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	Benefits

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

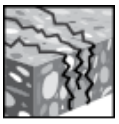
Rebar (ϕ8 - ϕ40)

- safe set 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 °C
- Odourless epoxy

Application condition

Base material

Concrete (uncracked)



Concrete (cracked)

Load conditions

Static/ Quasi-static

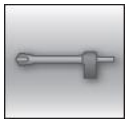
Seismic, ETA-C1, C2

Fire Resistance

Drilling, cleaning, setting

Hammer drilled holes

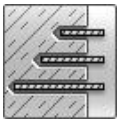
Diamond cored holes



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
ETA-20/0541	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	IFU Hilti HIT-RE 500 V4 (330/500 ml)	IFU Hilti HIT-RE 500 V4 (1400 ml)	-
Fastener	IFU HAS-U	IFU HAS	IFU HIS-N
Accessory	IFU Filling set	-	-
Dispenser	IFU HDM	IFU HDE	IFU HIT-P8000D

Link to Hilti Webpage

Injection mortars / Dispenser / Accessories					
Hilti HIT-RE 500 V4	HDE 500-22	HDE 500-A12	HDM 500	Filling set	Hilti HIT-P8000D

Fastener: Threaded rod		
HAS-U	HAS	HIS-N

Fastener special dimensions

Mechanical properties and dimensions HAS and HAS-U

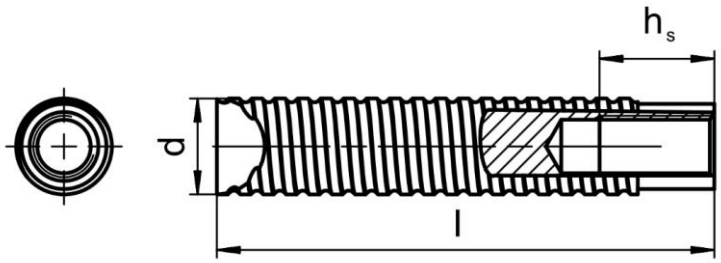
Mechanical properties and dimensions of the threaded rods are standardized and can be taken from the ETA listed in the table Approvals / Certificates.

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

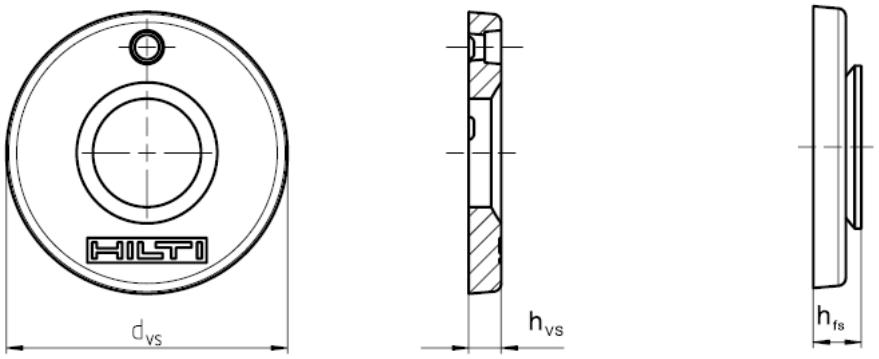
Part	Material
Rebar	Bars and de-coiled rods class B or C according to NDP or NCL of EN 1992-1-1

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 ψ_{sus} acc. to EN 1992-4
  Hammer drilled holes, hammer drilled holes with hollow drill bit and diamond cored holes with Hilti roughening tool: $\psi^0_{sus} = 0{,}88$
- Recommended loads: With overall partial safety factor for action $\gamma = 1{,}4$.

For specific design cases refer to PROFIS Engineering.

Embedment depth [1] and base material thickness

Anchor size			ETA-20/0541								Hilti tech. data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
HAS, HAS-U													
Embedment depth	h_{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
HIS-N													
Embedment depth	h_{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	
			ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ18	ϕ20	ϕ24	ϕ25	ϕ28	ϕ30	ϕ32	ϕ36	ϕ40
Embedment depth	h_{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

[1] 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
Uncracked concrete														
Tension	HAS 5.8 HAS-U 5.8	N_{Rd}	[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_{Rd}	[kN]	8,8	13,9	20,2	37,7	58,8	84,7	110,2	134,6	166,6	196,1	234,2
	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	-	-	-	-	-	-
Cracked concrete														
Tension	HAS 5.8 HAS-U 5.8	N_{Rd}	[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_{Rd}	[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
Uncracked concrete																
Tension	N_{Rd}	[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_{Rd}	[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
Cracked concrete																
Tension	N_{Rd}	[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_{Rd}	[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
Uncracked concrete														
Tension	HAS 5.8 HAS-U 5.8	N_{Rec}	[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_{Rec}	[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	-	-	-	-	-	-
Cracked concrete														
Tension	HAS 5.8 HAS-U 5.8	N_{Rec}	[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_{Rec}	[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	-	-	-	-	-	-

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
Uncracked concrete																	
Tension	N_{rec}	[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_{rec}	[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
Cracked concrete																	
Tension	N_{rec}	[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_{rec}	[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)
- α_{gap}=1,0 (using Hilti seismic filling set) or α_{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

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

			ETA-20/0541										
Rebar B500B size			**ϕ8**	**ϕ10**	**ϕ12**	**ϕ14**	**ϕ16**	**ϕ18**	**ϕ20**	**ϕ24**	**ϕ25**	**ϕ28**	**ϕ30**	**ϕ32**
Embedment depth	h_{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

				ETA-20/0541							
Anchor size				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Tension	HAS ,HAS-U 8.8,	$N_{Rd,seis}$	[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	-	-
with Hilti filling set											
Shear	HAS ,HAS-U 8.8	$V_{Rd,seis}$	[kN]	-	-	22,4	36,8	61,6	82,4	-	-
	HAS-U 8.8 HDG			-	-	14,4	24,0	36,8	52,8	-	-
without Hilti filling set											
Shear	HAS ,HAS-U 8.8	$V_{Rd,seis}$	[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	-	-	-
with Hilti filling set											
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	-	-	-
without Hilti filling set											
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									
				ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ18	ϕ20	ϕ24	ϕ25	ϕ28	ϕ30	ϕ32
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 recomendations)
- 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
HAS 5.8, HAS-U 5.8, HAS A4, HAS-U A4											
Embedment depth (minimum)		$h_{ef,min}$	[mm]	60	60	72	80	90	96	108	120
Base material thickness for $h_{ef,min}$		h ≥	[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 ≥	[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 ≥	[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
HAS 5.8, HAS-U 5.8												
Tension	30 min	$h_{ef,min}$	$N_{Rd,fi(30)}$	[kN]	0,30	0,29	0,59	0,86	1,30	1,66	2,55	3,73
		$h_{ef,med}$			0,84	1,30	1,64	2,81	3,55	3,59	5,37	7,76
		$h_{ef,max}$			1,04	1,77	2,80	5,22	8,15	11,74	15,27	18,67
	60 min	$h_{ef,med}$	$N_{Rd,fi(60)}$	[kN]	0,30	0,50	0,64	1,16	1,47	1,34	2,14	3,19
		$h_{ef,max}$			0,81	1,34	2,05	3,83	5,98	8,62	11,21	13,70
	90 min	$h_{ef,med}$	$N_{Rd,fi(90)}$	[kN]	0,10	0,21	0,26	0,56	0,70	0,42	0,94	1,62
		$h_{ef,max}$			0,58	0,91	1,31	2,44	3,81	5,49	7,14	8,73
	120 min	$h_{ef,max}$	$N_{Rd,fi(120)}$	[kN]	0,47	0,70	0,93	1,74	2,72	3,92	5,10	6,24
Shear	30 min	$h_{ef,min}$	$V_{Rd,fi(30)}$	[kN]	1,04	1,77	2,80	5,22	8,15	11,74	15,27	18,67
		$h_{ef,med}$			1,04	1,77	2,80	5,22	8,15	11,74	15,27	18,67
		$h_{ef,max}$			1,04	1,77	2,80	5,22	8,15	11,74	15,27	18,67
	60 min	$h_{ef,med}$	$V_{Rd,fi(60)}$	[kN]	0,81	1,34	2,05	3,83	5,98	8,62	11,21	13,70
		$h_{ef,max}$			0,81	1,34	2,05	3,83	5,98	8,62	11,21	13,70
	90 min	$h_{ef,med}$	$V_{Rd,fi(90)}$	[kN]	0,58	0,91	1,31	2,44	3,81	5,49	7,14	8,73
		$h_{ef,max}$			0,58	0,91	1,31	2,44	3,81	5,49	7,14	8,73
	120 min	$h_{ef,max}$	$V_{Rd,fi(120)}$	[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
HAS A4, HAS-U A4												
Tension	30 min	$h_{ef,min}$	$N_{Rd,fi(30)}$	[kN]	0,46	0,49	1,00	1,58	2,57	3,43	5,54	8,50
		$h_{ef,med}$			1,26	2,10	2,83	5,61	7,64	7,94	12,80	19,50
		$h_{ef,max}$			2,67	4,85	7,93	14,77	23,06	33,23	43,20	52,81
	60 min	$h_{ef,min}$	$N_{Rd,fi(60)}$	[kN]	0,10	0,06	0,27	0,43	0,75	0,96	1,66	2,63
		$h_{ef,med}$			0,44	0,77	1,02	1,99	2,69	2,67	4,33	6,70
		$h_{ef,max}$			1,93	3,44	5,56	10,37	16,18	23,31	30,31	37,05
	90 min	$h_{ef,med}$	$N_{Rd,fi(90)}$	[kN]	0,19	0,38	0,50	1,05	1,39	1,31	2,25	3,53
		$h_{ef,max}$			1,18	2,03	3,20	5,96	9,30	13,40	17,42	21,29
	120 min	$h_{ef,max}$	$N_{Rd,fi(120)}$	[kN]	0,80	1,33	2,01	3,75	5,86	8,44	10,98	13,42
Shear	30 min	$h_{ef,min}$	$V_{Rd,fi(30)}$	[kN]	2,67	4,85	7,93	14,77	23,06	31,09	41,74	52,81
		$h_{ef,med}$			2,67	4,85	7,93	14,77	23,06	33,23	43,20	52,81
		$h_{ef,max}$			2,67	4,85	7,93	14,77	23,06	33,23	43,20	52,81
	60 min	$h_{ef,min}$	$V_{Rd,fi(60)}$	[kN]	1,93	3,44	5,56	10,37	16,18	23,31	30,31	37,05
		$h_{ef,med}$			1,93	3,44	5,56	10,37	16,18	23,31	30,31	37,05
		$h_{ef,max}$			1,93	3,44	5,56	10,37	16,18	23,31	30,31	37,05
	90 min	$h_{ef,med}$	$V_{Rd,fi(90)}$	[kN]	1,18	2,03	3,20	5,96	9,30	13,40	17,42	21,29
		$h_{ef,max}$			1,18	2,03	3,20	5,96	9,30	13,40	17,42	21,29
	120 min	$h_{ef,max}$	$V_{Rd,fi(120)}$	[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 [b]	t_{work}	t_{cure} [a]
-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

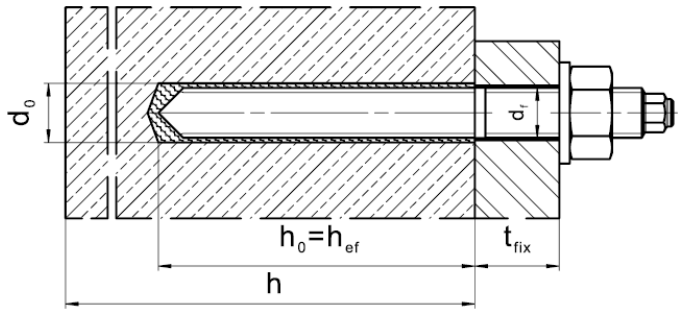
Anchor size			ETA-20/0541								Hilti tech. data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Nominal diameter of element	d	[mm]	8	10	12	16	20	24	27	30	33	36	39
Nominal diameter of drill bit	d_0	[mm]	10	12	14	18	22	28	30	35	37	40	42
Effective anchorage depth (=drill hole depth) [a]	$h_{ef,min} = h_0$	[mm]	60	60	70	80	90	96	108	120	132	144	156
	$h_{ef,max} = h_0$	[mm]	160	200	240	320	400	480	540	600	660	720	780
Minimum thickness of concrete member	h_{min}	[mm]	h_{ef} +30 mm ≥ 100 mm			h_{ef} + 2 d_0							
Maximum installation torque	T_{max}	[Nm]	10	20	40	80	150	200	270	300	330	360	390
Minimum spacing	s_{min}	[mm]	40	50	60	75	90	115	120	140	165	180	195
Minimum edge distance	c_{min}	[mm]	40	45	45	50	55	60	75	80	165	180	195
Characteristic distances													
Spacing for splitting failure	$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$										
Edge distance for splitting failure [b]	$c_{cr,sp}$	[mm]	1,0 · h_{ef} for h / h_{ef} ≥ 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} ≤ 1,3										
Spacing for concrete cone failure [c]	$s_{cr,N}$	[mm]	2 $c_{cr,N}$										
Edge distance for concrete cone failure [c]	$c_{cr,N}$	[mm]	1,5 h_{ef}										

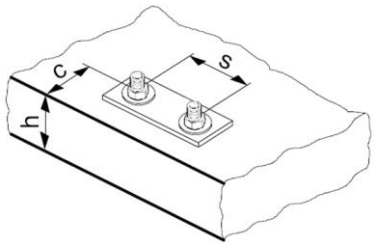
For spacing (edge distance) smaller than characteristic spacing (characteristic edge distance) the design loads must be reduced.

a) $h_{ef,min} \le h_{ef} \le h_{ef,max}$ (h_{ef}: embedment depth)

b) h: base material thickness ($h \ge h_{min}$)

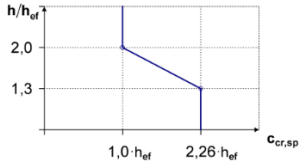
c) The characteristic edge distance for concrete cone failure depends on the embedment depth h_{ef} and the design bond resistance. The simplified formula given in this table is on the safe side.





Setting details 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 [a]	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 [b]	$c_{cr,sp}$	[mm]	$1,0 \cdot h_{ef}$ 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 [c]	$s_{cr,N}$	[mm]	2 $c_{cr,N}$				
Edge distance for concrete cone failure [c]	$c_{cr,N}$	[mm]	1,5 h_{ef}				

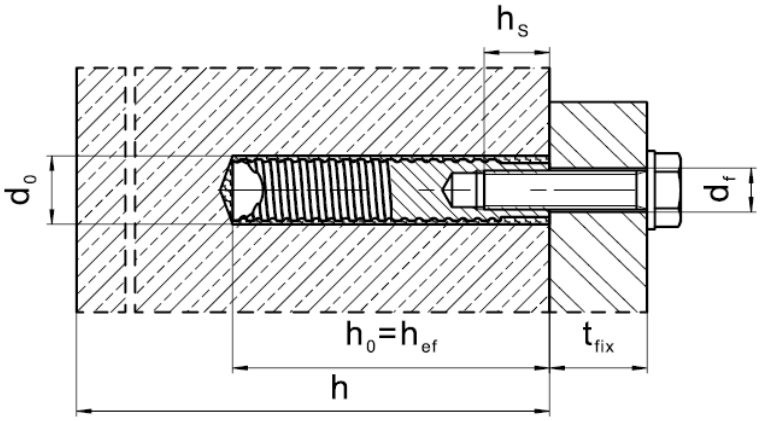


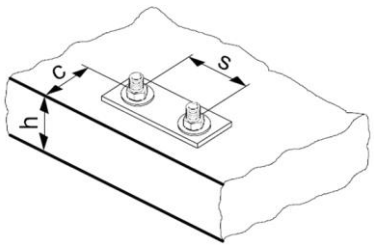
For spacing (edge distance) smaller than characteristic spacing (characteristic edge distance) the design loads must be reduced.

[a] Max. torque moment to avoid splitting failure during Instalation with minimum spacing and edge distance

[b] h: base material thickness ($h \geq h_{min}$)

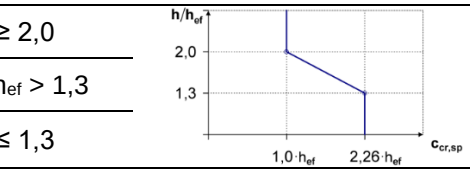
[c] The characteristic edge distance for concrete cone failure depends on the embedment depth h_{ef} and the design bond resistance. The simplified formula given in this table is on the safe side.





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 a)	12 14a)	14a)	16a)	18	20	22	25	30 32a)	30 32a)	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]	hef +30mm ≥ 100 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 c)	$c_{cr,sp}$	[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 d)	$s_{cr,N}$	[mm]	2 $c_{cr,N}$														
Edge distance for concrete cone failure d)	$c_{cr,N}$	[mm]	1,5 h_{ef}														



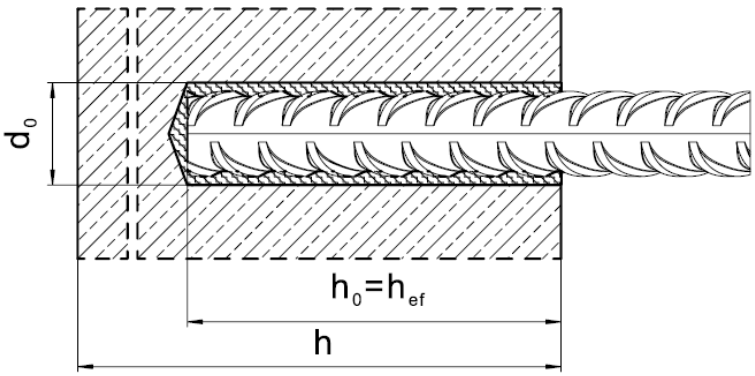
For spacing (edge distance) smaller than characteristic spacing (characteristic edge distance) the design loads must be reduced,

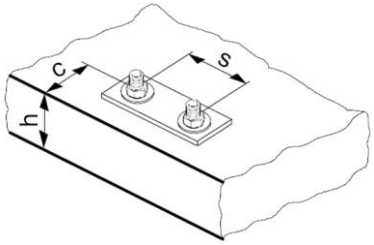
a) Both given values for drill bit diameter can be used

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