCESSORIES



Setting tool EA-ST

Setting tool **EAW H Plus** with hand impact protection for your safety and embossing tool

2

High Performance Steel Anchors

Item	Art-No.	Fits	Sales unit (pcs)
EAW H 6 Plus	044630	EA M6 N	1
EAW H 8 x 30 Plus	044631	EA M8 N	1
EAW H 8 x 40 Plus	044632	EA M8 N	1
EAW H 10 Plus	044633	EA M10 N	1
EAW H 10 x 30 plus	048487	EA M10 N	1
EAW H 12 Plus	044634	EA M12 N	1
EAW H 16 Plus	044635	EA M16 N	1
EAW H 20 Plus	044636	EA M20 N	1
EA-ST 12	504585	EA M6 N	1

LOADS

Design <sup>2)</sup> and recommended <sup>1)</sup> resistance for a single anchor.

Anchor size	EA M6 N	EA M8 N	EA M10 N	EA M12 N	EA M16 N	EA M20 N
Recommended Tensile Load C20/25 N <sub>rec</sub> (kN)	1.5	2.1	3.3	4.8	7	9.5
Design Tensile Load C20/25 N <sub>rec</sub> (kN)	2.1	2.9	4.6	6.7	9.8	13.3
Maximum Torque T <sub>inst</sub> (Nm)	4	8	15	35	60	120

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

(2) The required safety factor for material is considered.

Design <sup>1)</sup> and Recommended Resistance <sup>2)</sup> For Multiple Fixings with Large Spacing & Edge Distances

Anchor size	EA M6 N	EA M8 N	EA M10 N	EA M12 N
Recommended Tensile Load C20/25 N <sub>rec</sub> (kN)	0.5	0.5	0.5	0.5
Design Tensile Load C20/25 N <sub>rec</sub> (kN)	0.7	0.7	0.7	0.7
Maximum Torque T <sub>inst</sub> (Nm)	4	8	15	35

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

(2) The required safety factor for material is considered.



## The brass expansion fixing with metric thread



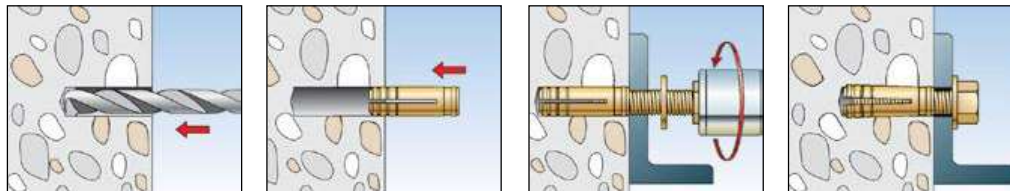
### ADVANTAGES

- The compact design of the brass fixing reduces the amount of drilling required, helping to ensure a fast installation.
- The special surface structure of the MS prevents the fixing from rotating in the drill hole. This provides increased installation safety.
- The internal thread allows for the use of standard metric screws or threaded rods, and for surface flush removal and reuse of the fixing point. This provides great flexibility.

### BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

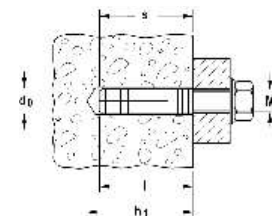
### INSTALLATION



### TECHNICAL DATA



Brass fixing **MS** for metric screws



Item	Art-No.	Drill hole diameter $h_c$ (mm)	Min.drill hole depth $h_1$ (mm)	Anchor length $l$ (mm)	Internal thread $M$	Bolt penetration $S$ (mm)	Sales unit (pcs)
MS 4 x 15	026424	5	20	15	M 4	15	100
MS 5 x 18	026425	6	25	18	M 5	18	100
MS 6 x 22	078660	8	27	22	M 6	22	100
MS 8 x 28	078981	10	35	28	M 8	28	50
MS 10 x 32	078661	12	39	32	M 10	32	25
MS 12 x 37	078662	15	46	37	M 12	37	10
MS 16 x 43	078663	20	50	43	M 16	43	10

### LOADS

Recommended resistance for a single anchor.

The given loads are valid for machine screws with the specified thread size.

Anchor size		MS 4 x 15	MS 5 x 18	MS 6 x 22	MS 8 x 28	MS 10 x 32	MS 12 x 37	MS 16 x 43
Thread size	(M)	M4	M5	M6	M8	M10	M12	M16
<b>Recommended loads in the respective base material base F Frc2)</b>								
Concrete	≥ C 20/25 (kN)	0.25	0.40	0.65	1.10	1.60	2.20	3.30
Solid brickwork	(kN)	0.20	0.35	0.55	0.90	1.30	1.60	2.30

(1) Required safety factors are considered.

(2) Valid for tensile load, shear load and oblique load under any angle.

## The installation-friendly internally threaded anchor for fixings in pre-stressed hollow-core concrete slabs

2 High Performance Steel Anchors



Cable trays in pre-stressed hollow-core concrete slabs

### APPROVALS



### ADVANTAGES

- The active principle of the anchor means that the FHY can be used in cavities or in solid materials up to 5cm from the tensioning wire. This ensures the highest flexibility and user-friendly installation.
- The embossed edge prevents the anchor sleeve from slipping in the cavity, thus allowing for trouble-free installation.
- The optimised geometry minimises setting energy and allows for use in extremely narrow spaces. This allows for user-friendly installation.
- The metric internal thread means that it is possible to use standard screws or threaded rods for the ideal adaptation to suit the intended use.

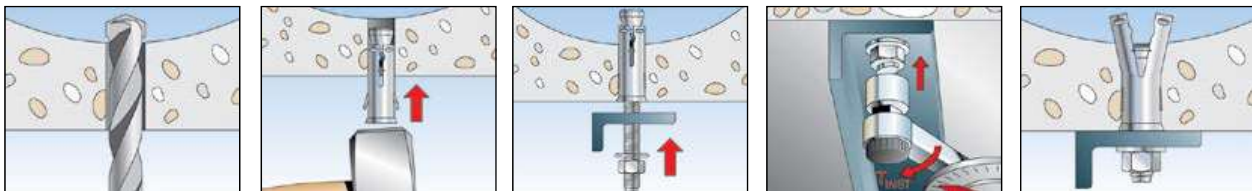
### BUILDING MATERIALS

- Approved for:**
- Pre-stressed hollow-core concrete slabs  $\geq$  C45/55

### VERSION

- Zinc-plated steel
- Stainless steel

### INSTALLATION



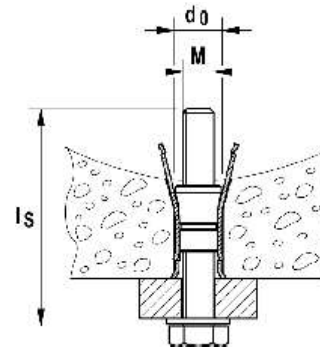
Anchor size	FHY M6				FHY M8				FHY M10				FHY M12				
<b>Zinc-plated - gvz</b>																	
Web thickness	$d_w$ (mm)	25-29	30-39	40-49	$\geq 50$	25-29	30-39	40-49	$\geq 50$	25-29	30-39	40-49	$\geq 50$	25-29	30-39	40-49	$\geq 50$
Min. anchorage depth	$h_{ef}$ (mm)	30	30	30	30	35	35	35	35	40	40	40	40	40	40	40	40
Torque moment	$T_{fix}$ (Nm)	10	10	10	10	10	10	10	10	20	20	20	20	30	30	30	30
Critical spacing <sup>(1)</sup>	(mm)	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Edge distance <sup>(2)</sup>	(mm)	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
<b>Stainless steel - A4</b>																	
Web thickness	$d_w$ (mm)	25-29	30-39	40-49	$\geq 50$	25-29	30-39	40-49	$\geq 50$	25-29	30-39	40-49	$\geq 50$	-	-	-	-
Min. anchorage depth	$h_{ef}$ (mm)	30	30	30	30	35	35	35	35	40	40	40	40	-	-	-	-
Torque moment	$T_{fix}$ (Nm)	10	10	10	10	10	10	10	10	20	20	20	20	-	-	-	-
Critical spacing <sup>(1)</sup>	(mm)	300	300	300	300	300	300	300	300	300	300	300	300	-	-	-	-
Edge distance <sup>(2)</sup>	(mm)	150	150	150	150	150	150	150	150	150	150	150	150	-	-	-	-

(1) Minimum spacing is dependent on  $d_w$ . (Follow DIBt approval Z-21.1-1711 or IEA to design with min. spacing)  
 (2) Minimum allowed edge distance can be 100mm. (Follow DIBt approval Z-21.1-1711 or IEA to design with min. spacing)

## TECHNICAL DATA



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



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Drill hole diameter $d_0$ (mm)	Anchor length $l$ (mm)	Thread $M$	Min drill hole depth $h_1$ (mm)	Min. bolt penetration $l_{E,min}$ (mm)	Sales unit (pcs)
	gvz	A4*						
<b>FHY M 6</b>	<b>030138</b>	<b>030139</b>	10	37	M 6	50	37	50
<b>FHY M 8</b>	<b>030146</b>	<b>030147</b>	12	43	M 8	60	43	25
<b>FHY M10</b>	<b>030148</b>	<b>030151</b>	16	52	M 10	65	52	20
<b>FHY M12</b>	<b>545512</b>	-	18	52	M 12	65	52	25

## LOADS

Design<sup>2)</sup> and Recommended<sup>1)</sup> resistance for a single anchor in pre-stressed hollow-core concrete slabs of strength class  $\geq B55$  resp. C45/55. For the design the complete test document has to be considered.

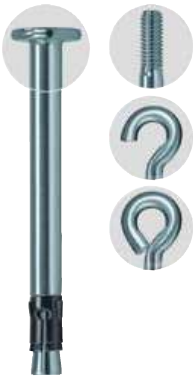
Item	Anchor size	Web Thickness $d_w$ (mm)	Recommended Tensile Load $N_{rec}$ (kN)	Recommended Shear Load $V_{rec}$ (kN)	Design Tension load $N_d$ (kN)	Design Shear Load $V_d$ (kN)
<b>FHY M6</b>	gvz	25-29	0,7	0,7	1,0	1,0
		30-39	0,9	0,9	1,3	1,3
	A4	40-50	2,0	2,0	2,8	2,8
		$\geq 50$	2,0	2,0	2,8	2,8
<b>FHY M8</b>	gvz	25-29	0,7	0,7	1,0	1,0
		30-39	0,9	0,9	1,3	1,3
	A4	40-50	2,0	2,0	2,8	2,8
		$\geq 50$	2,0	2,0	2,8	2,8
<b>FHY M10</b>	gvz	25-29	0,7	0,7	1,0	1,0
		30-39	1,2	1,2	1,7	1,7
	A4	40-50	3,0	3,0	4,2	4,2
		$\geq 50$	3,0	3,0	4,2	4,2
<b>FHY M12</b>	gvz	25-29	1,1	0,7	1,5	1,5
		30-39	1,8	1,4	2,5	2,5
		40-50	3,6	3,6	5,0	5,0
		$\geq 50$	3,6	3,6	5,0	5,0

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_f = 1.4$  are considered.

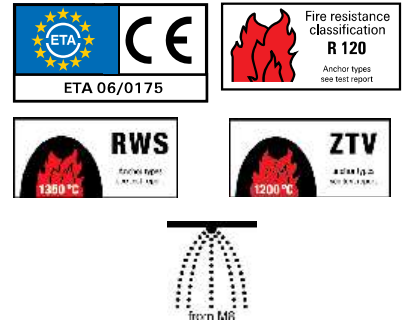
(2) The required safety factor for material is considered.

The installation-friendly hammer-set anchor for multiple fixings

2 High Performance Steel Anchors



APPROVALS



ADVANTAGES

- The special active principle allows for a simple hammer-set installation and therefore, a short processing time.
- The optimised expansion clip ensures hold when placing in the drill hole, and prevents it falling out during overhead installations.
- The massive shaft cross-section guarantees a high load-bearing capacity, thus offering an extremely high level of safety.
- A range of head shapes allows for the fixing of wide-ranging fixtures, and for the ideal adaptation to suit the intended use.

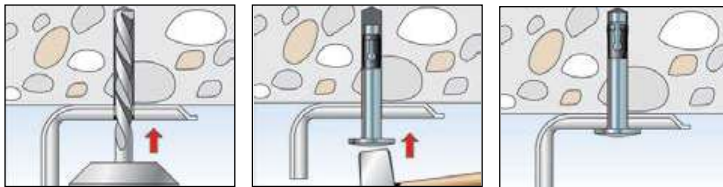
BUILDING MATERIALS

- Approved for:**
- Concrete C12/15 to C50/60 cracked, for multiple fixings of non-structural applications
- Also suitable for:**
- Solid sand-lime brick
  - Natural stone with dense structure
  - Prestressed hollow-core concrete slabs

VERSION

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

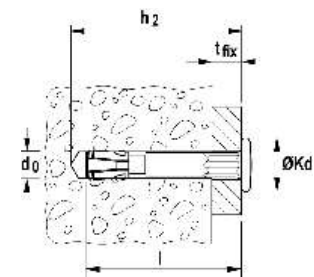
INSTALLATION



TECHNICAL DATA



Nail anchor FNA II with nail head



Item	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Drill hole diameter	Anchor length	Min. drill hole depth for through fixing	Max. fixture thickness	KD head Ø	Sales unit
	Art-No.	Art-No.	Art-No.	$d_0$ (mm)	$l$ (mm)	$h_2$ (mm)	$t_{fix}$ (mm)	(mm)	(pcs)
	gvz	A4	C						
FNA II 6 x 25/5	044121 <sup>1)</sup>	—	—	6	35	40	5	13	100
FNA II 6 x 30/5	044115 <sup>1)</sup>	044122	—	6	40	45	5	13	100
FNA II 6 x 30/5	—	—	044124	6	40	45	5	13	25
FNA II 6 x 30/20	—	—	506147	6	55	60	20	13	50
FNA II 6 x 30/30	044116	044123	—	6	65	70	30	13	50
FNA II 6 x 30/30	—	—	044125	6	65	70	30	13	25
FNA II 6 x 30/50	044117	046024	500569	6	85	90	50	13	50
FNA II 6 x 30/75	044118	—	500573 <sup>2)</sup>	6	110	115	75	13	50
FNA II 6 x 30/100	044119	—	500574 <sup>2)</sup>	6	135	140	100	13	50
FNA II 6 x 30/120	044120	—	500575 <sup>2)</sup>	6	155	160	120	13	50

(1) with hexagon below the nail head for anti-rotation lock of hole and wire hangers (for example) and centering for optional setting tool FNA-S  
 (2) On request.



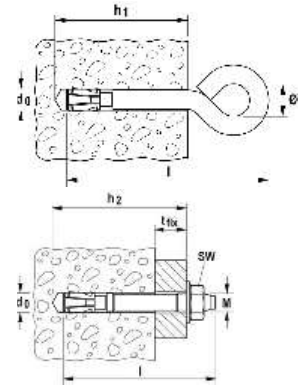
Nail anchor **FNA II-H** with hook



Nail anchor **FNA II-OE** with eye



Nail anchor **FNA II M6** with thread and flange nut



Item	Zinc-plated steel Art-No.	Stainless steel Art-No.	Highly corrosion resistant steel Art-No.	Drill hole diameter $d_0$ (mm)	Anchor length $l$ (mm)	Min. drill hole depth $h_2$ (mm)	Max. fixture thickness $t_{fix}$ (mm)	Inner diameter of the hook/eye ( $\emptyset$ mm)	Thread $l$	KD head $\emptyset$ (mm)	Sales unit (pcs)
	gvz	A4	C								
<b>FNA II 6 x 25 H</b>	044126	—	—	6	54	35	—	10	M 6	—	50
<b>FNA II 6 x 25 OE</b>	044127	—	—	6	54	35	—	10	M 6	—	50
<b>FNA II 6 x 25 M6/5</b>	044111	—	—	6	45	40	5	—	M 6	10	100
<b>FNA II 6 x 30 M6/5</b>	044109	—	—	6	50	45	5	—	M 6	10	100
<b>FNA II 6 x 30 M6/5</b>	—	044122 <sup>2)</sup>	—	6	50	45	5	—	M 6	10	50
<b>FNA II 6 x 30 M6/5</b>	—	—	044113 <sup>2)</sup>	6	50	45	5	—	M 6	10	25
<b>FNA II 6 x 30 M6x41</b>	044110 <sup>1)</sup>	—	—	6	41	40	—	—	M 6	10	100
<b>FNA II 6 x 30 M6/10</b>	046022	—	—	6	55	45	10	—	M 6	10	100
<b>FNA II 6 x 30 M8/5</b>	044114	—	—	6	51	45	5	—	M 8	13	50

(1) With nut ; e.g. for fixing of pipe clamps.

(2) With nut and washer (no flange nut).

## LOADS

### Nail anchor FNA II

zinc plated steel / stainless steel / high corrosion resistant steel

Design & Highest permissible loads<sup>1)</sup> for a single fixing point as part of a multiple fixing of non-structural systems<sup>3)</sup> in concrete C20/25 up to C50/60

Item	Material fixing element	Effective anchorage depth $h_{ef}$ (mm)	Maximum torque moment $T_{fix}$ (Nm)	Permissible load $F_{actm}$ <sup>2)</sup> (kN)	Design Tensile load $N_d$ (kN)	Required edge distance (with one edge) for Max. tension load $c$ (mm)	Required spacing for Max load $s$ (mm)	Minimum spacings while reducing the load	
								Min. spacing $s_{min}$ (mm)	Min. edge distance $c_{min}$ (mm)
<b>FNA II 6 x 25</b>	gvz	25	—	1.4	1.96	100 for $s \geq 200$	100 for $s \geq 200$	40	40
<b>FNA II 6 x 30</b>	gvz	30	—	2.4	3.36				
	A4								
	C								
<b>FNA II 6 x 25 M6</b>	gvz	25	4	1.4	1.96				
<b>FNA II 6 x 30 M6</b>	gvz	30	4	2.4	3.36				
	A4								
	C								
<b>FNA II 6 x 30 M8</b>	gvz	30	4	2.4	3.36				
<b>FNA II 6 x 25 OE</b>	gvz	25	—	0.7	0.98				

For the design the complete approval ETA - 06/0175 has to be considered.

1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered.

2) Valid for tensile, shear and oblique loads under any angle. For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.

3) Multiple use is defined acc ETAG 001 Part 6 with min. 3 fixing points with min. one anchor per fixing point and a permissible load of 1.4 kN or min. 4 fixing points with min. one anchor and a permissible load of 2.1 kN.

## ACCESSORIES



Machine setting tool **FNA S-SDS**



Machine setting tool **FNA S-SBO**  
for mounting on the drill bit (drill- $\emptyset$  6mm)



Hand tool **FNA S-H**

Item	Art-No.	Print table text	Technical details	Sales unit (pcs)
<b>FNA S-SDS</b>	061547	for all FNA II with nail head	The ideal setting tool for the serial installation with SDS-plus adapter for driving in FNA II with nail head using a hammer drill.	1
<b>FNA S-sbo</b>	061548	for all FNA II with nail head	For a power saving and fast installation to be placed on the drill.	1
<b>FNA S-H</b>	095990	for FNA II with metric thread M6	E.g. for the fixing of installation of mounting rails. Chuck with outer diameter of 15mm for the installation of FNA II M6 by hand.	1

The installation friendly hammer-set anchor for multiple fixings

2

High Performance Steel Anchors



APPROVALS



ADVANTAGES

- The simple active principle allows for a fast hammer-set installation without special tools.
- The FDN II can be installed without cleaning of the drill hole as per ETA assessment.
- The two hit zones (first nail head, then expansion pin) ensure correct installation especially in narrow drill holes and also ensure high safety in use.
- The new short version of the FDN II requires less drilling effort and hammer blows, thus saving time and avoid reinforcement strikes.

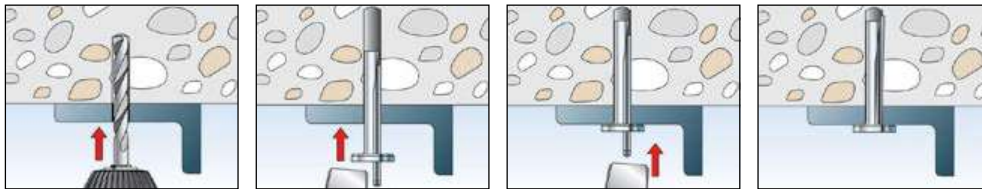
BUILDING MATERIALS

- Approved for:**
- Concrete C12/25 to C50/60, cracked, for multiple fixings of non-structural applications
- Also suitable for:**
- Concrete C12/15
  - Natural stone with dense structure

VERSION

- Zinc-plated steel

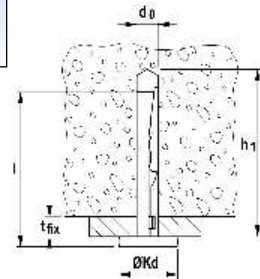
INSTALLATION



TECHNICAL DATA



Ceiling nail FDN II



Item	Zinc-plated steel Art-No. gvz	Drill hole diameter $d_0$ (mm)	Anchor length $l$ (mm)	Effective anchorage depth $h_{ef}$ (mm)	Max. fixture thickness $t_{fix}$ (mm)	KD head $\varnothing$ (mm)	Sales unit (pcs)
FDN II 6/5	545636	6	37	32	5	15	100
FDN II 6/35	545637	6	67	32	35	15	100
FDN II 6/5 K	545638	6	30	25	5	15	100
FDN II 6/35 K	545639	6	60	25	35	15	100

LOADS

Design <sup>2)</sup> and recommended <sup>1)</sup> resistance for a single anchor for multiple fixing <sup>4)</sup> for non-structural applications in concrete C20/25 upto C50/60. For the design the complete approval ETA - has to be considered.

Item	Effective anchor depth $h_{ef}$ (mm)	Minimum member thickness $h_{min}$ (mm)	Torque moment $T_{inst}$ (Nm)	Cracked or Non-cracked concrete			
				Design load $F_{d}^{(3)}$ (kN)	Permissible load $F_{rec}^{(3)}$ (kN)	Min. spacing $s_{min}^{(4)}$ (mm)	Min. edge distance $c_{min}^{(4)}$ (mm)
FDN II 6	32	80	-	2.4	1.7	50	60
FDN II 6 K	25	80	-	1.7	1.2	60	70

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1.5 \times h_{ef}$ . Accurate data see approval.  
 (2) The required safety factor for material is considered.

(3) Valid for tensile, shear and oblique loads under any angle. For combinations of loads with bending moments see approval.  
 (4) A multiple fixing in accordance with ETAG 001 Part 6 is defined by at least 3 fixing points with at least one anchor each and a permissible load per fixing point of 1.4 kN or by at least 4 fixing points with at least one anchor each and a permissible load per fixing point of 2.1 kN.

## The cost-efficient hammer-set anchor for multiple fixings



### APPROVALS



2

High Performance Steel Anchors

### ADVANTAGES

- The FDZ can be installed without cleaning of the drill hole as per ETA assessment.
- The simple active principle allows for a fast hammer-set installation without special tools.
- The two hit zones (first nail head, then expansion pin) ensure correct installation especially in narrow drill holes and also ensure high safety in use.
- The yellow expansion pin enables a clear visual differentiation to the FDZ.

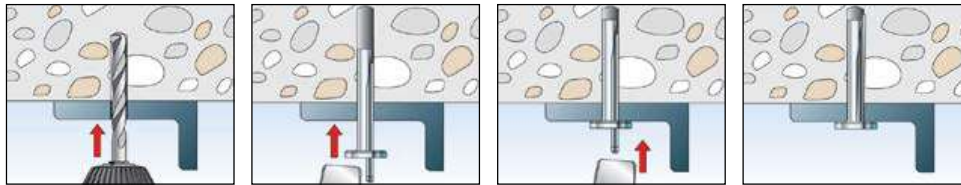
### BUILDING MATERIALS

- Approved for:**
- Concrete C12/25 to C50/60, cracked, for multiple fixings of non-structural applications
- Also suitable for:**
- Concrete C12/15
  - Natural stone with dense structure

### VERSION

- Zinc-plated steel

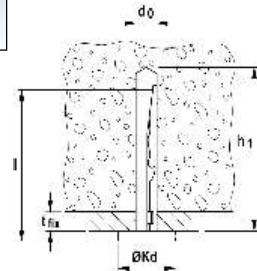
### INSTALLATION



### TECHNICAL DATA



Ceiling nail FDZ



Item	Zinc-plated steel Art-No. gvz	Drill hole diameter $d_0$ (mm)	Anchor length $l$ (mm)	Effective anchorage depth $h_{ef}$ (mm)	Max. fixture thickness $t_{fix}$ (mm)	KD head $\varnothing$ (mm)	Sales unit (pcs)
FDZ 6/5	544103	6	37	32	5	15	100
FDZ 6/35	544104	6	67	32	35	15	100

### LOADS

Design <sup>2)</sup> and recommended <sup>1)</sup> resistance for a single anchor for multiple fixing <sup>4)</sup> for non-structural applications in concrete C20/25 upto C50/60. For the design, the complete approval ETA - 17/0737 has to be considered.

Item	Effective anchor depth $h_{ef}$ (mm)	Minimum member thickness $h_{min}$ (mm)	Torque moment $T_{req}$ (Nm)	Cracked or Non-cracked concrete			
				Design load $F_d^{3)}$ (kN)	Permissible load $F_{Rk}$ (kN)	Min. spacing $s_{min}^{4)}$ (mm)	Min. edge distance $c_{min}^{4)}$ (mm)
FDZ 6	32	80	-	1.4	1.0	50	60

(1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1.5 \times h_{ef}$ . Accurate data see approval.  
 (2) The required safety factor for material is considered.

(3) Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads, bending moments see approval.

(4) A multiple fixing in accordance with ETAG 001 Part 6 is defined by at least 3 fixing points with at least one anchor each and a permissible load per fixing point of 1.4 kN or by at least 4 fixing points with at least one anchor each and a permissible load per fixing point of 2.1 kN.

**Bolt anchor in zinc-plated steel and hot-dipped galvanised steel with A2 clip.**

2

High Performance Steel Anchors



FWA, zinc-plated steel



FWA hot-dipped galvanised steel with A2-clip



Stormwater overflow tank manholes

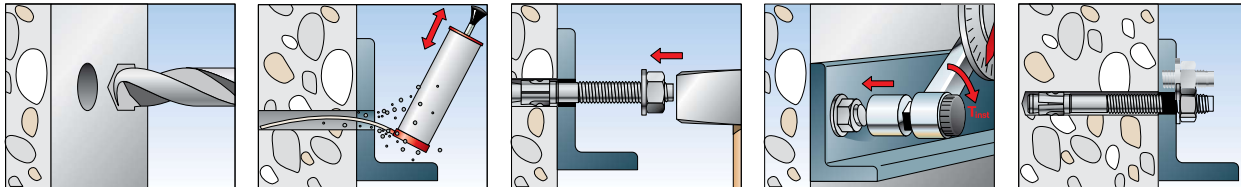
**ADVANTAGES**

- Anchor bolt for push-through installation.
- When the hexagon nut is tightened, the cone bolt is pulled into the expansion clip and expands it against the whole wall
- Thread diameter 6 to 20 mm.
- Zinc-plated steel version for indoor use.
- Hot-dipped galvanised version for temporary outdoor use.

**Suitable for:**

- Non-cracked concrete  $\geq$  C 20/25.
- Natural stone with dense structure.

**INSTALLATION**



Anchor size	M 8			M 10			M 12			M 16			M 20			
	gvz	+	hdg	gvz	+	hdg	gvz	+	hdg	gvz	+	hdg	gvz	+	hdg	
Effective anchorage depth	$h_{\text{ef}} \geq$	(mm)	25	30*	40	30	40*	50	40	50*	60	50	65*	80	80*	100
Drill hole diameter	$d_h$	(mm)	8	8	8	10	10	10	12	12	12	16	16	16	20	20
Min. edge distance	$c_{\text{min}}$	(mm)	40	45	60	45	60	75	60	75	90	75	100	120	120	150
Min. spacing	$s_{\text{min}}$	(mm)	80	90	120	90	120	150	120	150	180	150	200	240	240	300
Min. structural component thickness	$t_{\text{min}}$	(mm)	100	100	100	100	100	100	100	100	120	100	130	160	160	200
Clearance-hole in the fixture to be attached <sup>(1)</sup>	$d_f$		9	9	9	12	12	12	14	14	14	18	18	18	22	22

\*preferred embedment depth

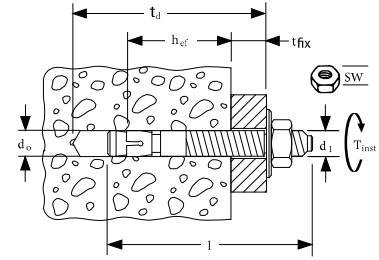
(1) Values only suitable for pre-positioned installation mode. Using push-through installation 1 mm to be added.



## TECHNICAL DATA



Bolt Anchor - FWA



Item	Art-No.	Thread d1 (mm)	Nominal drill-Ø d <sub>0</sub> (mm)	Max. fixing thickness t <sub>fix</sub> (mm)	Min. fixing thickness t <sub>fix</sub> (mm)	Min. anchorage depth h <sub>eff</sub> (mm)	Min. drill depth at push-through mode t <sub>d</sub> (mm)	Total length l (mm)	Width across flat SW (mm)	Installation torque T <sub>inst</sub> (Nm)	Sales unit (pcs)
FWA 6 x 40	45536	6	3	-	25	-	40	40	10	7,5	100
FWA 6 x 55	45582	6	15	5	25	35	55	55	10	7,5	100
FWA 6 x 70	45598	6	30	20	25	35	70	70	10	7,5	100
FWA 6 x 120	502920	6	80	60	25	35	120	120	10	7,5	50
FWA 8 x 50	45644	8	5	-	25	-	50	50	13	15	50
FWA 8 x 60	502893	8	15	-	25	-	60	60	13	15	50
FWA 8 x 65	45788	8	20	5	25	40	65	65	13	15	50
FWA 8 x 80	45789	8	35	20	25	40	80	80	13	15	50
FWA 8 x 95	45790	8	50	35	25	40	95	95	13	15	50
FWA 8 x 120	45791	8	75	60	25	40	120	120	13	15	50
FWA 10 x 60	502894	10	5	-	30	-	60	60	17	30	50
FWA 10 x 65	45645	10	10	-	30	-	65	65	17	30	50
FWA 10 x 80	45792	10	25	5	30	50	80	80	17	30	50
FWA 10 x 95	45793	10	40	20	30	50	95	95	17	30	50
FWA 10 x 115	45794	10	60	40	30	50	115	115	17	30	25
FWA 10 x 130	45646	10	75	55	30	50	130	130	17	30	25
FWA 10 x 140	503367	10	85	65	30	50	140	140	17	30	25
FWA 10 x 160	503368	10	105	85	30	50	160	160	17	30	25
FWA 10 x 180	503369	10	115	105	30	50	180	180	17	30	25
FWA 10 x 200	503370	10	135	115	30	50	200	200	17	30	25
FWA 12 x 80	45647	12	10	-	40	-	80	80	19	50	25
FWA 12 x 100	45648	12	30	10	40	60	100	100	19	50	25
FWA 12 x 120	45795	12	50	30	40	60	120	120	19	50	25
FWA 12 x 150	45796	12	80	60	40	60	150	150	19	50	25
FWA 12 x 160	503371	12	90	70	40	60	160	160	19	50	25
FWA 12 x 180	503372	12	110	90	40	60	180	180	19	50	25
FWA 12 x 200	503373	12	130	110	40	60	200	200	19	50	25
FWA 12 x 220	503374	12	150	130	40	60	220	220	19	50	25
FWA 12 x 240	503377	12	170	150	40	60	240	240	19	50	25
FWA 16 x 105	45649	16	15	-	50	-	95	105	24	100	20
FWA 16 x 125	502921	16	35	5	50	80	115	125	24	100	20
FWA 16 x 140	45798	16	50	20	50	80	130	140	24	100	10
FWA 16 x 180	45799	16	90	60	50	80	170	180	24	100	10
FWA 16 x 200	503379	16	110	80	50	80	190	200	24	100	10
FWA 16 x 240	503380	16	150	120	50	80	230	240	24	100	10
FWA 16 x 300	503381	16	190	160	50	80	290	300	24	100	10
FWA 20 x 160	45800	20	40	20	80	100	150	160	30	200	10
FWA 20 x 200	503382	20	80	60	80	100	190	200	30	200	10
FWA 20 x 220	56133	20	100	80	80	100	210	220	30	200	10
FWA 20 x 240	503383	20	120	100	80	100	230	240	30	200	10
FWA 20 x 300	503387	20	160	140	80	100	290	300	30	200	10
FWA 24 x 200	503388	24	50	25	100	125	190	200	36	260	10
FWA 24 x 250	503389	24	100	75	100	125	240	250	36	260	10
FWA 24 x 300	503390	24	150	125	100	125	290	300	36	260	10
FWA 8 x 65 hdg	502922	8	20	5	25	40	65	65	13	15	50
FWA 8 x 80 hdg	502923	8	35	20	25	40	80	80	13	15	50
FWA 8 x 95 hdg	502924	8	50	35	25	40	95	95	13	15	50
FWA 8 x 120 hdg	502925	8	75	60	25	40	120	120	13	15	50
FWA 10 x 80 hdg	502926	10	25	5	30	50	80	80	17	30	50
FWA 10 x 95 hdg	502927	10	40	20	30	50	95	95	17	30	50
FWA 10 x 115 hdg	502928	10	60	40	30	50	115	115	17	30	25
FWA 10 x 130 hdg	502929	10	75	55	30	50	130	130	17	30	25
FWA 12 x 80 hdg	502972	12	10	-	40	-	80	80	19	50	25
FWA 12 x 100 hdg	502973	12	30	10	40	60	100	100	19	50	25
FWA 12 x 120 hdg	502974	12	50	30	40	60	120	120	19	50	25
FWA 12 x 150 hdg	502975	12	80	60	40	60	150	150	19	50	25
FWA 16 x 105 hdg	502976	16	15	-	50	-	95	105	24	100	20
FWA 16 x 125 hdg	502977	16	35	5	50	80	115	125	24	100	20
FWA 16 x 140 hdg	502978	16	50	20	50	80	130	140	24	100	10
FWA 16 x 180 hdg	502979	16	90	60	50	80	170	180	24	100	10
FWA 20 x 160 hdg	502980	20	40	20	80	100	150	160	30	200	10

**LOADS**

Design and recommended resistance of a single anchor in concrete C20/25

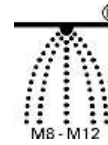
Non-cracked concrete						
	Effective anchorage depth	Design tensile load	Recommended tensile load	Design shear load	Recommended shear load	Recommended bending moment
Item	$h_{ef} \geq$ (mm)	$N_d$ (kN)	$N_{Rk}$ (kN)	$V_d$ (kN)	$V_{Rk}$ (kN)	$M_{Rk}$ (Nm)
<b>FWA M 6</b>	25	1.8	1.3	1.8	1.3	1.4
<b>FWA M 6</b>	35	2.9	2.1	2.9	2.1	1.4
<b>FWA M 8</b>	25	1.9	1.4	1.9	1.4	3.5
<b>FWA M 8</b>	30	2.5	1.8	2.5	1.8	3.5
<b>FWA M 8</b>	40	3.9	2.8	3.9	2.8	3.5
<b>FWA M 10</b>	30	2.5	1.8	2.5	1.8	6.9
<b>FWA M 10</b>	40	3.9	2.8	3.9	2.8	6.9
<b>FWA M 10</b>	50	5.3	3.8	5.3	3.8	6.9
<b>FWA M 12</b>	40	4.4	3.2	4.4	3.2	13.2
<b>FWA M 12</b>	50	6.1	4.4	6.1	4.4	13.2
<b>FWA M 12</b>	60	8.1	5.8	8.1	5.8	13.2
<b>FWA M 16</b>	50	6.1	4.4	6.1	4.4	31.3
<b>FWA M 16</b>	65	8.6	6.2	8.6	6.2	31.3
<b>FWA M 16</b>	80	11.9	8.5	11.9	8.5	31.3
<b>FWA M20</b>	80	13.5	9.7	13.5	9.7	72.2
<b>FWA M20</b>	100	18.9	13.5	18.9	13.5	72.2

All load values for non-cracked concrete C20/25 without edge and spacing influences. Recommended loads: material safety factor  $\gamma_M$  and safety factor for load  $\gamma_L=1.4$  included.

## The strong internally threaded anchor with unique 4-way expansion for fixings in aerated concrete



### APPROVALS



### ADVANTAGES

- The FPX-I enables easy tightening via the hexagon wrench using a cordless screwdriver or ratchet and therefore offers top installation comfort.
- The deformation-controlled expansion of the anchor with the hexagon wrench ensures safe, even and gentle installation.
- The unique 4-way expansion of the FPX-I with a square expansion sleeve prevents the rotation of the anchor in the drill hole and ensures high tension and shear loads, which means fewer fixing points.
- The releasing of the hexagonal wrench guarantees an automatic setting control for each installation process.
- The first steel anchor with an ETA-Approval and fire protection certificate for fixings in aerated concrete enables use for safety relevant fixings, too.

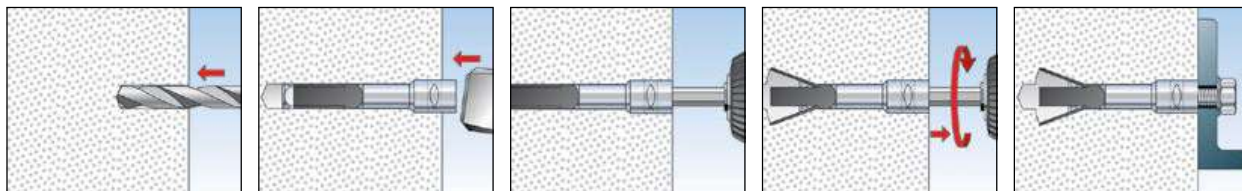
### BUILDING MATERIALS

- Approved for:**
- Aerated concrete with compressive strength 2 to 7 N/mm<sup>2</sup>
  - Aerated concrete wall or ceiling boards with compressive strength 3.3 to 4.4 N/mm<sup>2</sup>
  - Planked aerated concrete masonry, e.g. plastered, tiled, papered etc.

### VERSION

- Zinc-plated steel

### INSTALLATION



### ANCHOR INSTALLATION DATA

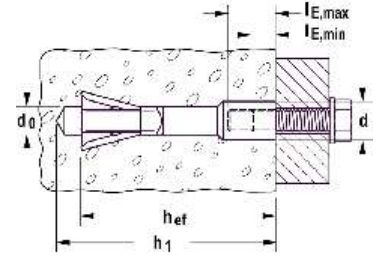
Required component dimensions in aerated masonry.

Anchor type	FPXI M6, M8, M10, M12		
<b>Component Dimensions</b>			
Minimum member thickness with drill hole cleaning	$h_{min}$ (mm)	10	
Minimum member thickness without drill hole cleaning	$h_{min}$ (mm)	70	
<b>Single Anchor</b>			
Minimum Spacing between Single Anchors	$a$ (mm)	375	
Minimum Edge Distance	$c1$ (mm)	125	
Minimum Distance to joints	$cF^{*}$ (mm)	75 <sup>*)</sup> / 125	
Minimum Edge Distance orthogonal to $c1$	$c2$ (mm)	190	
<b>Anchor group with 2 or 4 anchors</b>			
<b>Actions</b>			
		Shear + Oblique Tension	Only Axial Tension
Minimum spacing	$S_{min}$ (mm)	100	100
Minimum edge distances $c1$	$c1$ (mm)	250	125
Minimum Spacing between Single Anchors	$a$ (mm)	750	375
Minimum Edge Distance orthogonal to $c1$	$c2$ (mm)	375	190

## TECHNICAL DATA



Aircrete anchor **FPX-I**



2

High Performance Steel Anchors

Item	Art-No.	Drill hole diameter $d_0$ (mm)	Anchor length $l$ (mm)	Min. drill hole depth for pre-positioned installation $h_p$ (mm)	Effective anchorage depth $h_{ef}$ (mm)	Min. bolt penetration $l_{E,min}$ (mm)	Max. bolt penetration $l_{E,max}$ (mm)	Sales unit (pcs)
	qvz							
FPX M6-I	519021	10	75	95	70	10	15	25
FPX M8-I	519022	10	75	95	70	8	15	25
FPX M10-I	519023	10	75	95	70	10	15	25
FPX M12-I	519024	10	75	95	70	12	15	25

## ACCESSORIES



Setting tool **FPX M6 I**



Setting tool **FPX M8-M12 I**

Item	Art-No.	Matching anchor type (mm)	Sales unit (pcs)
Setting tool FPX M6 I	522517	FPX M6-I	25
Setting tool FPX M8-12 I	522518	FPX M8-I to FPX M12-I	25

## LOADS

High performance anchor for aerated masonry

Highest Permissible Loads<sup>1) 5)</sup> and design Loads<sup>5)</sup> for FPXI M6, M8, M10 & M12 in Aerated Masonry

Compressive Strength of AAC Blocks	Permissible Loads $F_{perm}^{1) 5)}$ (mm)	Design Loads $F_{design}^{5)}$ (mm)
AAC Compressive Strength $\geq 1.6$ N/mm <sup>2</sup>	0.32	0.43
AAC Compressive Strength $\geq 2$ N/mm <sup>2</sup>	0.43	0.58
AAC Compressive Strength $\geq 4$ N/mm <sup>2</sup>	0.89	1.20
AAC Compressive Strength $\geq 6$ N/mm <sup>2</sup>	1.43	1.93

For the design the complete approval ETA - 12/0456 has to be considered.

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered.

<sup>2)</sup> cF for tensile load and/or shear load parallel to the joint which is not filled with mortar with width  $\leq 2$  mm.

<sup>3)</sup>  $F_{perm,Group} = 2 \times F_{perm,single anchor}$  valid in case of anchor groups with 2 or 4 anchors.

<sup>4)</sup> In case of non visible joints  $F_{perm}$  has to be divided in half.

<sup>5)</sup> Grade of the screw, resp. threaded rod  $\geq 4.8$ .