



HMU-PF UNDERCUT ANCHOR

Technical Datasheet

Update: Jan-19





HMU-PF Undercut anchor

Everyday standard undercut anchor for cracked concrete

Anchor version



HMU-PF
(M12-M16)

Benefits

- Reliable mechanical interlock due to consistent high quality self-undercut
- ETA approval for cracked and non-cracked concrete
- Seismic approval ETA C1
- Comes standard with a hot-dip galvanized protective coating against corrosion
- Cost efficient heavy duty anchoring solution for high volume fastenings
- Easy verification of correct setting due to red setting mark
- Optimized and matching system components enable efficient and reliable installation

Base material



Concrete
(non-cracked)



Concrete
(cracked)

Load conditions



Static/
quasi-static

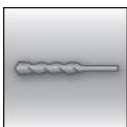


Seismic
ETA-C1



Fire
resistance

Installation conditions



Hammer
drilled holes

Other information



European
Technical
Assessment



CE
conformity



PROFIS
design
Software

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment ^{a)}	CSTB, Marne-la-Vallée	ETA-14/0069 / 2015-12-24
Shockproof fastenings in civil defence installations	Federal Office for Civil Protection, Bern	BZS D 14-602/2014-10-31

a) All data given in this section according to ETA-14/0069, issue 2015-12-24.

Static resistance

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$

Effective anchorage depth for static

Anchor size		M12	M16	M16
Effective anchorage depth range	h_{ef} [mm]	80	100	125

Characteristic resistance

Anchor size			M12x80	M16x100	M16x125
Non-cracked concrete					
Tension N_{Rk}	HMU-PF	[kN]	36,1	50,5	70,6
Shear V_{Rk}	HMU-PF		33,7	62,8	62,8
Cracked concrete					
Tension N_{Rk}	HMU-PF	[kN]	20	36	50,3
Shear V_{Rk}	HMU-PF		33,7	62,8	62,8

Design resistance

Anchor size			M12x80	M16x100	M16x125
Non-cracked concrete					
Tension N_{Rd}	HMU-PF	[kN]	24,1	33,7	47,1
Shear V_{Rd}	HMU-PF		27,0	50,2	50,2
Cracked concrete					
Tension N_{Rd}	HMU-PF	[kN]	13,3	24,0	33,5
Shear V_{Rd}	HMU-PF		27,0	48,0	50,2

Recommended loads ^{a)}

Anchor size			M12x80	M16x100	M16x125
Non-cracked concrete					
Tension N_{Rec}	HMU-PF	[kN]	17,2	24	33,6
Shear V_{Rec}	HMU-PF		19,3	35,9	19,3
Cracked concrete					
Tension N_{Rec}	HMU-PF	[kN]	9,5	17,1	24,0
Shear V_{Rec}	HMU-PF		19,3	34,3	35,9

a) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.



Seismic resistance (for a single anchor)

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$
- $\alpha_{gap} = 1,0$ (using Hilti seismic filling set)

Effective anchorage depth for seismic C1

Anchor size	M12	M16	M16
Effective anchorage depth range h_{ef} [mm]	80	100	125

Characteristic resistance in case of seismic performance category C1

Anchor size	M12x80	M16x100	M16x125
Tension $N_{Rk,seis}$ HMU-PF [kN]	17,3	30,6	42,8
Shear $V_{Rk,seis}$ HMU-PF [kN]	33,7	61,2	62,8

Design resistance in case of seismic category C1

Anchor size	M12x80	M16x100	M16x125
Tension $N_{Rd,seis}$ HMU-PF [kN]	11,5	20,4	28,5
Shear $V_{Rd,seis}$ HMU-PF [kN]	27,0	40,8	50,2

Fire resistance

Fire resistance data according to ETA-14/0069

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$

Recommended tension and shear resistance in cracked and non-cracked concrete

Anchor size	M12X80	M16X100	M16X125
HMU-PF	R30 $F_{Rk,fi}$ [kN]	1,7	3,1
	R120 $F_{Rk,fi}$ [kN]	0,8	1,6

For more information about different failure modes and fire resistance times please see the full ETA-14/0069 report.

Materials

Mechanical properties

Anchor size			M12x80	M16x100	M16x125
Nominal tensile strength	f_{uk}	[N/mm ²]	800	800	800
Yield strength	f_{yk}	[N/mm ²]	640	640	640
Stressed cross-section, thread	A_s	[mm ²]	84,3	157	157
Moment of resistance	W	[mm ³]	109	278	278
Char. bending resistance	$M^0_{Rk,s}$	[Nm]	105	266	266

Material quality

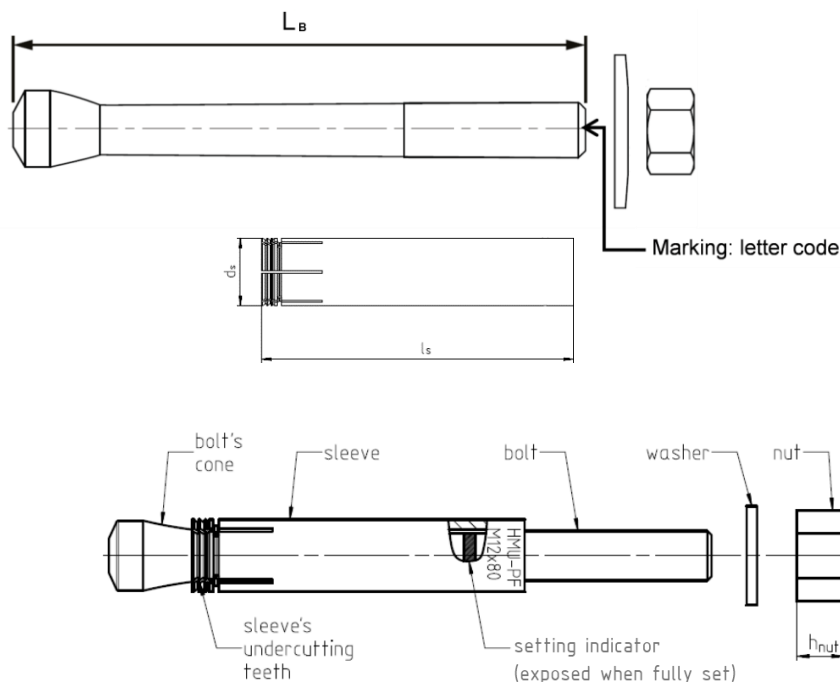
Part	Material
Threaded bolt with cone	Carbon steel strength 8.8, hot dip galvanized to min. 50 μ m
Sleeve	Carbon steel, hot dip galvanized min. 50 μ m
Hexagon nut	Steel grade 8, hot dip galvanized min. 50 μ m
Washer	According to DIN 125-1, 140 HV, hot dip galvanized min. 50 μ m

Letter code for anchor length

Anchor size	HMU-PF M12	M12x80/20	M12x80/35	M12x80/65
Letter code		H	I	K
Anchor size	HMU-PF M16	M16x100/30	M16x100/60	M16x125/60
Letter code		K	M	O

Anchor dimension

Anchor size		M12x80	M16x100	M16x125
Total length of bolt L_B	min	133	167	222
	max	176	197	239
Diameter of sleeve	d_s	17,5	21,6	21,6
Length of sleeve	l_s	80,6	100	125



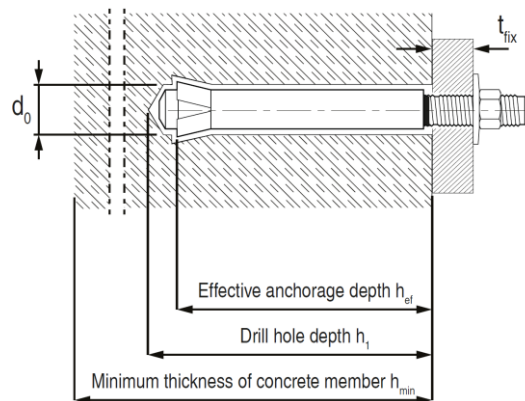
Setting information

Setting details of HMU-PF

Anchor size			M12x80	M16x100	M16x125
Effective anchorage depth	h_{ef}	[mm]	80	100	125
Nominal Diameter of drill bit	d_0	[mm]	18	23	
Cutting diameter of drill bit ¹⁾	$d_{cut} \leq$	[mm]	18,5	23,0	
Depth of drill hole	$h_1 =$	[mm]	92	115	140
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	14	18	
Thickness of fixture	t_{fix}	min.	2	0 ²⁾	0 ²⁾
		max	65	60	75
Torque moment	T_{inst}	[Nm]	45	120	
Width across nut flats	SW	[mm]	19	24	

1) Use special stop drill bit TE-C-HMU-B only.

2) When thickness of attachment is less than 3mm, big washer acc. to DIN1052 standard needs to be used.



Installation equipment

Anchor size	M12x80	M16x100	M16x125
Rotary hammer	TE 40 / TE 30-A36		
Stop drill bit	TE-C-HMU-B M12x80	TE-C-HMU-B M16x100 TE-Y-HMU-B M16x100	TE-C-HMU-B M16x125 TE-Y-HMU-B M16x125
Setting tool	TE-C-HMU-ST-M12	TE-C-HMU-ST-M16 / TE-Y-HMU-ST-M16	
Insert connections	TE-C (SDS Plus)	TE-C (SDS Plus) TE-Y (SDS Max)	
Other tools	Blow-out bulb		

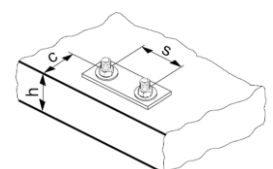
Setting parameters

Anchor size			M12	M16	M16
Effective anchorage depth	h_{ef}	[mm]	80	100	125
Minimum base material thickness	$h_{min} \geq$	[mm]	160	200	250
Minimum spacing	$s_{min} \geq$	[mm]	90	100	100
Minimum edge distance	$c_{min} \geq$	[mm]	90	100	100
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	300	300	375
Critical edge distance for splitting failure	$c_{cr,sp}$	[mm]	150	160	200
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	240	300	375
Critical edge distance for concrete cone failure	$c_{cr,N}$	[mm]	120	150	188

In case of smaller edge distance and spacing than $c_{cr,sp}$, $s_{cr,sp}$, $c_{cr,N}$ and $s_{cr,N}$ the load values shall be reduced according ETAG 001, Annex C.

Critical spacing and critical edge distance for splitting failure apply only for non-cracked concrete.

For cracked concrete only the critical spacing and critical edge distance for concrete cone failure are decisive.



Setting instruction

*For detailed information on installation see instruction for use given with the package of the product.

Setting instruction for HMU-PF	
1. Drilling 	2. Cleaning
3. Inserting the anchor by hand 	4. Applying hammer drill
5. Applying hammer drill 	6. Checking
7. Attaching the fixture 	8. Attaching the belonging washer