



LB



SB



ES



ESSH



EBF



HBF

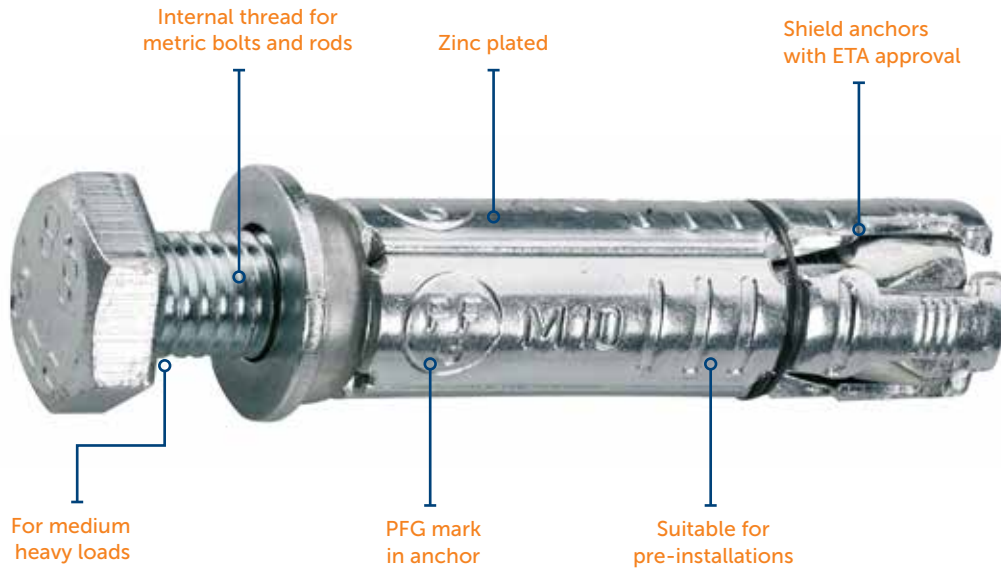
PRODUCT DATA SHEET

PFG SHIELD ANCHORS



LB, SB, ES, ESSH, EBF, HBF PFG ANCHORS

The original shield anchors with extra expansion for low-quality concrete



PFG® SHIELD ANCHORS

Description

- Torque-controlled shield anchors for pre- and distance installations depending on the type.
- 4-way extra wide expansion for great performance also in lower quality base materials found in many old constructions.
- ZP for dry indoor and temporary outdoor use.
- Blackdized for dry and humid indoor use, outdoor in rural areas only



LB

Pre-positioned installations with hexagonal bolt, ETA approved



Zinc electropl. acc. EN ISO 4042, $t \geq 5 \mu\text{m}$
 Dry indoor conditions, indoor with temporary condensation

ESSH

Pre-positioned installations



Blackdized for dry and humid indoor use, outdoor in rural areas only.

SB

Pre-positioned installations with threaded rod + nut. ETA approved Zinc electropl. acc. EN



ISO 4042, $t \geq 5 \mu\text{m}$
 Dry indoor conditions, indoor with temporary condensation

EBF

Pre-positioned installations with eyebolt



Zinc electropl. acc. EN ISO 4042, $t \geq 5 \mu\text{m}$
 Dry indoor conditions, indoor with temporary condensation

ES

Pre-positioned installations, ETA approved



Zinc electropl. acc. EN ISO 4042, $t \geq 5 \mu\text{m}$
 Dry indoor conditions, indoor with temporary condensation

HBF

Pre-positioned installations with hookbolt



Zinc electropl. acc. EN ISO 4042, $t \geq 5 \mu\text{m}$
 Dry indoor conditions, indoor with temporary condensation

Base materials

Approved for

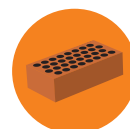


Non-cracked concrete

Also suitable for



Solid clay brick










Perforated clay brick



Natural stone

APPROVALS / CERTIFICATIONS / APPLICATIONS

Description of document		Authority/ Laboratory	ID	Additional info
European Technical Assessment		Centre Scientifique et Technique du Bâtiment	ETA-01/0012	ETAG 001-1 Option 8
Fire resistance		Centre Scientifique et Technique du Bâtiment	ETA-01/0012	EOTA TR 020 - Evaluation of Anchorages in Concrete concerning Resistance to Fire
Russian Technical Approval		FAU FCS	TC 4635-15	Technical approval
Sormat Trustfix anchor calculation software		Sormat Oy / S&P Software Consulting		TrustFIX anchor calculation
CAD-blocks for AutoCAD		Sormat Oy		Blocks installation instructions for AutoCAD
Drop in anchor components for TEKLA Structures		Sormat Oy		Tekla structures components + instructions video
YouTube installation videos		Sormat Oy		Sormat PFG anchor installation video

LB, SB, ES, ESSH, EBF, HBF PFG ANCHORS

STATIC AND QUASI-STATIC LOADS FOR TYPES LB, SB, ES

The data of these tables is based on:

- ETA-01/0012: Zinc plated anchors
- Non-cracked concrete C20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$
- Installation has been done correctly (see page 8)
- In combination with threaded studs or bolts of grade 8.8 or higher
- Edge- and spacing distance's (see page 10)
- Respect of minimum base material thickness (see page 10)

Characteristic resistances, all load directions

Anchor size		M6	M8	M10	M12	M16
Approval		OPT 8	OPT 8	OPT 8	OPT 8	-
Effective anchorage depth h_{ef}	[mm]	40	50	60	80	100
Nominal anchorage depth h_{nom}	[mm]	40	50	60	80	100
Concrete						
Tensile N_{Rk}	[kN]	5,0	9,0	12,0	16,0	25,0
Shear V_{Rk}	[kN]	8,0*	14,0*	23,0*	33,0*	62,8*

Design resistances, all load directions

Anchor size		M6	M8	M10	M12	M16
Approval		OPT 8	OPT 8	OPT 8	OPT 8	-
Effective anchorage depth h_{ef}	[mm]	40	50	60	80	100
Nominal anchorage depth h_{nom}	[mm]	40	50	60	80	100
Concrete						
Tensile N_{Rd}	[kN]	3,3	6,0	8,0	10,7	16,7
Shear V_{Rd}	[kN]	6,4*	11,2*	18,4*	26,4*	50,2*

Recommended loads, all load directions

Anchor size		M6	M8	M10	M12	M16
Approval		OPT 8	OPT 8	OPT 8	OPT 8	-
Effective anchorage depth h_{ef}	[mm]	40	50	60	80	100
Nominal anchorage depth h_{nom}	[mm]	40	50	60	80	100
Concrete						
Tensile N_{rec}	[kN]	2,4	4,3	5,7	7,6	11,9
Shear V_{rec}	[kN]	4,6*	8,0*	13,1*	18,9*	35,9*

* Failure mode = STEEL

FIRE RESISTANCE FOR TYPES LB, SB, ES

The data of these tables is based on:

- ETA-01/0012: Zinc plated anchors
- Non-cracked concrete C20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$
- Installation has been done correctly (see page 8)
- Edge- and spacing distances (see page 10)
- Respect of minimum base material thickness (see page 10)



Characteristic resistances

Anchor size		M6	M8	M10	M12
Approval		OPT 8	OPT 8	OPT 8	OPT 8
Effective anchorage depth h_{ef}	[mm]	40	50	60	80
Fire Exposure R30					
Load $F_{Rk,fi}$	[kN]	0,2	0,4	0,9	1,7
Fire Exposure R120					
Load $F_{Rk,fi}$	[kN]	0,1	0,2	0,5	0,8

Design resistances

Anchor size		M6	M8	M10	M12
Approval		OPT 8	OPT 8	OPT 8	OPT 8
Effective anchorage depth h_{ef}	[mm]	40	50	60	80
Fire Exposure R30					
Load $F_{Rd,fi}$	[kN]	0,2	0,4	0,9	1,7
Fire Exposure R120					
Load $F_{Rd,fi}$	[kN]	0,1	0,2	0,5	0,8

Recommended loads, all load directions

Anchor size		M6	M8	M10	M12
Approval		OPT 8	OPT 8	OPT 8	OPT 8
Effective anchorage depth h_{ef}	[mm]	40	50	60	80
Fire Exposure R30					
Load $F_{rec,fi}$	[kN]	0,2	0,4	0,9	1,7
Fire Exposure R120					
Load $F_{rec,fi}$	[kN]	0,1	0,2	0,5	0,8

In absence of other national regulations the partial safety factor for resistance under fire exposure $\gamma_{M,fi} = 1,0$ is recommended

MATERIALS AND DIMENSIONS

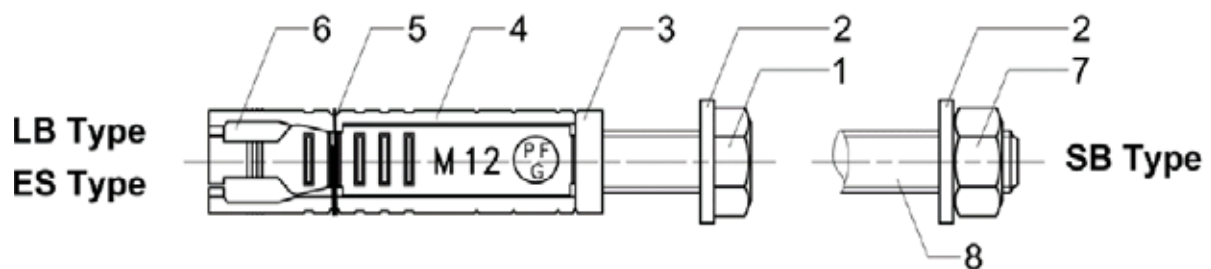
Mechanical properties

Specification			M6	M8	M10	M12	M16
Nominal tensile strength	F_{uk}	[N/mm ²]	800	800	800	800	800
Char. bending resistance	$M_{Rk,s}^0$	[Nm]	12	30	60	105	266
Design bending resistance	$M_{Rd,s}$	[Nm]	9,6	24,0	48,0	84,0	212,8
Recommended bending resistance	M_{rec}	[Nm]	6,9	17,1	34,3	60,0	152,0

Materials

Part	Material	
1	Hexagonal bolt	DIN 933 class 8.8 / galvanized min. 5 µm
2	Washer	EN ISO 7089A / galvanized min. 5 µm
3	Capsule	NA / galvanized min. 5 µm
4	Shields	Carbon steel / galvanized min. 5 µm or blackdized (ESSH)
5	Coil Spring	C1080 / NA
6	Conical Nut	Class 8 / galvanized min. 5 µm
7	Hexagonal nut	DIN 934 class 8 / galvanized min. 5 µm
8	Stud Bolt	class 8.8 / galvanized min. 5 µm

Blackdized is not covered by ETA-01/0012



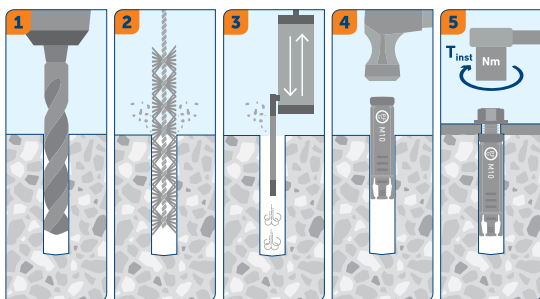
SETTING INSTRUCTIONS

FOR TYPES **LB, SB, ES, ESSH, EBF, HBF**

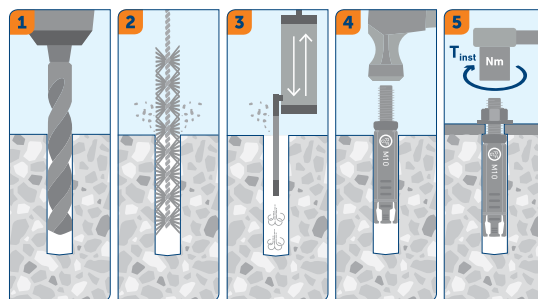
Installation equipment

Specification	M6	M8	M10	M12	M16
Rotary hammer	750...1200 rpm / 1.8 ...3.3 J			360...550 rpm / 4,9...11,5 J	
	SDS+ 2-CUT or 4-CUT				
Drill bit	10	14	16	20	25
Additional tools	Air pump/compressor, hammer, wrench, torque wrench				

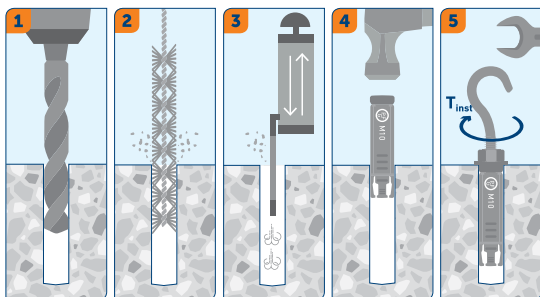
TYPES **LB, ES**



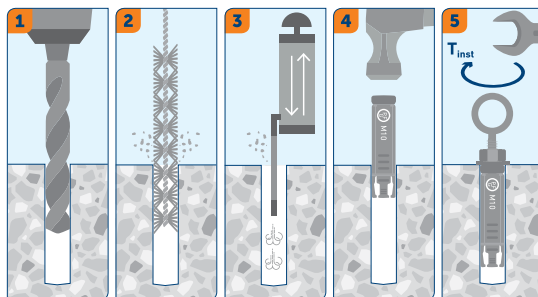
TYPE **SB**



TYPE **HBF**



TYPE **EBF**



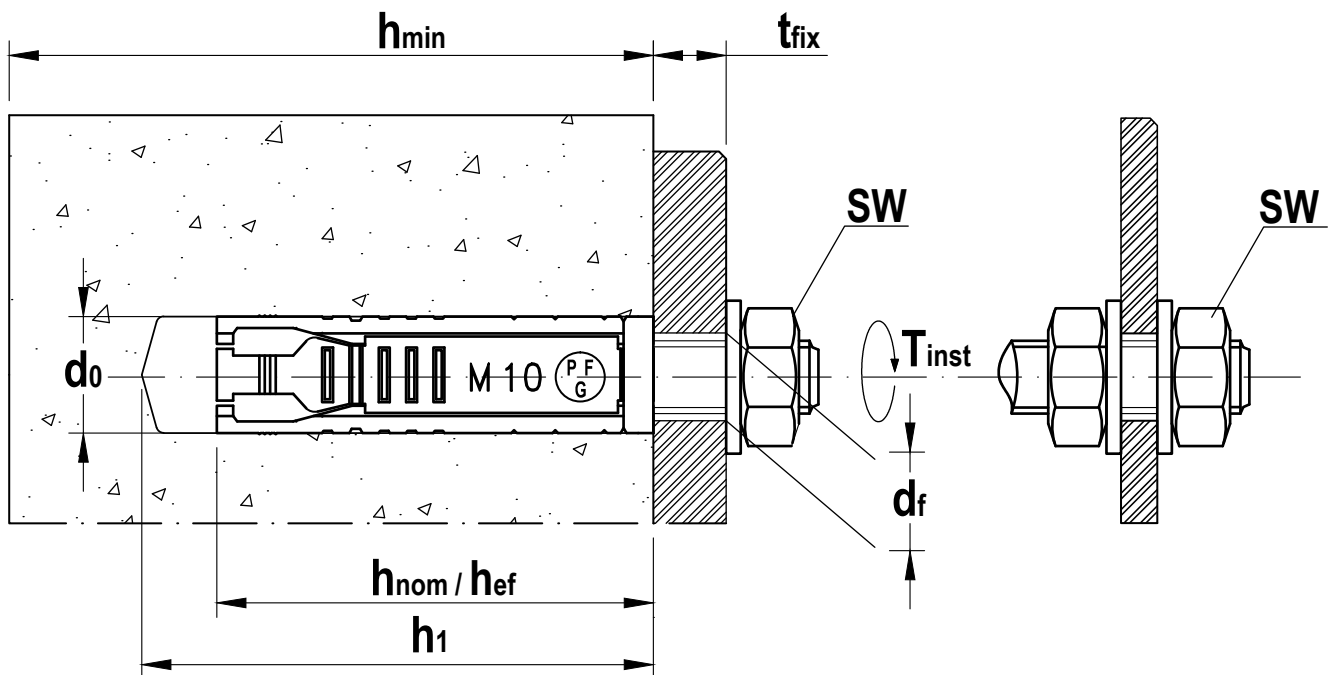
INSTALLATION

Installation data and anchor dimensions

Parameters and anchors sizes			M6	M8	M10	M12	M16
Drill hole diameter	d_0	[mm]	10	14	16	20	25
Cutting diameter at the upper tolerance limit (max. diam. bit)	$d_{cut,max} \leq$	[mm]	10,45	14,50	16,50	20,55	25,55
Depth of drilled hole to deepest point	$h_1 \geq$	[mm]	45	55	65	85	105
Effective anchorage depth	h_{ef}	[mm]	40	50	60	80	100
Nominal anchorage depth	h_{nom}	[mm]	40	50	60	80	100
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	11	13	18
Torque moment type B	T_{inst}	[Nm]	10	25	50	85	120
Width across flats	SW	[mm]	10	13	17	19	24

PRE-POSITIONED INSTALLATION

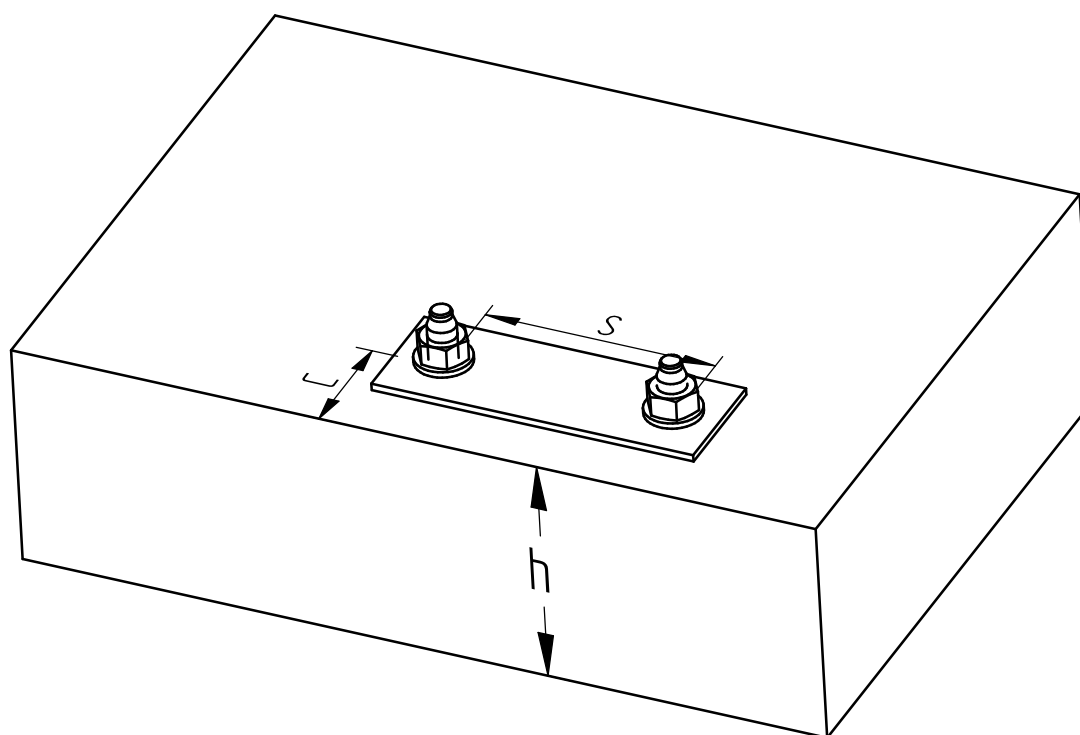
DISTANCE INSTALLATION



INSTALLATION

Minimum thickness of concrete member, spacing and edge distance

Cracked and non-cracked concrete			M6	M8	M10	M12	M16
Effective anchorage depth	h_{ef}	[mm]	40	50	60	80	100
Nominal anchorage depth	h_{nom}	[mm]	40	50	60	80	100
Minimum thickness of base material	h_{min}	[mm]	100	100	120	160	170
Minimum spacing	s_{min}	[mm]	60	75	90	120	150
Minimum edge distance	c_{min}	[mm]	60	75	90	120	150
Critical spacing for splitting failure and concrete cone failure (in case characteristic loading affects)	$s_{cr,sp}$	[mm]	240	300	360	480	NA
	$s_{cr,N}$	[mm]	120	150	180	240	300
Critical edge distance for splitting failure and concrete cone failure (in case characteristic loading affects)	$c_{cr,sp}$	[mm]	120	150	180	240	NA
	$c_{cr,N}$	[mm]	60	75	90	120	150



NOTES

Blank lined area for notes, consisting of 20 horizontal grey bars.

LB, SB, ES, ESSH, EBF, HBF PFG ANCHORS



ETA-01/0012 Not part of ETA

Size	Type	Type	Type	Type	Type	Type
M6	6-15	6-15	6	6	6	6
	6-35	6-30				
M8	8-25	8-20	8	8	8	8
	8-35	8-30				
	8-45	8-45				
	-	8-85				
M10	10-15	10-10	10	10	10	10
	10-35	10-20				
	10-55	10-30				
	10-85	10-50				
	-	10-70				
M12	12-20	12-20	12	12	12	12
	12-50	12-30				
	12-70	12-50				
	-	12-65				
M16	16-30	16-25	16	16	16	16
	-	16-45				