



# HIT-RE 500 V4 INJECTION MORTAR

**Product Technical Datasheet**  
**Steel-to-concrete**  
Update: July 24



# HIT-RE 500 V4 injection mortar

Anchor design (EN 1992-4) / Rods, Sleeves and Rebar / Concrete

## Injection mortar system



Foil pack: HIT-RE 500 V4  
(available in 330, 500 and 1400 ml Foils)



Anchor rod (M8-M39):

HAS,  
HAS HDG,  
HAS A4,  
HAS-U,  
HAS-U HDG,  
HAS-U A4,  
HAS-U HCR



Internally threaded sleeve (M8-M20):

HIS-N  
HIS-RN



Rebar ( $\phi 8 - \phi 40$ )



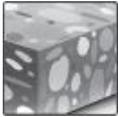
## Benefits

- technology:
  - Simplified method of borehole preparation using either Hilti hollow drill bit for hammer drilling or Roughening tool for diamond cored applications
- Suitable for non-cracked and cracked concrete C 20/25 to C 50/60
- High loading capacity
- Suitable for dry and water saturated concrete
- Hilti Technical Data for under water application
- ETA Data for 100y working life
- High corrosion resistance
- Long working time at elevated temperatures
- Cures down to  $-5\text{ }^{\circ}\text{C}$
- Odourless epoxy

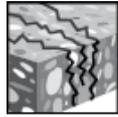


## Application condition

### Base material

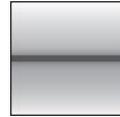


Concrete  
(uncracked)

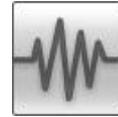


Concrete  
(cracked)

### Load conditions



Static/  
Quasi-static



Seismic,  
ETA-C1, C2



Fire  
Resistance

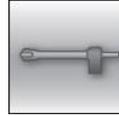
### Drilling, cleaning, setting



Hammer  
drilled holes



Diamond  
cored  
holes

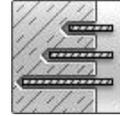


Hollow Drill  
Bit drilled  
holes



Water-filled  
boreholes

### Other information



Variable  
embedment  
depth



ETA,  
100 Years  
Working life



PROFIS  
Engineering  
design  
Software



Hilti  
Technical  
Data

## 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-20/0541</a>	Static and quasi-static / Seismic / Fire	CSTB Champs-Sur-Marne	09-06-2023	-
No.: 10/2021	Engineering Judgement (120-years working life based on EAD 330499-01-0601)	BERGMEISTER, Vienna	11-11-2021	-
BZS D 21-602	Shockproof fastenings in civil defence installations	Federal Office for Civil Protection, Bern	25-10-2021	-
Hilti Technical data	Static and quasi-static	Hilti	-	-

### Instructions for use(IFU)

Material			
Injection mortar	<a href="#">IFU Hilti HIT-RE 500 V4 (330/500 ml)</a>	<a href="#">IFU Hilti HIT-RE 500 V4 (1400 ml)</a>	-
Fastener	<a href="#">IFU HAS-U</a>	<a href="#">IFU HAS</a>	<a href="#">IFU HIS-N</a>
Accessory	<a href="#">IFU Filling set</a>	-	-
Dispenser	<a href="#">IFU HDM</a>	<a href="#">IFU HDE</a>	<a href="#">IFU HIT-P8000D</a>

**Link to Hilti Webpage**

Injection mortars / Dispenser / Accessories					
<a href="#">Hilti HIT-RE 500 V4</a>	<a href="#">HDE 500-22</a>	<a href="#">HDE 500-A12</a>	<a href="#">HDM 500</a>	<a href="#">Filling set</a>	<a href="#">Hilti HIT-P8000D</a>
Fastener: Threaded rod					
<a href="#">HAS-U</a>	<a href="#">HAS</a>	<a href="#">HIS-N</a>			

**Fastener special dimensions**

**Mechanical properties and dimensions HAS and HAS-U**

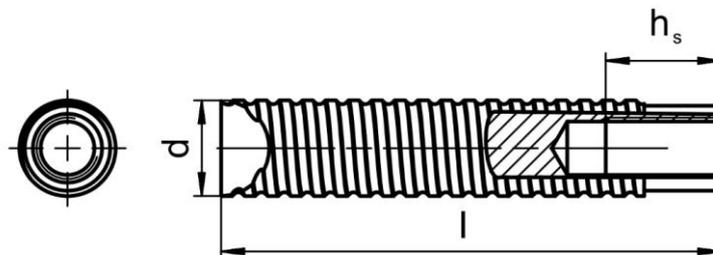
Mechanical properties and dimensions of the threaded rods are standardized and can be taken from the ETA listed in the table Approvals / Certificates.

**Mechanical properties and dimensions HIS-N and HIS-RN**

Mechanical properties of the internal threaded sleeve can be taken from the ETA listed in the table Approvals / Certificates.

**Dimensions for HIS-N and HIS-RN**

Anchor size		M8	M10	M12	M16	M20
Diameter of element	d [mm]	12,5	16,5	20,5	25,4	27,6
Length of element	L [mm]	90	110	125	170	205
Thread engagement length; min - max	$h_s$ [mm]	8-20	10-25	12-30	16-40	20-50



**Mechanical properties and dimensions rebar**

Mechanical properties and dimensions of the rebars B500 B are standardized and can be taken from the ETA.

**Material quality**

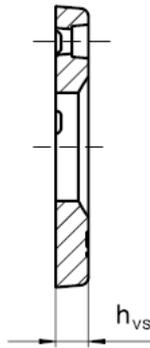
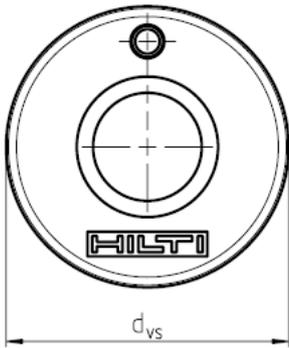
Part	Material
Rebar	Bars and de-coiled rods class B or C according to NDP or NCL of EN 1992-1-1

## Mechanical properties and dimensions filling washer for use with standard nut

Mechanical properties of the filling washer can be taken from the ETA's listed in the table Approvals / Certificates.

### Dimensions filling washer

Anchor size		M8	M10	M12	M16	M20	M24
Diameter	$d_{vs}$ [mm]	38	42	44	52	60	70
Height of filling washer	$h_{vs}$ [mm]	5	5	5	6	6	6
Height of filling washer and spherical washer	$h_{fs}$ [mm]	8	9	10	11	13	15



**Static and quasi-static loading based on ETA-20/0541 and design according to EN 1992-4**

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

- Correct setting (see setting instruction)
- For a single anchor
- Hammer drilled holes, hammer drilled holes with Hilti hollow drill bit
- No edge distance and spacing influence (see setting detail tables with characteristic distances)
- Minimum base material thickness, as specified in the table of this section
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section (HIS-N with screw grade 8.8 and HIS-RN with screw grade 70)
- Concrete C 20/25
- Data given below are for 50 Years Working Life
- In-service temperature range I: -40 °C to +40 °C  
(min. base material temperature -40 °C, max. long/short term base material temperature: +24 °C/40 °C)
- Short term loading. For long term loading apply  $\psi_{\text{sus}}$  acc. to EN 1992-4  
Hammer drilled holes, hammer drilled holes with hollow drill bit and diamond cored holes with Hilti roughening tool:  $\psi_{\text{sus}}^0 = 0,88$
- Recommended loads: With overall partial safety factor for action  $\gamma = 1,4$ .

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

**Embedment depth <sup>1)</sup> and base material thickness**

Anchor size			ETA-20/0541							Hilti tech. data			
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
<b>HAS, HAS-U</b>													
Embedment depth	$h_{\text{ef}}$	[mm]	80	90	110	125	170	210	240	270	300	330	360
Base material thickness	$h$	[mm]	110	120	140	161	214	266	300	340	374	410	444
<b>HIS-N</b>													
Embedment depth	$h_{\text{ef}}$	[mm]	90	110	125	170	205	-	-	-	-	-	-
Base material thickness	$h$	[mm]	120	150	170	230	270	-	-	-	-	-	-

Rebar B500 B size			ETA-20/0541											Hilti tech. data		
			$\phi 8$	$\phi 10$	$\phi 12$	$\phi 14$	$\phi 16$	$\phi 18$	$\phi 20$	$\phi 24$	$\phi 25$	$\phi 28$	$\phi 30$	$\phi 32$	$\phi 36$	$\phi 40$
Embedment depth	$h_{\text{ef}}$	[mm]	80	90	110	125	125	150	170	190	210	270	270	300	330	360
Base material thickness	$h$	[mm]	110	120	142	161	165	194	220	250	274	340	344	380	420	470

<sup>1)</sup> The allowed range of embedment depth is shown in the setting details.



### Design resistance

Anchor size		ETA-20/0541								Hilti tech. data				
		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39		
<b>Uncracked concrete</b>														
Tension	HAS 5.8 HAS-U 5.8	N <sub>Rd</sub>	[kN]	12,2	19,3	28,1	45,8	72,7	99,8	121,9	145,5	142,0	163,8	186,7
	HAS 8.8 HAS-U 8.8			19,5	28,0	37,8	45,8	72,7	99,8	121,9	145,5	142,0	163,8	186,7
	HAS A4 HAS-U A4			13,7	21,7	31,6	45,8	72,7	99,8	80,2	98,1	121,3	142,8	170,6
	HAS-U HCR			19,5	28,0	37,8	45,8	72,7	99,8	121,9	145,5	142,0	163,8	186,7
	HIS-N 8.8			16,7	30,7	44,7	72,7	77,3	-	-	-	-	-	-
	HIS-RN 70			13,9	21,9	31,6	58,8	69,2	-	-	-	-	-	-
	Shear			HAS 5.8 HAS-U 5.8	V <sub>Rd</sub>	[kN]	8,8	13,9	20,2	37,7	58,8	84,7	110,2	134,6
HAS 8.8 HAS-U 8.8		11,7	18,6	27,0			50,2	78,4	113,0	146,9	179,5	222,1	261,4	312,3
HAS A4 HAS-U A4		8,2	13,0	18,9			35,2	55,0	79,2	48,2	58,9	72,9	85,8	102,5
HAS-U HCR		11,7	18,6	27,0			50,2	78,4	70,6	91,8	112,2	87,0	102,0	122,0
HIS-N 8.8		10,4	18,4	27,2			50,4	46,4	-	-	-	-	-	-
HIS-RN 70		8,3	12,8	19,2			35,3	41,5	-	-	-	-	-	-
<b>Cracked concrete</b>														
Tension	HAS 5.8 HAS-U 5.8	N <sub>Rd</sub>	[kN]	10,0	17,0	26,5	32,1	50,9	69,9	85,4	101,8	-	-	-
	HAS 8.8 HAS-U 8.8			10,0	17,0	26,5	32,1	50,9	69,9	85,4	101,8	-	-	-
	HAS A4 HAS-U A4			10,0	17,0	26,5	32,1	50,9	69,9	80,2	98,1	-	-	-
	HAS-U HCR			10,0	17,0	26,5	32,1	50,9	69,9	85,4	101,8	-	-	-
	HIS-N 8.8			16,7	26,5	32,1	50,9	67,4	-	-	-	-	-	-
	HIS-RN 70			13,9	21,9	31,6	50,9	67,4	-	-	-	-	-	-
	Shear			HAS 5.8 HAS-U 5.8	V <sub>Rd</sub>	[kN]	8,8	13,9	20,2	37,7	58,8	84,7	110,2	134,6
HAS 8.8 HAS-U 8.8		11,7	18,6	27,0			50,2	78,4	113,0	146,9	179,5	-	-	-
HAS A4 HAS-U A4		8,2	13,0	18,9			35,2	55,0	79,2	48,2	58,9	-	-	-
HAS-U HCR		11,7	18,6	27,0			50,2	78,4	70,6	91,8	112,2	-	-	-
HIS-N 8.8		10,4	18,4	27,2			50,4	46,4	-	-	-	-	-	-
HIS-RN 70		8,3	12,8	19,2			35,3	41,5	-	-	-	-	-	-

### Design resistance

Rebar B500B size		ETA-20/0541											Hilti tech. data			
		φ8	φ10	φ12	φ14	φ16	φ18	φ20	φ24	φ25	φ28	φ30	φ32	φ36	φ40	
<b>Uncracked concrete</b>																
Tension	N <sub>Rd</sub>	[kN]	13,4	28,0	37,8	45,8	45,8	60,2	72,7	85,9	99,8	145,5	145,5	170,4	163,8	186,7
Shear	V <sub>Rd</sub>	[kN]	9,3	14,7	20,7	28,0	36,7	46,7	57,3	82,7	90,0	112,7	129,3	147,3	186,7	230,7
<b>Cracked concrete</b>																
Tension	N <sub>Rd</sub>	[kN]	7,4	18,8	26,5	32,1	32,1	42,2	50,9	60,1	69,9	101,8	101,8	119,3	-	-
Shear	V <sub>Rd</sub>	[kN]	9,3	14,7	20,7	28,0	36,7	46,7	57,3	82,7	90,0	112,7	129,3	147,3	-	-

**Recommended loads**

Anchor size		ETA-20/0541								Hilti tech. data				
		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39		
<b>Uncracked concrete</b>														
Tension	HAS 5.8 HAS-U 5.8	N <sub>Rec</sub> [kN]	[kN]	8,7	13,8	20,1	32,7	51,9	71,3	87,1	103,9	101,4	117,0	133,3
	HAS 8.8 HAS-U 8.8			13,9	20,0	27,0	32,7	51,9	71,3	87,1	103,9	101,4	117,0	133,3
	HAS A4 HAS-U A4			9,8	15,5	22,5	32,7	51,9	71,3	57,3	70,1	86,7	102,0	121,9
	HAS-U HCR			13,9	20,0	27,0	32,7	51,9	71,3	87,1	103,9	101,4	117,0	133,3
	HIS-N 8.8			11,9	21,9	31,9	51,9	55,2	-	-	-	-	-	-
	HIS-RN 70			9,9	15,7	22,5	42,0	49,4	-	-	-	-	-	-
Shear	HAS 5.8 HAS-U 5.8	V <sub>Rec</sub> [kN]	[kN]	6,3	9,9	14,5	26,9	42,0	60,5	78,7	96,2	119,0	140,1	167,3
	HAS 8.8 HAS-U 8.8			8,4	13,3	19,3	35,9	56,0	80,7	104,9	128,2	158,6	186,7	223,1
	HAS A4 HAS-U A4			5,9	9,3	13,5	25,2	39,3	56,6	34,4	42,1	52,1	61,3	73,2
	HAS-U HCR			8,4	13,3	19,3	35,9	56,0	50,4	65,6	80,1	62,1	72,9	87,1
	HIS-N 8.8			7,4	13,1	19,4	36,0	33,1	-	-	-	-	-	-
	HIS-RN 70			6,0	9,2	13,7	25,2	29,6	-	-	-	-	-	-
<b>Cracked concrete</b>														
Tension	HAS 5.8 HAS-U 5.8	N <sub>Rec</sub> [kN]	[kN]	7,2	12,1	18,9	22,9	36,3	49,9	61,0	72,7	-	-	-
	HAS 8.8 HAS-U 8.8			7,2	12,1	18,9	22,9	36,3	49,9	61,0	72,7	-	-	-
	HAS A4 HAS-U A4			7,2	12,1	18,9	22,9	36,3	49,9	57,3	70,1	-	-	-
	HAS-U HCR			7,2	12,1	18,9	22,9	36,3	49,9	61,0	72,7	-	-	-
	HIS-N 8.8			11,9	18,9	22,9	36,3	48,1	-	-	-	-	-	-
	HIS-RN 70			9,9	15,7	22,5	36,3	48,1	-	-	-	-	-	-
Shear	HAS 5.8 HAS-U 5.8	V <sub>Rec</sub> [kN]	[kN]	6,3	9,9	14,5	26,9	42,0	60,5	78,7	96,2	-	-	-
	HAS 8.8 HAS-U 8.8			8,4	13,3	19,3	35,9	56,0	80,7	104,9	128,2	-	-	-
	HAS A4 HAS-U A4			5,9	9,3	13,5	25,2	39,3	56,6	34,4	42,1	-	-	-
	HAS-U HCR			8,4	13,3	19,3	35,9	56,0	50,4	65,6	80,1	-	-	-
	HIS-N 8.8			7,4	13,1	19,4	36,0	33,1	-	-	-	-	-	-
	HIS-RN 70			6,0	9,2	13,7	25,2	29,6	-	-	-	-	-	-

**Recommended loads**

Rebar B500B size		ETA-20/0541											Hilti tech. data		
		φ8	φ10	φ12	φ14	φ16	φ18	φ20	φ24	φ25	φ28	φ30	φ32	φ36	φ40
<b>Uncracked concrete</b>															
Tension	N <sub>rec</sub> [kN]	9,6	20,0	27,0	32,7	32,7	43,0	51,9	61,4	71,3	103,9	103,9	121,7	117,0	133,3
Shear	V <sub>rec</sub> [kN]	6,7	10,5	14,8	20,0	26,2	33,3	41,0	59,0	64,3	80,5	92,4	105,2	133,3	164,8
<b>Cracked concrete</b>															
Tension	N <sub>rec</sub> [kN]	5,3	13,5	18,9	22,9	22,9	30,1	36,3	42,9	49,9	72,7	72,7	85,2	-	-
Shear	V <sub>rec</sub> [kN]	6,7	10,5	14,8	20,0	26,2	33,3	41,0	59,0	64,3	80,5	92,4	105,2	-	-

## Seismic loading based on ETA-20/0541 and design according to EN 1992-4

### All data in this section applies to:

- Correct setting (see setting instruction)
- For a single anchor
- Hammer drilled holes, hammer drilled holes with Hilti hollow drill bit
- No edge distance and spacing influence (see setting detail tables with characteristic distances)
- Minimum base material thickness, as specified in the table of this section
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete class C 20/25
- In-service temperature range I  
(min. base material temperature -40 °C, max. long/short term base material temperature: +24 °C/40 °C)
- $\alpha_{\text{gap}}=1,0$  (using Hilti seismic filling set) or  $\alpha_{\text{gap}}=0,5$  (without using Hilti seismic filling set) accordingly

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

### Embedment depth and base material thickness for seismic C2 and C1

Anchor size			ETA-20/0541							
			M8	M10	M12	M16	M20	M24	M27	M30
<b>HAS ,HAS-U</b>										
Embedment depth	$h_{\text{ef}}$	[mm]	80	90	110	125	170	210	240	270
Base material thickness	$h$	[mm]	110	120	140	161	214	266	300	340
<b>HIS-N</b>										
Embedment depth	$h_{\text{ef}}$	[mm]	90	110	125	170	205	-	-	-
Base material thickness	$h$	[mm]	120	146	169	226	269	-	-	-

### Embedment depth and base material thickness in case of seismic performance category C1

Rebar B500B size			ETA-20/0541											
			$\phi 8$	$\phi 10$	$\phi 12$	$\phi 14$	$\phi 16$	$\phi 18$	$\phi 20$	$\phi 24$	$\phi 25$	$\phi 28$	$\phi 30$	$\phi 32$
Embedment depth	$h_{\text{ef}}$	[mm]	-	90	110	125	125	150	170	190	210	270	270	300
Base material thickness	$h$	[mm]	-	120	142	161	165	194	220	250	274	340	344	380

### Design resistance in case of seismic performance category C2

Anchor size			ETA-20/0541							
			M8	M10	M12	M16	M20	M24	M27	M30
Tension	HAS ,HAS-U 8.8,	$N_{\text{Rd,seis}}$ [kN]	-	-	10,2	27,2	41,3	59,4	67,8	86,6
	HAS-U 8.8 HDG,		-	-	10,2	27,2	41,3	59,4	-	-
<b>with Hilti filling set</b>										
Shear	HAS ,HAS-U 8.8	$V_{\text{Rd,seis}}$ [kN]	-	-	22,4	36,8	61,6	82,4	-	-
	HAS-U 8.8 HDG		-	-	14,4	24,0	36,8	52,8	-	-
<b>without Hilti filling set</b>										
Shear	HAS ,HAS-U 8.8	$V_{\text{Rd,seis}}$ [kN]	-	-	9,6	16,0	28,4	36,0	48,4	54,0
	HAS-U 8.8 HDG,		-	-	7,2	12,0	18,4	26,4	-	-

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

Anchor size		ETA-20/0541								
		M8	M10	M12	M16	M20	M24	M27	M30	
Tension	HAS ,HAS-U 8.8	$N_{Rd,seis}$ [kN]	9,1	15,4	22,5	27,3	43,3	59,4	72,6	86,6
	HIS-N 8.8		16,7	22,5	27,3	43,3	57,3	-	-	-
<b>with Hilti filling set</b>										
Shear	HAS ,HAS-U 8.8	$V_{Rd,seis}$ [kN]	11,7	18,6	27,0	50,2	78,4	113,0	-	-
	HIS-N 8.8		7,2	12,8	21,6	32,8	31,2	-	-	-
<b>without Hilti filling set</b>										
Shear	HAS ,HAS-U 8.8	$V_{Rd,seis}$ [kN]	5,9	9,3	13,5	25,1	39,2	56,5	73,4	89,8
	HIS-N 8.8		3,6	6,4	10,8	16,4	15,6	-	-	-

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

Rebar B500B size		ETA-20/0541											
		$\phi 8$	$\phi 10$	$\phi 12$	$\phi 14$	$\phi 16$	$\phi 18$	$\phi 20$	$\phi 24$	$\phi 25$	$\phi 28$	$\phi 30$	$\phi 32$
Tension	$N_{Rd,seis}$ [kN]	-	16,7	22,5	27,3	27,3	35,8	43,3	51,1	59,4	86,6	86,6	101,4
Shear	$V_{Rd,seis}$ [kN]	-	5,0	7,3	10,0	13,0	16,3	20,0	29,0	31,6	39,3	45,3	51,6

### Fire loading based on ETA-20/0541. Design according to EOTA TR 082

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

- In case of fire a partial safety factor  $\gamma_{M,fi} = 1,0$  is taken (in absence of other national recommendations)
- Correct setting (see setting instructions)
- For a single anchor
- Hammer drilled holes, hammer drilled holes with Hilti hollow drill bit
- No edge distance and spacing influence (see setting detail tables with characteristic distances)
- Fire attack from side only
- Minimum base material thickness, as specified in the table of this section
- Embedment depth, as specified in the table of this section
- Anchor material, as specified in the tables of this section
- Concrete C20/25

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

#### Anchorage depth in case of fire

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
<b>HAS 5.8, HAS-U 5.8, HAS A4, HAS-U A4</b>									
Embedment depth (minimum)	$h_{ef,min}$ [mm]	60	60	72	80	90	96	108	120
Base material thickness for $h_{ef,min}$	$h \geq$ [mm]	100	100	105	120	135	155	170	190
Embedment depth (intermediate)	$h_{ef,med}$ [mm]	80	90	96	112	120	120	135	150
Base material thickness for $h_{ef,med}$	$h \geq$ [mm]	110	120	125	150	165	180	195	220
Embedment depth (maximum)	$h_{ef,max}$ [mm]	160	200	240	320	400	480	540	600
Base material thickness for $h_{ef,max}$	$h \geq$ [mm]	190	230	270	360	445	540	600	670



**Design resistance in case of fire**

Anchor size					M8	M10	M12	M16	M20	M24	M27	M30	
<b>HAS 5.8, HAS-U 5.8</b>													
Tension	30 min	hef,min	N <sub>Rd,fi(30)</sub>	[kN]	0,30	0,29	0,59	0,86	1,30	1,66	2,55	3,73	
		hef,med			0,84	1,30	1,64	2,81	3,55	3,59	5,37	7,76	
		hef,max			1,04	1,77	2,80	5,22	8,15	11,74	15,27	18,67	
	60 min	hef,med	N <sub>Rd,fi(60)</sub>	[kN]	0,30	0,50	0,64	1,16	1,47	1,34	2,14	3,19	
		hef,max			0,81	1,34	2,05	3,83	5,98	8,62	11,21	13,70	
	90 min	hef,med	N <sub>Rd,fi(90)</sub>	[kN]	0,10	0,21	0,26	0,56	0,70	0,42	0,94	1,62	
		hef,max			0,58	0,91	1,31	2,44	3,81	5,49	7,14	8,73	
	120 min	hef,max	N <sub>Rd,fi(120)</sub>	[kN]	0,47	0,70	0,93	1,74	2,72	3,92	5,10	6,24	
	Shear	30 min	hef,min	V <sub>Rd,fi(30)</sub>	[kN]	1,04	1,77	2,80	5,22	8,15	11,74	15,27	18,67
			hef,med			1,04	1,77	2,80	5,22	8,15	11,74	15,27	18,67
			hef,max			1,04	1,77	2,80	5,22	8,15	11,74	15,27	18,67
		60 min	hef,med	V <sub>Rd,fi(60)</sub>	[kN]	0,81	1,34	2,05	3,83	5,98	8,62	11,21	13,70
hef,max			0,81			1,34	2,05	3,83	5,98	8,62	11,21	13,70	
90 min		hef,med	V <sub>Rd,fi(90)</sub>	[kN]	0,58	0,91	1,31	2,44	3,81	5,49	7,14	8,73	
		hef,max			0,58	0,91	1,31	2,44	3,81	5,49	7,14	8,73	
120 min		hef,max	V <sub>Rd,fi(120)</sub>	[kN]	0,47	0,70	0,93	1,74	2,72	3,92	5,10	6,24	

**Design resistance in case of fire**

Anchor size					M8	M10	M12	M16	M20	M24	M27	M30	
<b>HAS A4, HAS-U A4</b>													
Tension	30 min	hef,min	N <sub>Rd,fi(30)</sub>	[kN]	0,46	0,49	1,00	1,58	2,57	3,43	5,54	8,50	
		hef,med			1,26	2,10	2,83	5,61	7,64	7,94	12,80	19,50	
		hef,max			2,67	4,85	7,93	14,77	23,06	33,23	43,20	52,81	
	60 min	hef,min	N <sub>Rd,fi(60)</sub>	[kN]	0,10	0,06	0,27	0,43	0,75	0,96	1,66	2,63	
		hef,med			0,44	0,77	1,02	1,99	2,69	2,67	4,33	6,70	
	90 min	hef,max	N <sub>Rd,fi(90)</sub>	[kN]	1,93	3,44	5,56	10,37	16,18	23,31	30,31	37,05	
		hef,med			0,19	0,38	0,50	1,05	1,39	1,31	2,25	3,53	
	120 min	hef,max	N <sub>Rd,fi(120)</sub>	[kN]	1,18	2,03	3,20	5,96	9,30	13,40	17,42	21,29	
	Shear	30 min	hef,min	V <sub>Rd,fi(30)</sub>	[kN]	0,80	1,33	2,01	3,75	5,86	8,44	10,98	13,42
			hef,med			2,67	4,85	7,93	14,77	23,06	31,09	41,74	52,81
			hef,max			2,67	4,85	7,93	14,77	23,06	33,23	43,20	52,81
		60 min	hef,min	V <sub>Rd,fi(60)</sub>	[kN]	1,93	3,44	5,56	10,37	16,18	23,31	30,31	37,05
hef,med			1,93			3,44	5,56	10,37	16,18	23,31	30,31	37,05	
90 min		hef,max	V <sub>Rd,fi(90)</sub>	[kN]	1,93	3,44	5,56	10,37	16,18	23,31	30,31	37,05	
		hef,med			1,18	2,03	3,20	5,96	9,30	13,40	17,42	21,29	
120 min		hef,max	V <sub>Rd,fi(120)</sub>	[kN]	1,18	2,03	3,20	5,96	9,30	13,40	17,42	21,29	
120 min		hef,max	V <sub>Rd,fi(120)</sub>	[kN]	0,80	1,33	2,01	3,75	5,86	8,44	10,98	13,42	

## Setting information

### Installation temperature

-5 °C to +40 °C

### Service temperature range

Hilti HIT-RE 500 V4 injection mortar with anchor rod HAS / HAS-U / HIS-N / Rebar may be applied in the temperature ranges given below. An elevated base material temperature may lead to a reduction of the design bond resistance.

Temperature range	Base material temperature	Maximum long term base material temperature	Maximum short term base material temperature
Temperature range I	-40 °C to +40 °C	+24 °C	+40 °C
Temperature range II	-40 °C to +55 °C	+43 °C	+55 °C
Temperature range III	-40 °C to +75 °C	+55 °C	+75 °C

### Maximum short term base material temperature

Short-term elevated base material temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling.

### Maximum long term base material temperature

Long-term elevated base material temperatures are roughly constant over significant periods of time.

### Working time and curing time

Temperature of the base material	Maximum working time	Minimum curing time
T <sup>b)</sup>	t <sub>work</sub>	t <sub>cure</sub> <sup>a)</sup>
-5 °C to -1 °C	2 h	168 h
> -1 °C to 4 °C	2 h	48 h
> 4 °C to 9 °C	2 h	24 h
> 9 °C to 14 °C	1,5 h	16 h
> 14 °C to 19 °C	1 h	12 h
> 19 °C to 24 °C	30 min	7 h
> 24 °C to 29 °C	20 min	6 h
> 29 °C to 34 °C	15 min	5 h
> 34 °C to 39 °C	12 min	4,5 h
> 39 °C to 40 °C	10 min	4 h

a) The curing time data are valid for dry base material only. In wet base material, the curing times must be doubled.

b) The minimum temperature of the foil pack is +5° C.

### Setting details for HAS, HAS-U

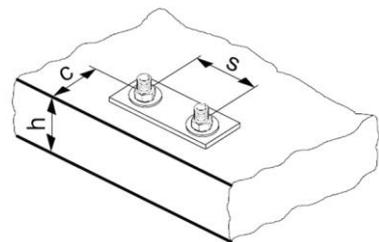
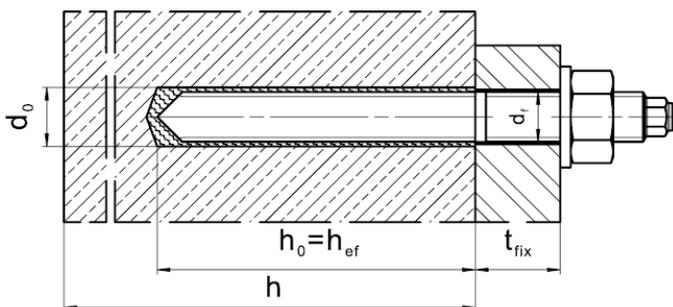
Anchor size	ETA-20/0541									Hilti tech. data			
	M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39		
Nominal diameter of element	d	[mm]	8	10	12	16	20	24	27	30	33	36	39
Nominal diameter of drill bit	d <sub>0</sub>	[mm]	10	12	14	18	22	28	30	35	37	40	42
Effective anchorage depth (=drill hole depth) <sup>a)</sup>	h <sub>ef,min</sub> = h <sub>0</sub>	[mm]	60	60	70	80	90	96	108	120	132	144	156
	h <sub>ef,max</sub> = h <sub>0</sub>	[mm]	160	200	240	320	400	480	540	600	660	720	780
Minimum thickness of concrete member	h <sub>min</sub>	[mm]	h <sub>ef</sub> +30 mm ≥ 100 mm			h <sub>ef</sub> + 2 d <sub>0</sub>							
Maximum installation torque	T <sub>max</sub>	[Nm]	10	20	40	80	150	200	270	300	330	360	390
Minimum spacing	s <sub>min</sub>	[mm]	40	50	60	75	90	115	120	140	165	180	195
Minimum edge distance	c <sub>min</sub>	[mm]	40	45	45	50	55	60	75	80	165	180	195
Characteristic distances													
Spacing for splitting failure	s <sub>cr,sp</sub>	[mm]	2 c <sub>cr,sp</sub>										
Edge distance for splitting failure <sup>b)</sup>	c <sub>cr,sp</sub>	[mm]	1,0 · h <sub>ef</sub>		for h / h <sub>ef</sub> ≥ 2,0								
			4,6 h <sub>ef</sub> - 1,8 h		for 2,0 > h / h <sub>ef</sub> > 1,3								
			2,26 h <sub>ef</sub>		for h / h <sub>ef</sub> ≤ 1,3								
Spacing for concrete cone failure <sup>c)</sup>	s <sub>cr,N</sub>	[mm]	2 c <sub>cr,N</sub>										
Edge distance for concrete cone failure <sup>c)</sup>	c <sub>cr,N</sub>	[mm]	1,5 h <sub>ef</sub>										

For spacing (edge distance) smaller than characteristic spacing (characteristic edge distance) the design loads must be reduced.

a)  $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$  (h<sub>ef</sub>: embedment depth)

b) h: base material thickness (h ≥ h<sub>min</sub>)

c) The characteristic edge distance for concrete cone failure depends on the embedment depth h<sub>ef</sub> and the design bond resistance. The simplified formula given in this table is on the safe side.



### Setting details for HIS-N

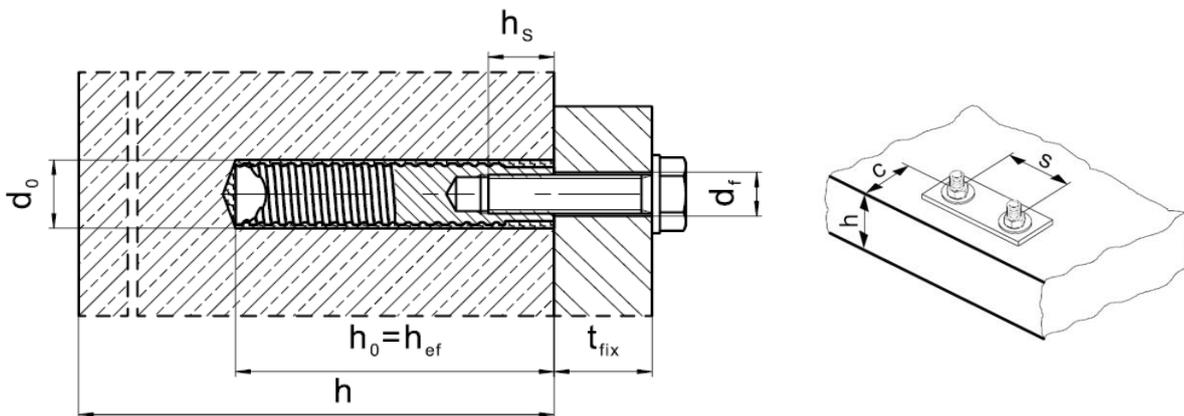
			M8	M10	M12	M16	M20	
Nominal diameter of drill bit	$d_0$	[mm]	14	18	22	28	32	
Diameter of element	$d$	[mm]	12,5	16,5	20,5	25,4	27,6	
Effective anchorage and drill hole depth	$h_{ef} = h_0$	[mm]	90	110	125	170	205	
Minimum thickness of concrete member	$h_{min}$	[mm]	120	150	170	230	270	
Diameter of clearance hole in the fixture	$d_f$	[mm]	9	12	14	18	22	
Thread engagement length; min - max	$h_s$	[mm]	8-20	10-25	12-30	16-40	20-50	
Maximum torque moment <sup>a)</sup>	$T_{max}$	[Nm]	10	20	40	80	150	
Minimum spacing	$s_{min}$	[mm]	60	70	90	115	130	
Minimum edge distance	$c_{min}$	[mm]	40	45	55	65	90	
Characteristic distances								
Spacing for splitting failure	$s_{cr,sp}$	[mm]	$2 c_{cr,sp}$					
Edge distance for splitting failure <sup>b)</sup>	$c_{cr,sp}$	[mm]	$1,0 \cdot h_{ef}$ for $h / h_{ef} \geq 2,0$					
			$4,6 \frac{h_{ef}}{h} - 1,8$ for $2,0 > h / h_{ef} > 1,3$					
			$2,26 h_{ef}$ for $h / h_{ef} \leq 1,3$					
Spacing for concrete cone failure <sup>c)</sup>	$s_{cr,N}$	[mm]	$2 c_{cr,N}$					
Edge distance for concrete cone failure <sup>c)</sup>	$c_{cr,N}$	[mm]	$1,5 h_{ef}$					

For spacing (edge distance) smaller than characteristic spacing (characteristic edge distance) the design loads must be reduced.

<sup>a)</sup> Max. torque moment to avoid splitting failure during Installation with minimum spacing and edge distance

<sup>b)</sup>  $h$ : base material thickness ( $h \geq h_{min}$ )

<sup>c)</sup> The characteristic edge distance for concrete cone failure depends on the embedment depth  $h_{ef}$  and the design bond resistance. The simplified formula given in this table is on the safe side.

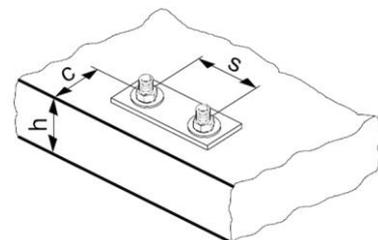
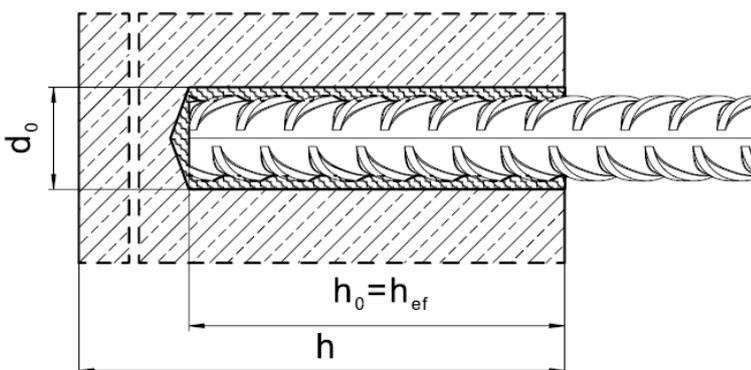


### Setting details rebar

Rebar size			ETA-20/0541												Hilti tech. data			
			φ8	φ10	φ12	φ14	φ16	φ18	φ20	φ24	φ25	φ28	φ30	φ32	φ36	φ40		
Nominal diameter of drill bit	$d_0$	[mm]	10 12 <sup>a)</sup>	12 14 <sup>a)</sup>	14 <sup>a)</sup>	16 <sup>a)</sup>	18	20	22	25	30 32 <sup>a)</sup>	30 32 <sup>a)</sup>	35	37	40	45	55	
Effective embedment depth (drill hole depth)	$h_{ef,min} = h_0$	[mm]	60	60	70	70	75	80	85	90	100	100	112	120	128	144	160	
	$h_{ef,max} = h_0$	[mm]	160	200	240	240	280	320	360	400	480	500	560	600	640	720	800	
Minimum thickness of concrete member	$h_{min}$	[mm]	$h_{ef} + 30\text{mm}$ $\geq 100\text{mm}$				$h_{ef} + 2 d_0$											
Minimum spacing	$s_{min}$	[mm]	40	50	60	60	70	80	90	100	125	125	140	150	160	180	200	
Minimum edge distance	$c_{min}$	[mm]	40	45	45	45	50	50	60	65	70	70	75	80	80	180	200	
Characteristic distances																		
Spacing for splitting failure	$s_{cr,sp}$	[mm]	$2 c_{cr,sp}$															
Edge distance for splitting failure <sup>c)</sup>	$c_{cr,sp}$	[mm]	$1,0 h_{ef}$						for $h / h_{ef} \geq 2,0$									
			$4,6 h_{ef} - 1,8 h$						for $2,0 > h / h_{ef} > 1,3$									
			$2,26 h_{ef}$						for $h / h_{ef} \leq 1,3$									
Spacing for concrete cone failure <sup>d)</sup>	$s_{cr,N}$	[mm]	$2 c_{cr,N}$															
Edge distance for concrete cone failure <sup>d)</sup>	$c_{cr,N}$	[mm]	$1,5 h_{ef}$															

For spacing (edge distance) smaller than characteristic spacing (characteristic edge distance) the design loads must be reduced,

- a) Both given values for drill bit diameter can be used
- b)  $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$  ( $h_{ef}$ : embedment depth)
- c)  $h$ : base material thickness ( $h \geq h_{min}$ )
- d) The characteristic edge distance for concrete cone failure depends on the embedment depth  $h_{ef}$  and the design bond resistance, The simplified formula given in this table is on the safe side.



## Drilling and Installation equipment

For detailed setting information on installation see instructions for use given with the product.

Rotary Hammers (Corded and Cordless)		TE 2 - TE 70
Diamond Coring Machines		DD EC-1, DD 100 ... DD 160
Dispenser		HDE HDM PE-8000D
Other tools		Blow out pump, Compressed air gun, Set of cleaning brushes
		Hammer drill bit TE-CX, TE-YX, TE-C, TE-Y
		Hollow drill bit TE-CD, TE-YD
		Diamond core bit SP-L, SP-HX, SP-H, P-U
		Roughening tools TE-YRT
		Piston plug