



# HDA Undercut anchor

**Product Technical Datasheet**



**Steel-to-concrete**

Update: June 24







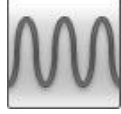


# HDA Undercut anchor

## Heavy-duty undercut anchor

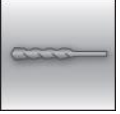

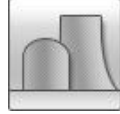



Anchor version	Benefits
 <p>Anchor for pre-setting HDA-P HDA-PF (M10-M20) HDA-PR (M10-M16)</p>	<ul style="list-style-type: none"> <li>- Safe and high performance structural seismic design with ETA C1 and C2</li> <li>- Mechanical interlock (undercut)</li> <li>- Low expansion force (thus small edge distance / spacing)</li> <li>- Self undercutting (without special undercutting tool)</li> </ul>
 <p>Anchor for through-fastening HDA-T HDA-TF (M10-M20) HDA-TR (M10-M16)</p>	<ul style="list-style-type: none"> <li>- Performance of a headed stud</li> <li>- Complete system (anchor, stop drill bit, setting tool, drill hammer)</li> <li>- Setting mark on anchor for control (easy and safe)</li> <li>- Completely removable</li> </ul>



### Base material      Load conditions

						
Concrete (uncracked)	Concrete (cracked)	Static/ quasi-static	Seismic, C1, C2	Fatigue	Shock BZS-CH	Fire resistance

### Drilling, cleaning, setting      Other information

					
Hammer drilled holes	Tracefast	Nuclear power plant approval	Hilti technical data	PROFIS Engineering Software	Steel to concrete Handbook



**Linked Approvals/Certificates and Instructions for use**







**Approvals/certificates**

Approval no	Application / loading condition	Authority / Laboratory	Date of issue	Date of expiry
<a href="#">ETA-99/0009</a>	Static and quasi-static / Seismic	CSTB, Marne-la-Vallée	06-01-2015	-
<a href="#">ETA-18/0974</a>	Fatigue	DIBt, Berlin	30-11-2020	-
<a href="#">BZS D 09-601</a>	Shockproof fastenings in civil defence installations	Federal Office for Civil Protection, Bern	31-10-2020	31-10-2030
<a href="#">Z-21.1-1987</a>	Nuclear power plants	DIBt, Berlin	20-06-2023	15-04-2025

**Instructions for use**

Anchor version	M10	M12	M16	M20
P	<a href="#">IFU HDA M10-P/PR/PF</a>	<a href="#">IFU HDA M12-P/PR/PF</a>	<a href="#">IFU HDA M16-P/PR/PF</a>	<a href="#">IFU HDA M20-P/PF</a>
T	<a href="#">IFU HDA M10-T/TR/TF</a>	<a href="#">IFU HDA M12-T/TR/TF</a>	<a href="#">IFU HDA M16-T/TR/TF</a>	<a href="#">IFU HDA M20-T/TF</a>
Filling set	<a href="#">IFU Filling set</a>			

**Link to Hilti Webpage**

<a href="#">HDA-P</a>	<a href="#">HDA-T</a>	<a href="#">HDA-PR</a>	<a href="#">HDA-TR</a>	<a href="#">HDA-PF</a>	<a href="#">HDA-TF</a>
					

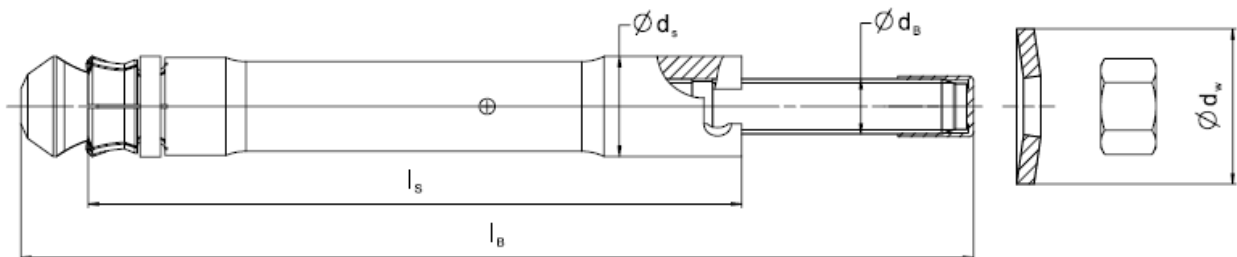
## Fastener special dimensions

### Anchor dimensions

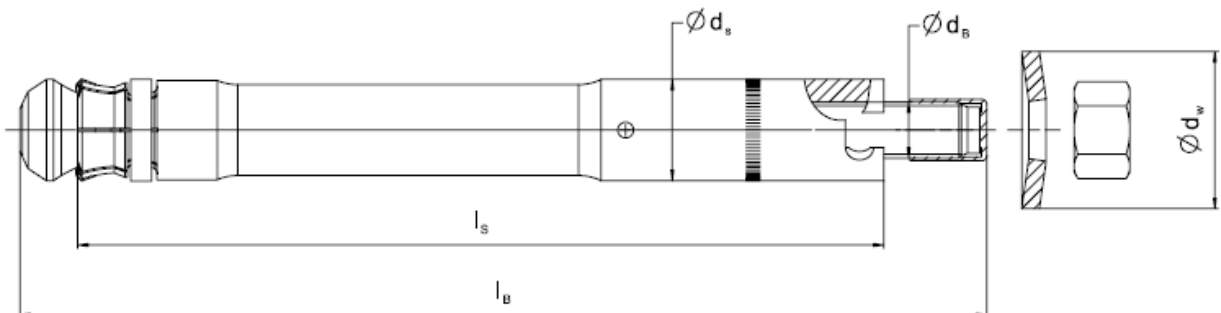
Anchor size			HDA-P / HDA-PR / HDA-T / HDA-TR / HDA-PF / HDA-TF							
			M10		M12		M16		M20	
			x100/20	x125/30	x125/50	x190/40	x190/60	x250/50	x250/100	
<b>Length code letter</b>			I	L	N	R	S	V	X	
Total length of bolt	$l_B$	[mm]	150	190	210	275	295	360	410	
Diameter of bolt	$d_B$	[mm]	10	12		16		20		
Length of sleeve	HDA-P	$l_s$	100	125	125	190	190	250	250	
	HDA-T	$l_s$	120	155	175	230	250	300	350	
Max. diameter of sleeve	$d_s$	[mm]	19	21		29		35		
Diameter of washer	$d_w$	[mm]	27,5	33,5		45,5		50		
Width across flats	SW	[mm]	17	19		24		30		

Anchor size	Material / Coating
HDA-P / HDA-T	Carbon steel, galvanized to min. 5 $\mu\text{m}$
HDA-PF / HDA-TF	Carbon steel, sherardized
HDA-PR / HDA-TR	Stainless steel

#### HDA-P / HDA-PF / HDA-PR



#### HDA-T / HDA-TF / HDA-TR

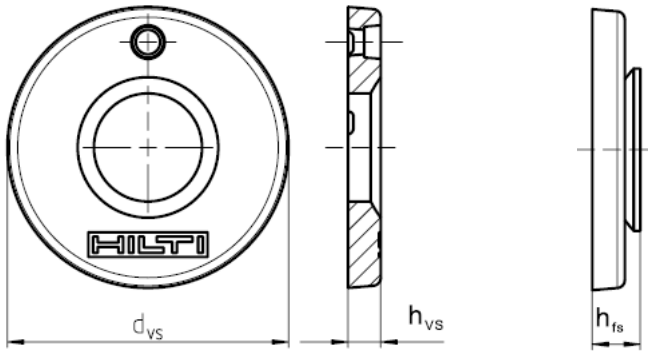




Hilti filling set :

**Dimensions of filling washer**

Anchor size		M10	M12	M16	M20
Diameter	$d_{vs}$ [mm]	42	44	52	60
Height of filling washer	$h_{vs}$ [mm]	5	5	6	6
Height of filling washer and spherical washer	$h_{fs}$ [mm]	9	10	11	13



**Static and quasi-static loading based on ETA-99/0009 for HDA-P / HDA-PR / HDA-T / HDA-TR and Hilti technical data for HDA-PF and HDA-TF. Design according to EN 1992-4**

**All data in this section applies to:**

- Correct setting (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances)
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25
- Hammer drilled holes
- Recommended loads: With overall partial safety factor for action  $\gamma = 1,4$ .

For specific design cases refer to [PROFIS Engineering](#).

**Design resistance: Tension**

Anchor size		M10	M12	M16	M20
Effective anchorage depth	$h_{ef}$ [mm]	100	125	190	250
<b>Uncracked concrete</b>					
HDA-P, HDA-PF, HDA-T, HDA-TF	$N_{Rd}$ [kN]	30,7	44,7	84,0	128,0
HDA-PR, HDA-TR		28,8	41,9	78,8	-
<b>Cracked concrete</b>					
HDA-P, HDA-PF, HDA-T, HDA-TF	$N_{Rd}$ [kN]	16,7	23,3	50,0	63,3
HDA-PR, HDA-TR		16,7	23,3	50,0	-

**Design resistance: Shear for uncracked and cracked concrete**

Anchor size		M10	M12			M16				M20		
Effective anchorage depth	$h_{ef}$ [mm]	100	125			190				250		
HDA-T, HDA-TF	$t_{fix,min}$ [mm]	15	15	20	30	20	25	30	35	25	40	55
	$t_{fix,max}$ [mm]	<20	<20	<30	<50	<25	<30	<35	<60	<40	<55	<100
	$V_{Rd}$ [kN]	46,7	53,3	66,7	66,7	93,3	103,3	113,3	126,7	136,7	156,7	166,7
HDA-TR	$t_{fix,min}$ [mm]	15	15	20	30	20	25	30	35	-		
	$t_{fix,max}$ [mm]	20	20	30	50	25	30	35	60	-		
	$V_{Rd}$ [kN]	53,4	65,4	70,7	82,0	114,3	118,8	118,8	127,8	-		
HDA-P, HDA-PF	$V_{Rd}$ [kN]	17,6	24,0			49,6				73,6		
HDA-PR		17,3	25,6			47,4				-		



### Recommended loads: Tension

Anchor size	M10	M12	M16	M20
Effective anchorage depth $h_{ef}$ [mm]	100	125	190	250
<b>Uncracked concrete</b>				
HDA-P, HDA-PF, HDA-T, HDA-TF $N_{rec}$ [kN]	21,9	31,9	60,0	91,4
HDA-PR, HDA-TR	20,5	29,9	56,3	-
<b>Cracked concrete</b>				
HDA-P, HDA-PF, HDA-T, HDA-TF $N_{rec}$ [kN]	11,9	16,7	35,7	45,2
HDA-PR, HDA-TR	11,9	16,7	35,7	-

### Recommended loads: Shear for uncracked and cracked concrete

Anchor size	M10	M12				M16				M20		
Effective anchorage $h_{ef}$ [mm]	100	125				190				250		
HDA-T, HDA-TF	$t_{fix,min}$ [mm]	15	15	20	30	20	25	30	35	25	40	55
	$t_{fix,max}$ [mm]	<20	<20	<30	<50	<25	<30	<35	<60	<40	<55	<100
	$V_{rec}$ [kN]	31	38	38	38	67	74	81	90	98	112	119
HDA-TR	$t_{fix,min}$ [mm]	15	15	20	30	20	25	30	35	-		
	$t_{fix,max}$ [mm]	20	20	30	50	25	30	35	60	-		
	$V_{rec}$ [kN]	38	47	50	59	82	85	85	91	-		
HDA-P, HDA-PF	$V_{rec}$ [kN]	12,6	17,1				35,4				52,6	
HDA-PR		12,3	18,2				33,8				-	

HDA M20: only galvanized 5 $\mu$ m version is available.

Resistance values for HDA-T types are presented without centering washer. To check the values using centering washer, refer to ETA-99/0009.

**Seismic loading based on ETA-99/0009 for HDA-P / HDA-PR / HDA-T / HDA-TR and Hilti technical data for HDA-PF and HDA-TF. Design according to EN 1992-4**

**All data in this section applies to:**

- Correct setting (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances)
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25
- Hammer drilled holes
- $\alpha_{\text{gap}} = 1,0$  using Hilti filling set

For specific design cases refer to [PROFIS Engineering](#).

**Design resistance in case of seismic performance category C2: Tension**

Anchor size		M10	M12	M16	M20
Effective anchorage depth	$h_{\text{ef}}$ [mm]	100	125	190	250
<b>Cracked concrete</b>					
HDA-P, HDA-PF, HDA-T, HDA-TF	$N_{\text{Rd}}$ [kN]	16,7	23,3	50	63,3
HDA-PR, HDA-TR		16,7	23,3	50	-

**Design resistance in case of seismic performance category C2: Shear**

Anchor size		M10	M12			M16				M20		
Effective anchorage depth	$h_{\text{ef}}$ [mm]	100	125			190				250		
HDA-T, HDA-TF	$t_{\text{fix,min}}$ [mm]	15	15	20	30	20	25	30	35	25	40	55
	$t_{\text{fix,max}}$ [mm]	<20	<20	<30	<50	<25	<30	<35	<60	<40	<55	<100
	$V_{\text{Rd}}$ [kN]	28	37,3	46,7	46,7	56	62	68	74,7	96	110	116,7
HDA-TR	$t_{\text{fix,min}}$ [mm]	15	15	20	30	20	25	30	35	-		
	$t_{\text{fix,max}}$ [mm]	20	20	30	50	25	30	35	60	-		
	$V_{\text{Rd}}$ [kN]	32,3	45,9	49,6	57,1	68,4	71,4	71,4	76,7	-		
HDA-P, HDA-PF	$V_{\text{Rd}}$ [kN]	16	19,2			44,8				66,4		
HDA-PR	$V_{\text{Rd}}$ [kN]	15,8	20,3			42,9				-		





### Design resistance in case of seismic performance category C1: Tension

Anchor size	M10	M12	M16	M20
Effective anchorage depth $h_{ef}$ [mm]	100	125	190	250
<b>Cracked concrete</b>				
HDA-P, HDA-PF, HDA-T, HDA-TF	27,7	38,7	72,5	109,4
HDA-PR, HDA-TR				

### Design resistance in case of seismic performance category C1: Shear

Anchor size	M10	M12	M16	M20								
Effective anchorage depth $h_{ef}$ [mm]	100	125	190	250								
HDA-T, HDA-TF	$t_{fix,min}$ [mm]	15	15	20	30	20	25	30	35	25	40	55
	$t_{fix,max}$ [mm]	<20	<20	<30	<50	<25	<30	<35	<60	<40	<55	<100
	$V_{Rd}$ [kN]	46,7	53,3	66,7	66,7	93,3	103,3	113,3	126,7	136,7	156,7	166,7
HDA-TR	$t_{fix,min}$ [mm]	15	15	20	30	20	25	30	35	-		
	$t_{fix,max}$ [mm]	20	20	30	50	25	30	35	60	-		
	$V_{Rd}$ [kN]	53,1	65,4	70,7	74,2	114,3	118,8	118,8	127,8	-		
HDA-P, HDA-PF	17,6	24		49,6				73,6				
HDA-PR		17,3	25,6		47,4				-			

### Fatigue loading based on ETA-18/0974. Design according to EN 1992-4

#### All data in this section applies to:

- Correct setting using Hilti seismic filling set (See setting instruction)
- For a single anchor
- No edge distance and spacing influence (see table with characteristic distances).
- Characteristic spacing and edge distance for splitting failure apply only for uncracked concrete.
- For cracked concrete only the characteristic spacing and edge distance for concrete cone failure are decisive
- Minimum base material thickness (see table)
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C 20/25
- Hammer drilled holes

For specific design cases refer to [PROFIS Engineering](#).

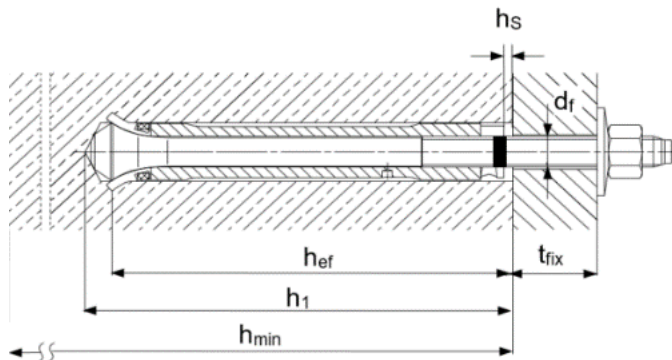
#### Design resistance

Anchor size	M10	M12	M16	M20	
Effective anchorage depth $h_{ef}$ [mm]	100	125	190	250	
<b>Uncracked concrete</b>					
Tension	HDA-P	6,8	12,1	16,8	19,8
	HDA-T				
Shear	HDA-P	6,3	11,1	17,0	13,0
	HDA-T				
<b>Cracked concrete</b>					
Tension	HDA-P	6,8	12,1	16,8	19,8
	HDA-T				
Shear	HDA-P	6,3	11,1	17,0	13,0
	HDA-T				

## Setting information

### Setting details

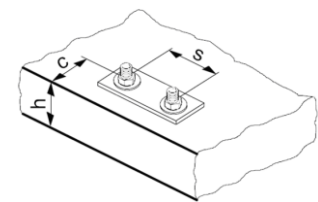
Anchor size		HDA-P / HDA-PR							
		M10		M12		M16		M20	
		x100/20	x125/30	x125/50	x190/40	x190/60	x250/50	x250/10	
Length code letter		I	L	N	R	S	V	X	
Nominal drill bit diameter	$d_0$ [mm]	20	22		30		37		
Depth of drill hole	$h_1$ [mm]	107	133		203		266		
Effective anchorage depth	$h_{ef}$ [mm]	100	125		190		250		
Sleeve recess	$h_{s,min}$ [mm]	2	2		2		2		
	$h_{s,max}$ [mm]	6	7		8		8		
Torque moment	$T_{inst}$ [Nm]	50	80		120		300		
Clearance hole	$d_f$ [mm]	12	14		18		22		
Minimum base material thickness	$h_{min}$ [mm]	180	200		270		350		
Minimum spacing	$s_{min}$ [mm]	100	125		190		250		
Minimum edge distance	$c_{min}$ [mm]	80	100		150		200		
<b>Fixture thicknesses</b> (Minimum fixture thickness is 10 mm under cyclic loads according to ETA-18/0974)									
Tension load only	$t_{fix,min}$ [mm]	10	10		15		20	50	
Shear load	$t_{fix,min}$ [mm]	15	15		20		25	50	
Max. fixture thickness	$t_{fix,max}$ [mm]	20	30	50	40	60	50	100	
Thickness of Hilti filling set	$h_{fs}$ [mm]	9	10		11		13		
Effective fixture thickness with Hilti filling set	$t_{fix,ef}$ [mm]	$t_{fix} - h_{fs}$							
<b>Characteristic distances</b>									
Spacing for splitting failure	$s_{cr,sp}$ [mm]	300	375		570		750		
Edge distance for splitting failure	$c_{cr,sp}$ [mm]	150	190		285		375		
Spacing for concrete cone failure	$s_{cr,N}$ [mm]	300	375		570		750		
Edge distance for concrete cone failure	$c_{cr,N}$ [mm]	150	190		285		375		



HDA-P / HDA-PR

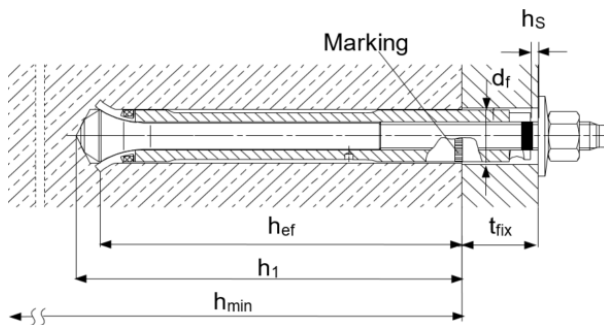


Filling set



### Setting details

Anchor size		HDA-T / HDA-TR							
		M10	M12		M16		M20		
		x100/20	x125/30	x125/50	x190/40	x190/60	x250/50	x250/100	
Length code letter		I	L	N	R	S	V	X	
Nominal drill bit	$d_0$ [mm]	20	22		30		37		
Depth of drill hole	$h_{1min}$ [mm]	107	133		203		266		
	$h_1$ [mm]	$h_{1min} + (t_{fix,max} - t_{fix})$							
Effective anchorage depth	$h_{ef}$ [mm]	100	125		190		250		
Sleeve recess	$h_{s,min}$ [mm]	2	2		2		2		
	$h_{s,max}$ [mm]	6	7		8		8		
Torque moment	$T_{inst}$ [Nm]	50	80		120		300		
Clearance hole	$d_f$ [mm]	21	23		32		40		
Minimum base material thickness	$h_{min}$ [mm]	$200-t_{fix}$	$230-t_{fix}$	$250-t_{fix}$	$310-t_{fix}$	$330-t_{fix}$	$400-t_{fix}$	$450-t_{fix}$	
Minimum spacing	$s_{min}$ [mm]	100	125		190		250		
Minimum edge distance	$c_{min}$ [mm]	80	100		150		200		
<b>Fixture thicknesses</b> (Minimum fixture thickness is 10 mm under cyclic loads according to ETA-18/0974)									
Tension load only	$t_{fix,min}$ [mm]	10	10		15		20	50	
Shear load	$t_{fix,min}$ [mm]	15	15		20		25	50	
Max. fixture thickness	$t_{fix,max}$ [mm]	20	30	50	40	60	50	100	
Thickness of Hilti filling set	$h_{fs}$ [mm]	9	10		11		13		
Effective fixture thickness with Hilti filling set	$t_{fix,ef}$ [mm]	$t_{fix} - h_{fs}$							
<b>Characteristic distances</b>									
Spacing for splitting failure	$s_{cr,sp}$ [mm]	300	375		570		750		
Edge distance for splitting failure	$c_{cr,sp}$ [mm]	150	190		285		375		
Spacing for concrete cone failure	$s_{cr,N}$ [mm]	300	375		570		750		
Edge distance for concrete cone failure	$c_{cr,N}$ [mm]	150	190		285		375		



HDA-T / HDA-TR



Filling set

