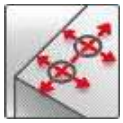
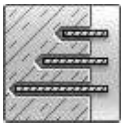
HIT-RE 500 V4 injection mortar

Anchor design (EN 1992-4) / Rods&Sleeves / Concrete

Injection mortar system	Benefits
 Foil pack: HIT-RE 500 V4 (available in 330, 500 and 1400 ml cartridges)	- **SafeSet** 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 - Hilti Technical Data for service life of 100 years - High corrosion resistance - Long working time at elevated temperatures - Cures down to -5 °C - Odourless epoxy
 Anchor rod: HAS-U HAS-U HDG HAS-U A4 HAS-U HCR AM 8.8 (HDG) (M8-M39)	
 Internally threaded sleeve: HIS-N HIS-RN (M8-M20)	

Base material		Installation conditions				
 Concrete (non-cracked)	 Concrete (cracked)	 Hammer drilled holes	 Diamond drilled holes	 Hilti **SafeSet** technology	 Small edge distance and spacing	 Variable embedment depth

Load conditions			Other information				
 Static/ quasi-static	 Seismic, ETA-C1, C2	 Service life 100y, Hilti Tech. Data	 European Technical Assessment	 CE conformity	 Corrosion resistance	 High corrosion resistance [1]	 PROFIS design Software

[1] High Corrosion Resistant (HCR) rods available only for HAS-U.

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment[a]	CSTB	ETA-20/0541 / 2020-11-21

[a] All data given in this section according to ETA-20/0541, issue 2020-11-21 (if not stated otherwise).

Static and quasi-static 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
- HAS-U anchor rod with strength class 5.8 and 8.8, AM anchor rod with strength class 8.8, HIS-N internally threaded insert with screw 8.8
- Base material thickness and one typical embedment depth, as specified in the table
- Concrete C 20/25
- Service life: 50 years
- 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: ψ^0_{sus} = 0,88; diamond cored holes: ψ^0_{sus} = 0,89

Embedment depth[a] and base material thickness

		ETA-20/0541, issued 2020-11-21								Hilti tech. data		
Anchor size		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**	**M33**	**M36**	**M39**
HAS-U												
Eff. anchorage depth	[mm]	80	90	110	125	170	210	240	270	300	330	360
Base material thickness	[mm]	110	120	140	161	214	266	300	340	374	410	444
HIS-N												
Eff. anchorage depth	[mm]	90	110	125	170	205	-	-	-	-	-	-
Base material thickness	[mm]	120	150	170	230	270	-	-	-	-	-	-

[a] The allowed range of embedment depth is shown in the setting.

For hammer drilled holes, hammer drilled holes with hollow drill bit[1] and diamond cored with Hilti roughening tool TE-YRT[2]:

Characteristic resistance

			ETA-20/0541, issued 2020-11-21								Hilti tech. data		
Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**	**M33**	**M36**	**M39**
Non-cracked concrete													
Tension N_{Rk}	HAS-U 5.8	[kN]	*18,0*	*29,0*	*42,0*	76,9	122	167	205	244	286	330	376
	HAS-U 8.8, AM 8.8		*29,0*	*46,0*	63,5	76,9	122	167	205	244	286	330	376
	HAS-U A4		*26,0*	*41,0*	*59,0*	76,9	122	167	205	244	286	330	376
	HAS-U HCR		*29,0*	*46,0*	63,5	76,9	122	167	205	244	286	330	376
	HIS-N 8.8		*25,0*	*46,0*	*67,0*	122	*116*	-	-	-	-	-	-
Shear V_{Rk}	HAS-U 5.8	[kN]	*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*	*115*	*140*	*174*	*204*	*244*
	HAS-U 8.8, AM 8.8		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141*	*184*	*224*	*278*	*327*	*390*
	HAS-U A4		*13,0*	*20,0*	*30,0*	*55,0*	*86,0*	*124*	*115*	*140*	*174*	*204*	*244*
	HAS-U HCR		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*124*	*161*	*196*	*174*	*204*	*244*
	HIS-N 8.8		*13,0*	*23,0*	*34,0*	*63,0*	*58,0*	-	-	-	-	-	-
Cracked concrete													
Tension N_{Rk}	HAS-U 5.8	[kN]	15,1	25,4	*42,0*	53,8	85,3	117	143	171	-	-	-
	HAS-U 8.8, AM 8.8		15,1	25,4	44,4	53,8	85,3	117	143	171	-	-	-
	HAS-U A4		15,1	25,4	44,4	53,8	85,3	117	143	171	-	-	-
	HAS-U HCR		15,1	25,4	44,4	53,8	85,3	117	143	171	-	-	-
	HIS-N 8.8		*25,0*	44,4	53,8	85,3	113	-	-	-	-	-	-
Shear V_{Rk}	HAS-U 5.8	[kN]	*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*	*115*	*140*	-	-	-
	HAS-U 8.8, AM 8.8		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141*	*184*	*224*	-	-	-
	HAS-U A4		*13,0*	*20,0*	*30,0*	*55,0*	*86,0*	*124*	*115*	*140*	-	-	-
	HAS-U HCR		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*124*	*161*	*196*	-	-	-
	HIS-N 8.8		*13,0*	*23,0*	*34,0*	*63,0*	*58,0*	-	-	-	-	-	-

[1] Hilti hollow drill bit available for element size M12-M30.
[2] Hilti Roughening tools are available for element size M16-M30.

Design resistance

Anchor size			ETA-20/0541, issued 2020-11-21								Hilti tech. data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non-cracked concrete													
Tension N_{Rd}	HAS-U 5.8	[kN]	12,0	19,3	28,0	45,8	72,7	99,8	122	146	142	164	187
	HAS-U 8.8, AM 8.8		19,3	28,0	37,8	45,8	72,7	99,8	122	146	142	164	187
	HAS-U A4		13,9	21,9	31,6	45,8	72,7	99,8	80,4	98,3	121	143	171
	HAS-U HCR		19,3	28,0	37,8	45,8	72,7	99,8	122	146	142	164	187
	HIS-N 8.8		16,7	30,7	44,7	72,7	77,3	-	-	-	-	-	-
Shear V_{Rd}	HAS-U 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112	139	163	195
	HAS-U 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	113	147	179	222	262	312
	HAS-U A4		8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8	73,1	85,7	103
	HAS-U HCR		12,0	18,4	27,2	50,4	78,4	70,9	92,0	112	87,0	102	122
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-	-	-	-
Cracked concrete													
Tension N_{Rd}	HAS-U 5.8	[kN]	10,1	17,0	26,5	32,1	50,9	69,9	85,4	102	-	-	-
	HAS-U 8.8, AM 8.8		10,1	17,0	26,5	32,1	50,9	69,9	85,4	102	-	-	-
	HAS-U A4		10,1	17,0	26,5	32,1	50,9	69,9	80,4	98,3	-	-	-
	HAS-U HCR		10,1	17,0	26,5	32,1	50,9	69,9	85,4	102	-	-	-
	HIS-N 8.8		16,7	26,5	32,1	50,9	67,4	-	-	-	-	-	-
Shear V_{Rd}	HAS-U 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112	-	-	-
	HAS-U 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	113	147	179	-	-	-
	HAS-U A4		8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8	-	-	-
	HAS-U HCR		12,0	18,4	27,2	50,4	78,4	70,9	92,0	112	-	-	-
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-	-	-	-

Recommended loads[a)]

Anchor size			ETA-20/0541, issued 2020-11-21								Hilti tech. data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non-cracked concrete													
Tension N_{Rec}	HAS-U 5.8	[kN]	8,6	13,8	20,0	32,7	51,9	71,3	87,1	104	101	117	133
	HAS-U 8.8, AM 8.8		13,8	20,0	27,0	32,7	51,9	71,3	87,1	104	101	117	133
	HAS-U A4		9,9	15,7	22,5	32,7	51,9	71,3	57,4	70,2	86,7	102	122
	HAS-U HCR		13,8	20,0	27,0	32,7	51,9	71,3	87,1	104	101	117	133
	HIS-N 8.8		11,9	21,9	31,9	51,9	55,2	-	-	-	-	-	-
Shear V_{Rec}	HAS-U 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0	99,4	117	139
	HAS-U 8.8, AM 8.8		8,6	13,1	19,4	36,0	56,0	80,6	105	128	159	187	223
	HAS-U A4		6,0	9,2	13,7	25,2	39,4	56,8	34,5	42,0	52,2	61,2	73,2
	HAS-U HCR		8,6	13,1	19,4	36,0	56,0	50,6	65,7	80,0	62,1	72,9	87,1
	HIS-N 8.8		7,4	13,1	19,4	36,0	33,1	-	-	-	-	-	-
Cracked concrete													
Tension N_{Rec}	HAS-U 5.8	[kN]	7,2	12,1	18,9	22,9	36,3	49,9	61,0	72,7	-	-	-
	HAS-U 8.8, AM 8.8		7,2	12,1	18,9	22,9	36,3	49,9	61,0	72,7	-	-	-
	HAS-U A4		7,2	12,1	18,9	22,9	36,3	49,9	57,4	70,2	-	-	-
	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	-	-	-	-	-	-
Shear V_{Rec}	HAS-U 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0	-	-	-
	HAS-U 8.8, AM 8.8		8,6	13,1	19,4	36,0	56,0	80,6	105	128	-	-	-
	HAS-U A4		6,0	9,2	13,7	25,2	39,4	56,8	34,5	42,0	-	-	-
	HAS-U HCR		8,6	13,1	19,4	36,0	56,0	50,6	65,7	80,0	-	-	-
	HIS-N 8.8		7,4	13,1	19,4	36,0	33,1	-	-	-	-	-	-

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

For diamond drilling:

Characteristic resistance

Anchor size			ETA-20/0541, issued 2020-11-21							
			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rk}	HAS-U 5.8	[kN]	18,0	29,0	42,0	76,9	122	167	205	244
	HAS-U 8.8, AM 8.8		26,1	36,8	53,9	76,9	122	167	205	244
	HAS-U A4		26,0	36,8	53,9	76,9	122	167	205	244
	HAS-U HCR		26,1	36,8	53,9	76,9	122	167	205	244
	HIS-N 8.8		25,0	46,0	67,0	122	116	-	-	-
Shear V_{Rk}	HAS-U 5.8	[kN]	9,0	15,0	21,0	39,0	61,0	88,0	115	140
	HAS-U 8.8, AM 8.8		15,0	23,0	34,0	63,0	98,0	141	184	224
	HAS-U A4		13,0	20,0	30,0	55,0	86,0	124	115	140
	HAS-U HCR		15,0	23,0	34,0	63,0	98,0	124	161	196
	HIS-N 8.8		13,0	23,0	34,0	63,0	58,0	-	-	-

Design resistance

Anchor size			ETA-20/0541, issued 2020-11-21							
			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rd}	HAS-U 5.8	[kN]	12,0	19,3	28,0	32,7	51,9	71,3	87,1	104
	HAS-U 8.8, AM 8.8		14,5	20,4	29,9	32,7	51,9	71,3	87,1	104
	HAS-U A4		13,9	20,4	29,9	32,7	51,9	71,3	80,4	98,3
	HAS-U HCR		14,5	20,4	29,9	32,7	51,9	71,3	87,1	104
	HIS-N 8.8		16,7	24,4	32,7	51,9	68,8	-	-	-
Shear V_{Rd}	HAS-U 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112
	HAS-U 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	113	147	179
	HAS-U A4		8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8
	HAS-U HCR		12,0	18,4	27,2	50,4	78,4	70,9	92,0	112
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-

Recommended loads[a)]

Anchor size			ETA-20/0541, issued 2020-11-21							
			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rec}	HAS-U 5.8	[kN]	8,6	13,8	20,0	23,4	37,1	50,9	62,2	74,2
	HAS-U 8.8, AM 8.8		10,4	14,6	21,4	23,4	37,1	50,9	62,2	74,2
	HAS-U A4		9,9	14,6	21,4	23,4	37,1	50,9	57,4	70,2
	HAS-U HCR		10,4	14,6	21,4	23,4	37,1	50,9	62,2	74,2
	HIS-N 8.8		11,9	17,5	23,4	37,1	49,1	-	-	-
Shear V_{Rec}	HAS-U 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0
	HAS-U 8.8, AM 8.8		8,6	13,1	19,4	36,0	56,0	80,6	105	128
	HAS-U A4		6,0	9,2	13,7	25,2	39,4	56,8	34,5	42,0
	HAS-U HCR		8,6	13,1	19,4	36,0	56,0	50,6	65,7	80,0
	HIS-N 8.8		7,4	13,1	19,4	36,0	33,1	-	-	-

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

Static and quasi-static 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
- HAS-U anchor rod with strength class 5.8 and 8.8, AM anchor rod with strength class 8.8, HIS-N internally threaded insert with screw 8.8
- Base material thickness and one typical embedment depth, as specified in the table
- Concrete C 20/25
- Service life: 100 years
- 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

Embedment depth[a] and base material thickness

		Hilti technical data							
Anchor size		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
HAS-U									
Eff. anchorage depth	[mm]	80	90	110	125	170	210	240	270
Base material thickness	[mm]	110	120	140	161	214	266	300	340
HIS-N									
Eff. anchorage depth	[mm]	90	110	125	170	205	-	-	-
Base material thickness	[mm]	120	150	170	230	270	-	-	-

a) The allowed range of embedment depth is shown in the setting.

For hammer drilled holes, hammer drilled holes with hollow drill bit[1] and diamond cored with Hilti roughening tool[2]:

Characteristic resistance

			Hilti technical data							
Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Non-cracked concrete										
Tension N_{Rk}	HAS-U 5.8	[kN]	*18,0*	*29,0*	*42,0*	76,9	122	167	205	244
	HAS-U 8.8, AM 8.8		*29,0*	*46,0*	63,5	76,9	122	167	205	244
	HAS-U A4		*26,0*	*41,0*	*59,0*	76,9	122	167	205	244
	HAS-U HCR		*29,0*	*46,0*	63,5	76,9	122	167	205	244
	HIS-N 8.8		*25,0*	*46,0*	*67,0*	122	*116*	-	-	-
Shear V_{Rk}	HAS-U 5.8	[kN]	*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*	*115*	*140*
	HAS-U 8.8, AM 8.8		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141*	*184*	*224*
	HAS-U A4		*13,0*	*20,0*	*30,0*	*55,0*	*86,0*	*124*	*115*	*140*
	HAS-U HCR		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*124*	*161*	*196*
	HIS-N 8.8		*13,0*	*23,0*	*34,0*	*63,0*	*58,0*	-	-	-
Cracked concrete										
Tension N_{Rk}	HAS-U 5.8	[kN]	11,1	18,4	*29,0*	40,8	69,4	95,0	112	140
	HAS-U 8.8, AM 8.8		11,1	18,4	*29,0*	40,8	69,4	95,0	112	140
	HAS-U A4		11,1	18,4	*29,0*	40,8	69,4	95,0	112	140
	HAS-U HCR		11,1	18,4	*29,0*	40,8	69,4	95,0	112	140
	HIS-N 8.8		19,4	31,4	44,3	81,4	107	-	-	-
Shear V_{Rk}	HAS-U 5.8	[kN]	*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*	*115*	*140*
	HAS-U 8.8, AM 8.8		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141*	*184*	*224*
	HAS-U A4		*13,0*	*20,0*	*30,0*	*55,0*	*86,0*	*124*	*115*	*140*
	HAS-U HCR		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*124*	*161*	*196*
	HIS-N 8.8		*13,0*	*23,0*	*34,0*	*63,0*	*58,0*	-	-	-

1) Hilti hollow drill bit available for element size M12-M30.
2) Hilti Roughening tools are available for element size M16-M30.

Design resistance

Anchor size			Hilti technical data							
			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rd}	HAS-U 5.8	[kN]	12,0	19,3	28,0	45,8	72,7	99,8	122	146
	HAS-U 8.8, AM 8.8		19,3	28,0	37,8	45,8	72,7	99,8	122	146
	HAS-U A4		13,9	21,9	31,6	45,8	72,7	99,8	80,4	98,3
	HAS-U HCR		19,3	28,0	37,8	45,8	72,7	99,8	122	146
	HIS-N 8.8		16,7	30,7	44,7	72,7	77,3	-	-	-
Shear V_{Rd}	HAS-U 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112
	HAS-U 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	113	147	179
	HAS-U A4		8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8
	HAS-U HCR		12,0	18,4	27,2	50,4	78,4	70,9	92,0	112
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-
Cracked concrete										
Tension N_{Rd}	HAS-U 5.8	[kN]	7,4	12,3	19,4	27,2	46,3	63,3	74,6	93,3
	HAS-U 8.8, AM 8.8		7,4	12,3	19,4	27,2	46,3	63,3	74,6	93,3
	HAS-U A4		7,4	12,3	19,4	27,2	46,3	63,3	74,6	93,3
	HAS-U HCR		7,4	12,3	19,4	27,2	46,3	63,3	74,6	93,3
	HIS-N 8.8		13,0	20,9	29,5	50,9	67,4	-	-	-
Shear V_{Rd}	HAS-U 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112
	HAS-U 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	113	147	179
	HAS-U A4		8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8
	HAS-U HCR		12,0	18,4	27,2	50,4	78,4	70,9	92,0	112
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-

Recommended loads[a)]

Anchor size			Hilti technical data							
			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rec}	HAS-U 5.8	[kN]	8,6	13,8	20,0	32,7	51,9	71,3	87,1	104
	HAS-U 8.8, AM 8.8		13,8	20,0	27,0	32,7	51,9	71,3	87,1	104
	HAS-U A4		9,9	15,7	22,5	32,7	51,9	71,3	57,4	70,2
	HAS-U HCR		13,8	20,0	27,0	32,7	51,9	71,3	87,1	104
	HIS-N 8.8		11,9	21,9	31,9	51,9	55,2	-	-	-
Shear V_{Rec}	HAS-U 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0
	HAS-U 8.8, AM 8.8		8,6	13,1	19,4	36,0	56,0	80,6	105	128
	HAS-U A4		6,0	9,2	13,7	25,2	39,4	56,8	34,5	42,0
	HAS-U HCR		8,6	13,1	19,4	36,0	56,0	50,6	65,7	80,0
	HIS-N 8.8		7,4	13,1	19,4	36,0	33,1	-	-	-
Cracked concrete										
Tension N_{Rec}	HAS-U 5.8	[kN]	5,3	8,8	13,8	19,4	33,1	45,2	53,3	66,6
	HAS-U 8.8, AM 8.8		5,3	8,8	13,8	19,4	33,1	45,2	53,3	66,6
	HAS-U A4		5,3	8,8	13,8	19,4	33,1	45,2	53,3	66,6
	HAS-U HCR		5,3	8,8	13,8	19,4	33,1	45,2	53,3	66,6
	HIS-N 8.8		9,3	14,9	21,1	36,3	48,1	-	-	-
Shear V_{Rec}	HAS-U 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0
	HAS-U 8.8, AM 8.8		8,6	13,1	19,4	36,0	56,0	80,6	105	128
	HAS-U A4		6,0	9,2	13,7	25,2	39,4	56,8	34,5	42,0
	HAS-U HCR		8,6	13,1	19,4	36,0	56,0	50,6	65,7	80,0
	HIS-N 8.8		7,4	13,1	19,4	36,0	33,1	-	-	-

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

For diamond coring:

Characteristic resistance

Anchor size			Hilti technical data							
			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rk}	HAS-U 5.8	[kN]	18,0	29,0	42,0	76,9	122	167	205	244
	HAS-U 8.8, AM 8.8		26,1	36,8	53,9	76,9	122	167	205	244
	HAS-U A4		26,0	36,8	53,9	76,9	122	167	205	244
	HAS-U HCR		26,1	36,8	53,9	76,9	122	167	205	244
	HIS-N 8.8		25,0	46,0	67,0	122	116	-	-	-
Shear V_{Rk}	HAS-U 5.8	[kN]	9,0	15,0	21,0	39,0	61,0	88,0	115	140
	HAS-U 8.8, AM 8.8		15,0	23,0	34,0	63,0	98,0	141	184	224
	HAS-U A4		13,0	20,0	30,0	55,0	86,0	124	115	140
	HAS-U HCR		15,0	23,0	34,0	63,0	98,0	124	161	196
	HIS-N 8.8		13,0	23,0	34,0	63,0	58,0	-	-	-

Design resistance

Anchor size			Hilti technical data							
			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rd}	HAS-U 5.8	[kN]	12,0	19,3	28,0	32,7	51,9	71,3	87,1	104
	HAS-U 8.8, AM 8.8		14,5	20,4	29,9	32,7	51,9	71,3	87,1	104
	HAS-U A4		13,9	20,4	29,9	32,7	51,9	71,3	80,4	98,3
	HAS-U HCR		14,5	20,4	29,9	32,7	51,9	71,3	87,1	104
	HIS-N 8.8		16,7	24,4	32,7	51,9	68,8	-	-	-
Shear V_{Rd}	HAS-U 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112
	HAS-U 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	113	147	179
	HAS-U A4		8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8
	HAS-U HCR		12,0	18,4	27,2	50,4	78,4	70,9	92,0	112
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-

Recommended loads[a)]

Anchor size			Hilti technical data							
			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rd}	HAS-U 5.8	[kN]	8,6	13,8	20,0	23,4	37,1	50,9	62,2	74,2
	HAS-U 8.8, AM 8.8		10,4	14,6	21,4	23,4	37,1	50,9	62,2	74,2
	HAS-U A4		9,9	14,6	21,4	23,4	37,1	50,9	57,4	70,2
	HAS-U HCR		10,4	14,6	21,4	23,4	37,1	50,9	62,2	74,2
	HIS-N 8.8		11,9	17,5	23,4	37,1	49,1	-	-	-
Shear V_{Rd}	HAS-U 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0
	HAS-U 8.8, AM 8.8		8,6	13,1	19,4	36,0	56,0	80,6	105	128
	HAS-U A4		6,0	9,2	13,7	25,2	39,4	56,8	34,5	42,0
	HAS-U HCR		8,6	13,1	19,4	36,0	56,0	50,6	65,7	80,0
	HIS-N 8.8		7,4	13,1	19,4	36,0	33,1	-	-	-

[a)] With overall partial safety factor for action γ=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
- HAS-U anchor rod with strength class 8.8, AM anchor rod with strength class 8.8, HIS-N internally threaded insert with screw 8.8
- Base material thickness and one typical embedment depth, as specified in the table
- Concrete C 20/25
- 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)

Embedment depth and base material thickness for seismic C2[a)] and C1

Anchor size		ETA-20/0541, issued 2020-11-21							
		M8	M10	M12	M16	M20	M24	M27	M30
HAS-U									
Eff. Anchorage depth	[mm]	80	90	110	125	170	210	240	270
Base material thickness	[mm]	110	120	140	161	214	266	300	340
HIS-N									
Eff. Anchorage depth	[mm]	90	110	125	170	205	-	-	-
Base material thickness	[mm]	120	146	169	226	269	-	-	-

a) C2 seismic approval only available for HAS-U rods.

For hammer drilled holes and hammer drilled holes with Hilti hollow drill bit[1)]:
Characteristic resistance in case of seismic performance category C2

Anchor size			ETA-20/0541, issued 2020-11-21							
			M8	M10	M12	M16	M20	M24	M27	M30
Tension $N_{Rk,seis}$	HAS-U 8.8, AM 8.8	[kN]	-	-	13,7	40,8	62,0	95,0	102	132
Shear $V_{Rk,seis}$	HAS-U 8.8, AM 8.8 w/ filling set	[kN]	-	-	*28,0*	*46,0*	*77*	*103*	-	-
	HAS-U 8.8, AM 8.8 w/o filling set		-	-	*24,0*	*40,0*	*71,0*	*90,0*	*121*	*135*

1) Hilti hollow drill bit available for element size M12-M30.

Design resistance in case of seismic performance category C2

Anchor size			ETA-20/0541, issued 2020-11-21							
			M8	M10	M12	M16	M20	M24	M27	M30
Tension $N_{Rd,seis}$	HAS-U 8.8, AM 8.8	[kN]	-	-	9,1	27,2	41,3	63,3	67,9	88,2
Shear $V_{Rd,seis}$	HAS-U 8.8, AM 8.8 w/ filling set	[kN]	-	-	*22,4*	*36,8*	*61,6*	*82,4*	-	-
	HAS-U 8.8, AM 8.8 w/o filling set		-	-	*19,2*	*32,0*	*56,8*	*72,0*	*96,8*	*108*

For hammer drilled holes and hammer drilled holes with Hilti hollow drill bit[1]:

Characteristic resistance in case of seismic performance category C1

Anchor size			ETA-20/0541, issued 2020-11-21							
			M8	M10	M12	M16	M20	M24	M27	M30
Tension $N_{Rk,seis}$	HAS-U 8.8, AM 8.8	[kN]	13,7	23,2	37,8	45,7	72,5	99,6	122	145
	HIS-N 8.8		*25,0*	37,8	45,7	72,5	96,1	-	-	-
Shear $V_{Rk,seis}$	HAS-U 8.8, AM 8.8	[kN]	*15,0*	*23,0*	*34,0*	*53,0*	*98,0*	*141*	*184*	*224*
	HIS-N 8.8		*9,0*	*16,0*	*24,0*	*44,0*	*41,0*	-	-	-

[1] Hilti hollow drill bit available for element size M12-M30.

Design resistance in case of seismic performance category C1

Anchor size			ETA-20/0541, issued 2020-11-21							
			M8	M10	M12	M16	M20	M24	M27	M30
Tension $N_{Rd,seis}$	HAS-U 8.8, AM 8.8	[kN]	9,1	15,5	25,2	30,5	48,4	66,4	81,1	96,8
	HIS-N 8.8		*16,7*	25,2	30,5	48,4	64,0	-	-	-
Shear $V_{Rd,seis}$	HAS-U 8.8, AM 8.8	[kN]	*12,0*	*18,4*	*27,2*	*50,4*	*78,4*	*113*	*147*	*179*
	HIS-N 8.8		*7,2*	*12,8*	*19,2*	*35,2*	*32,8*	-	-	-

Materials

Mechanical properties for HAS-U

Anchor size			ETA-20/0541, issued 2020-11-21								Hilti tech. data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Nominal tensile strength f_{uk}	HAS-U 5.8(F)	[N/mm²]	500	500	500	500	500	500	500	500	500	500	500
	HAS-U 8.8(F)		800	800	800	800	800	800	800	800	800	800	800
	AM 8.8(HDG)		800	800	800	800	800	800	800	800	800	800	800
	HAS-U A4		700	700	700	700	700	700	500	500	500	500	500
	HAS-U HCR		800	800	800	800	800	700	700	700	500	500	500
Yield strength f_{yk}	HAS-U 5.8(F)	[N/mm²]	400	400	400	400	400	400	400	400	400	400	400
	HAS-U 8.8(F)		640	640	640	640	640	640	640	640	640	640	640
	AM 8.8(HDG)		640	640	640	640	640	640	640	640	640	640	640
	HAS-U A4		450	450	450	450	450	450	210	210	210	210	210
	HAS-U HCR		640	640	640	640	640	400	400	400	250	250	250
Stressed cross-section A_s	HAS-U AM 8.8	[mm²]	36,6	58,0	84,3	157	245	353	459	561	694	817	976
Moment of resistance W	HAS-U AM 8.8	[mm³]	31,2	62,3	109	277	541	935	1387	1874	2579	3294	4301

Mechanical properties for HIS-N

Anchor size			ETA-20/0541, issued 2020-11-21				
			M8	M10	M12	M16	M20
Nominal tensile strength f_{uk}	HIS-N	[N/mm²]	490	490	460	460	460
	Screw 8.8		800	800	800	800	800
	HIS-RN		700	700	700	700	700
	Screw A4-70		700	700	700	700	700
Yield strength f_{yk}	HIS-N	[N/mm²]	410	410	375	375	375
	Screw 8.8		640	640	640	640	640
	HIS-RN		350	350	350	350	350
	Screw A4-70		450	450	450	450	450
Stressed cross-section A_s	HIS-(R)N	[mm²]	51,5	108	169	256	238
	Screw		36,6	58	84,3	157	245
Moment of resistance W	HIS-(R)N	[mm³]	145	430	840	1595	1543
	Screw		31,2	62,3	109	277	541

Material quality for HAS-U

Part	Material
Zinc coated steel	
Threaded rod, HAS-U 5.8 (HDG)	Strength class 5.8; Elongation at fracture A5 > 8% ductile Electroplated zinc coated ≥ 5μm; (F) hot dip galvanized ≥ 50 μm
Threaded rod, HAS-U 8.8 (HDG)	Strength class 8.8; Elongation at fracture A5 > 12% ductile Electroplated zinc coated ≥ 5μm; (F) hot dip galvanized ≥ 50 μm
Hilti Meter rod, AM 8.8 (HDG)	Strength class 8.8; Elongation at fracture A5 > 12% ductile Electroplated zinc coated ≥ 5μm (HDG) hot dip galvanized ≥ 50 μm
Washer	Electroplated zinc coated ≥ 5 μm, hot dip galvanized ≥ 50 μm
Nut	Strength class of nut adapted to strength class of threaded rod. Electroplated zinc coated ≥ 5μm, hot dip galvanized ≥ 50 μm
Stainless Steel	
Threaded rod, HAS-U A4	Strength class 70 for ≤ M24 and strength class 50 for > M24; Elongation at fracture A5 > 8% ductile Stainless steel 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362
Washer	Stainless steel 1.4401, 1.4404, 1.4578, 1.4571, 1.4439, 1.4362 EN 10088-1:2014
Nut	Stainless steel 1.4401, 1.4404, 1.4578, 1.4571, 1.4439, 1.4362 EN 10088-1:2014
High corrosion resistant steel	
Threaded rod, HAS-U HCR	Strength class 80 for ≤ M20 and class 70 for > M20, Elongation at fracture A5 > 8% ductile High corrosion resistance steel 1.4529; 1.4565;
Washer	High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014
Nut	High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014

Material quality for HIS-N

Part		Material
HIS-N	Internal threaded sleeve	C-steel 1.0718; Steel galvanized ≥ 5 μm
	Screw 8.8	Strength class 8.8, A5 > 8 % ductile; Steel galvanized ≥ 5 μm
HIS-RN	Internal threaded sleeve	Stainless steel 1.4401,1.4571
	Screw 70	Strength class 70, A5 > 8 % ductile Stainless steel 1.4401; 1.4404, 1.4578; 1.4571; 1.4439; 1.4362

Setting information

Installation temperature
-5 °C to +40 °C

Service temperature range
Hilti HIT-RE 500 V4 injection mortar 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	Max. long term base material temperature	Max. 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

Max. 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.

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

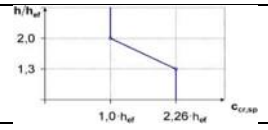
Working time and curing time

Temperature of the base material T[2)]	Working time t_{work}	Minimum curing time t_{cure}[1)]
-5 °C to -1 °C	2 h	168 h
0 °C to 4 °C	2 h	48 h
5 °C to 9 °C	2 h	24 h
10 °C to 14 °C	1,5 h	16 h
15 °C to 19 °C	1 h	12 h
20 °C to 24 °C	30 min	7 h
25 °C to 29 °C	20 min	6 h
30 °C to 34 °C	15 min	5 h
35 °C to 39 °C	12 min	4,5 h
40 °C	10 min	4 h

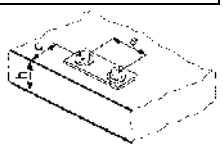
1) The curing time data are valid for dry base material only. In wet base material, the curing times must be doubled.
2) The minimum temperature of the foil pack is +5° C.

Setting details for HAS-U

Anchor size			ETA-20/0541, issue 2020-11-21								Hilti tech. data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Nominal diameter of drill bit	d_0	[mm]	10	12	14	18	22	28	30	35	37	40	42
Effective anchorage and drill hole depth range [a)]	$h_{ef,min}$	[mm]	60	60	70	80	90	96	108	120	132	144	156
	$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600	660	720	780
Minimum base material thickness	h_{min}	[mm]	h_{ef} +30 mm ≥ 100 mm			h_{ef} + 2 d_0							
Max. installation torque	max. T_{inst}	[Nm]	10	20	40	80	150	200	270	300	330	360	390
Min. spacing	s_{min}	[mm]	40	50	60	75	90	115	120	140	165	180	195
Min. edge distance	c_{min}	[mm]	40	45	45	50	55	60	75	80	165	180	195
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$										
Critical 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										
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	2 $c_{cr,N}$										
Critical edge distance for concrete cone failure	$c_{cr,N}$	[mm]	1,5 h_{ef}										



For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.
a) $h_{ef,min} \le h_{ef} \le h_{ef,max}$ (h_{ef}: embedment depth)
b) h: base material thickness (h ≥ h_{min})

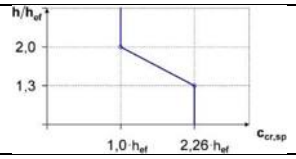


HAS-U-…

Marking:
Steel grade number and length identification letter: e.g. 8 L

Setting details for HIS-N

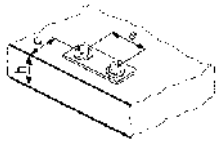
Anchor size			ETA-20/0541, issue 2020-11-21				
			M8	M10	M12	M16	M20
Nominal diameter of drill bit	d_0	[mm]	14	18	22	28	32
Diameter of element	d	[mm]	12,5	16,5	20,5	25,4	27,6
Effective anchorage and drill hole depth	h_{ef}	[mm]	90	110	125	170	205
Min. material thickness	h_{min}	[mm]	120	150	170	230	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
Min. spacing	s_{min}	[mm]	60	70	90	115	130
Min. edge distance	c_{min}	[mm]	40	45	55	65	90
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	$2\ c_{cr,sp}$				
Critical 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 $h / h_{ef} \leq 1,3$				
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	$2\ c_{cr,N}$				
Critical edge distance for concrete cone failure	$c_{cr,N}$	[mm]	$1,5\ h_{ef}$				
Max. installation torque	max. T_{inst}	[Nm]	10	20	40	80	150



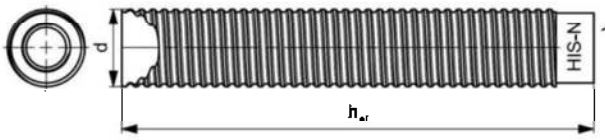
For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

[a] $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$ (h_{ef}: embedment depth)

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



Internally threaded sleeve HIS-(R)N...

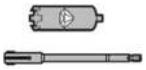


Marking:
Identifying mark - HILTI and
embossing "HIS-N" (for zinc coated steel)
embossing "HIS-RN" (for stainless steel)

Installation equipment

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30	M36	M39
Rotary hammer	HAS-U	TE 2 – TE 16				TE 40 – TE 80					
	HIS-N	TE 2 – TE 16		TE 40 – TE 80			-				
Other tools		compressed air gun, set of cleaning brushes, dispenser									
		roughening tools TE-YRT								-	
Additional Hilti recommended tools		DD EC-1, DD 100 … DD 160								-	

Parameters of cleaning and setting tools

HAS-U	HIS-N	Drill bit diameters d_0 [mm]				Installation	
		Hammer drill (HD)	Hollow Drill Bit (HDB)[a]	Diamond coring		Brush HIT-RB	Piston plug HIT-SZ
				Diamond coring (DD)	with roughening tool (RT)		
							
M8	**-**	10	-	10	-	10	-
M10	**-**	12	-	12	-	12	12
M12	**M8**	14	14	14	-	14	14
M16	**M10**	18	18	18	18	18	18
M20	**M12**	22	22	22	22	22	22
M24	**M16**	28	28	28	28	28	28
M27	**-**	30	-	30	30	30	30
-	**M20**	32	32	32	32	32	32
M30	**-**	35	35	35	35	35	35
M33	**-**	37[b]	-	-	-	37[b]	37[b]
M36	**-**	40[b]	-	-	-	40[b]	40[b]
M39	**-**	42[b]	-	-	-	42[b]	42[b]

[a] No cleaning required.
[b] Additional Hilti technical data

Associated components for the use of Hilti Roughening tool TE-YRT

Diamond coring		Roughening tool TE-YRT	Wear gauge RTG…
			
d_0 [mm]		d_0 [mm]	size
nominal	measured		
18	17,9 to 18,2	18	18
20	19,9 to 20,2	20	20
22	21,9 to 22,2	22	22
25	24,9 to 25,2	25	25
28	27,9 to 28,2	28	28
30	29,9 to 30,2	30	30
32	31,9 to 32,2	32	32
35	34,9 to 35,2	35	35

Minimum roughening time $t_{roughen}$ ($t_{roughen}$ [sec] = h_{ef} [mm] /10)

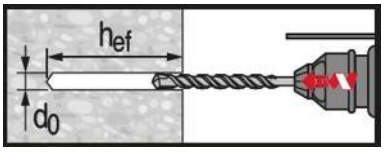
h_{ef} [mm]	$t_{roughen}$ [sec]
0 to 100	10
101 to 200	20
201 to 300	30
301 to 400	40
401 to 500	50
501 to 600	60

Setting instructions

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

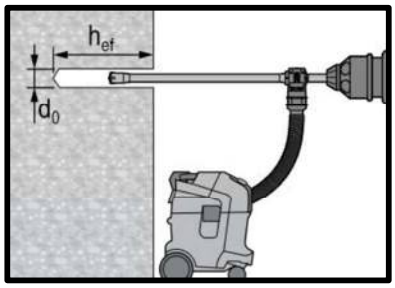
Safety regulations
Review the Material Safety Data Sheet (MSDS) before use for proper and safe handling! Wear well-fitting protective goggles and protective gloves when working with Hilti HIT-RE 500 V4.

Drilling



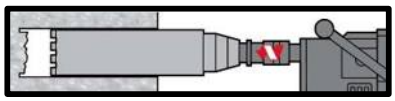
Hammer drilled hole

For dry and wet concrete and installation in flooded holes (no sea water).

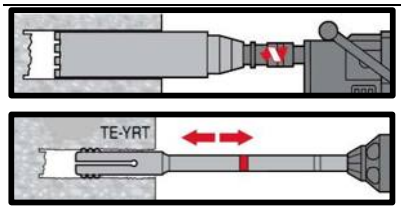


Hammer drilled hole with Hollow Drilled Bit (HDB)

No cleaning required.
For dry and wet concrete, only.

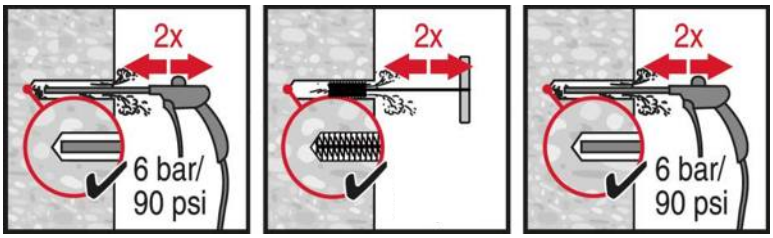


Diamond Coring
For dry and wet concrete, only.



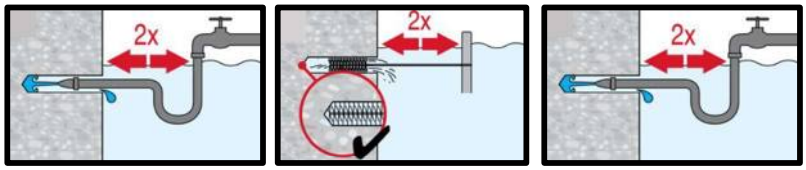
Diamond Coring + Roughening Tool
For dry and wet concrete only.
Before roughening, the borehole needs to be dry.

Cleaning (Inadequate hole cleaning=poor load values.)



Hammer Drilling:

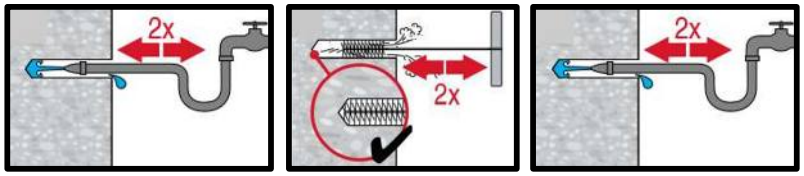
Compressed air cleaning (CAC)
For all drill hole diameters d_0 and all drill hole depths h_0.

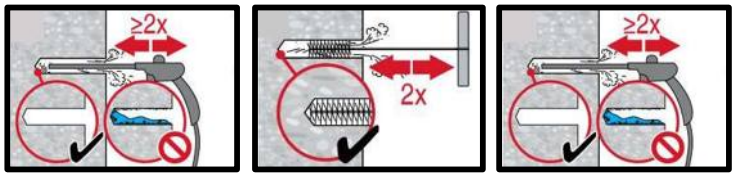


Hammer drilling:

Cleaning for under water:

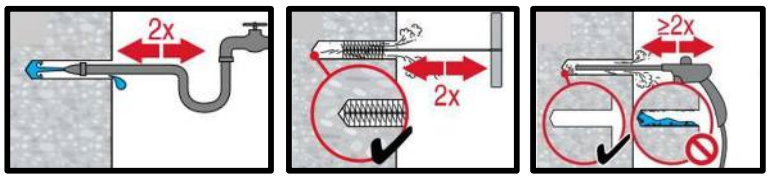
For all bore hole diameters d_0 and all bore hole depth h_0.





Hammer drilled flooded holes and diamond cored holes:

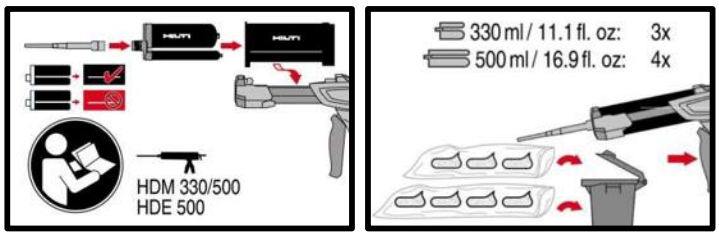
For all drill hole diameters d_0 and drill hole depths h_0.



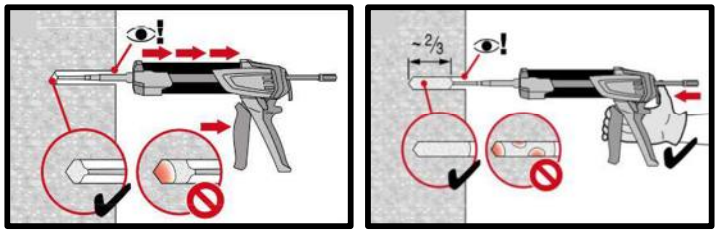
Diamond cored holes with Hilti roughening tool:

For all drill hole diameters d_0 and drill hole depths h_0.

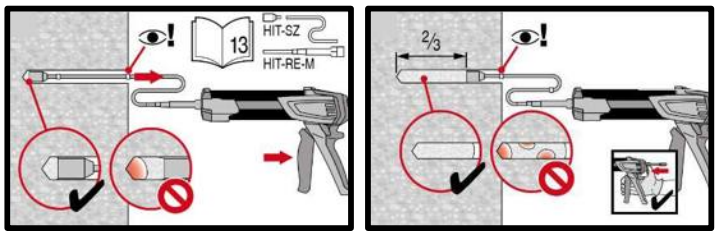
Injection preparation



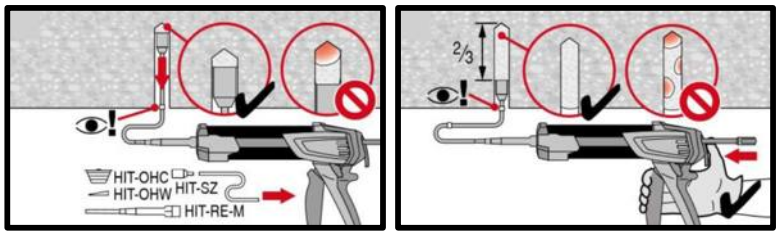
Injection system preparation.



Injection method for drill hole depth $h_{ef} \leq 250$ mm.

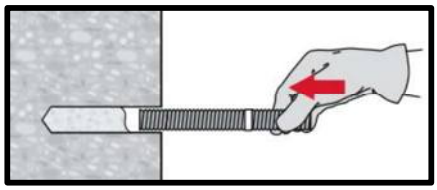


Injection method for drill hole depth $h_{ef} > 250$mm.

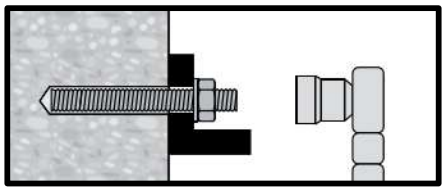


Injection method for overhead application.

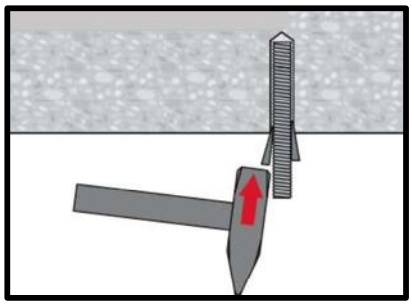
Setting the element



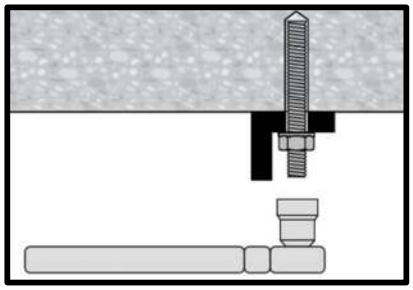
Setting element, observe working time "t_{work}".



Loading the anchor after required curing time t_{cure} the anchor can be loaded. The applied installation torque shall not exceed max. $T_{inst.}$



Setting element for overhead applications, observe working time "t_{work}"



Loading the anchor after required curing time t_{cure} the anchor can be loaded. The applied installation torque shall not exceed max. $T_{inst.}$