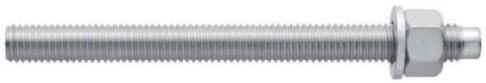
HIT-RE 500 V3 injection mortar

Anchor design (ETAG 001) / Rods&Sleeves / Concrete

Injection mortar system	Benefits

Foil pack: HIT-RE 500 V3

(available in 330, 500 and 1400 ml cartridges)



Anchor rod:
HIT-V
HIT-V-F
HIT-V-R
HIT-V-HCR
AM 8.8 (HDG)
(M8-M39)

Internally threaded sleeve:
HIS-N,
HIS-RN
(M8-M20)

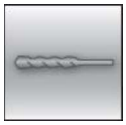
- **SafeSet** technology: Simplified method of borehole preparation using either Hilti hollow drill bit for hammer drilling or Roughening tool for diamond cored applications
- Suitable for cracked/non-cracked concrete C 20/25 to C 50/60
- High loading capacity
- Suitable for dry and water saturated concrete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

Base material

Concrete (non-cracked)

Concrete (cracked)

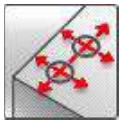
Installation conditions



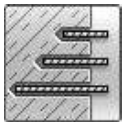
Hammer drilled holes

Diamond drilled holes

Hilti **SafeSet** technology

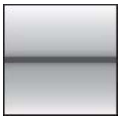


Small edge distance and spacing



Variable embedment depth

Load conditions



Static/ quasi-static

Seismic, ETA-C1, C2

Fire resistance

Other information

European Technical Assessment

CE conformity

PROFIS design Software

Corrosion resistance

High corrosion resistance [a)]

a) Applications only with HIT-V anchor rods

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment [a)]	CSTB	ETA-16/0143 / 2017-07-12
Shockproof fastenings in civil defence installations	Federal Office for Civil Protection, Bern	BZS D 16-601/ 2016-08-31
Fire test report [b)]	MFPA Leipzig	GS 3.2/15-361-4 / 2016-08-04

a) All data given in this section according to ETA-16/0143, issue 2017-07-12.
b) Fire test report only available for HIT-V rods.

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
- HIT-V 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, as specified in the table
- One typical embedment depth as specified in the table
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- Temperature range I
  (min. base material temperature -40°C, max. long/short term base material temperature: +24°C/40°C)

Embedment depth [a] and base material thickness

Anchor size		ETA-16/0143, issue 2017-07-12								Hilti technical data		
		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
HIT-V												
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, hollow drill bit[1] and diamond cored with roughening tool[2]:

Characteristic resistance

Anchor size			ETA-16/0143, issue 2017-07-12								Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non-cracked concrete													
Tension N_{Rk}	HIT-V 5.8	[kN]	18,0	29,0	42,0	70,6	111,	153,	187,	224,	262,4	302,7	344,9
	HIT-V 8.8, AM		29,0	43,1	58,3	70,6	111,	153,	187,	224,	262,4	302,7	344,9
	HIT-V-R		26,0	41,0	58,3	70,6	111,	153,	187,	224,	262,4	302,7	344,9
	HIT-V-HCR		29,0	43,1	58,3	70,6	111,	153,	187,	224,	262,4	302,7	334,9
	HIS-N 8.8		25,0	46,0	67,0	111,	116,	-	-	-	-	-	-
Shear V_{Rk}	HIT-V 5.8	[kN]	9,0	15,0	21,0	39,0	61,0	88,0	115,	140,	174,0	204,0	244,0
	HIT-V 8.8, AM		15,0	23,0	34,0	63,0	98,0	141,	184,	224,	278,0	327,0	390,0
	HIT-V-R		13,0	20,0	30,0	55,0	86,0	124,	115,	140,	174,0	204,0	244,0
	HIT-V-HCR		15,0	23,0	34,0	63,0	98,0	124,	161,	196,	174,0	204,0	244,0
	HIS-N 8.8		13,0	23,0	34,0	63,0	58,0	-	-	-	-	-	-
Cracked concrete													
Tension N_{Rk}	HIT-V 5.8	[kN]	13,1	21,2	33,2	50,3	79,8	109,	133,	159,	-	-	-
	HIT-V 8.8, AM		13,1	21,2	33,2	50,3	79,8	109,	133,	159,	-	-	-
	HIT-V-R		13,1	21,2	33,2	50,3	79,8	109,	133,	159,	-	-	-
	HIT-V-HCR		13,1	21,2	33,2	50,3	79,8	109,	113,	159,	-	-	-
	HIS-N 8.8		25,0	41,5	50,3	79,8	105,	-	-	-	-	-	-
Shear V_{Rk}	HIT-V 5.8	[kN]	9,0	15,0	21,0	39,0	61,0	88,0	115,	140,	-	-	-
	HIT-V 8.8, AM		15,0	23,0	34,0	63,0	98,0	141,	184,	224,	-	-	-
	HIT-V-R		13,0	20,0	30,0	55,0	86,0	124,	115,	140,	-	-	-
	HIT-V-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) Roughening tools are available for element size M16-M30.

Design resistance

Anchor size			ETA-16/0143, issue 2017-07-12							Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non-cracked concrete													
Tension N_{Rd}	HIT-V 5.8	[kN]	12,0	19,3	28,0	47,1	74,6	102,	125,	149,	145,8	168,2	191,6
	HIT-V 8.8, AM 8.8		19,3	28,7	38,8	47,1	74,6	102,	125,	149,	145,8	168,2	191,6
	HIT-V-R		13,9	21,9	31,6	47,1	74,6	102,	80,4	98,3	121,3	143,0	170,6
	HIT-V-HCR		19,3	28,7	38,8	47,1	74,6	102,	125,	149,	144,6	168,2	191,6
	HIS-N 8.8		16,7	30,7	44,7	74,6	77,3	-	-	-	-	-	-
Shear V_{Rd}	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,	139,2	163,2	195,2
	HIT-V 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	112,	147,	179,	222,4	261,6	312,0
	HIT-V-R		8,3	12,8	19,2	35,3	55,4	79,5	48,3	58,8	73,1	85,7	102,5
	HIT-V-HCR		12,0	18,4	27,2	50,4	78,4	70,9	92,0	112,	87,0	102,0	122,0
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-	-	-	-
Cracked concrete													
Tension N_{Rd}	HIT-V 5.8	[kN]	8,7	14,1	22,1	33,5	53,2	73,0	89,2	106,	-	-	-
	HIT-V 8.8, AM 8.8		8,7	14,1	22,1	33,5	53,2	73,0	89,2	106,	-	-	-
	HIT-V-R		8,7	14,1	22,1	35,5	53,2	73,0	80,4	98,3	-	-	-
	HIT-V-HCR		8,7	14,1	22,1	33,5	53,2	73,0	89,2	106,	-	-	-
	HIS-N 8.8		16,7	27,7	33,5	53,2	70,4	-	-	-	-	-	-
Shear V_{Rd}	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,	-	-	-
	HIT-V 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	112,	147,	179,	-	-	-
	HIT-V-R		8,3	12,8	19,2	35,3	55,1	79,5	48,3	58,8	-	-	-
	HIT-V-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	-	-	-	-	-	-

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

Recommended loads [a)]

Anchor size			ETA-16/0143, issue 2017-07-12							Hilti technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Non-cracked concrete													
Tension N_{Rec}	HIT-V 5.8	[kN]	8,6	13,8	20,0	33,6	53,3	73,2	89,4	106,7	104,1	120,1	136,9
	HIT-V-R		9,9	15,7	22,5	33,6	53,3	73,2	57,4	70,2	86,7	102,1	121,9
	HIT-V-HCR		13,8	20,5	27,7	33,6	53,3	73,2	89,4	106,7	103,3	120,1	136,9
	HIS-N 8.8		16,7	30,7	44,7	74,6	77,3	-	-	-	-	-	-
Shear V_{Rec}	HIT-V 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0	99,4	116,6	139,4
	HIT-V-R		6,0	9,2	13,7	25,2	39,4	56,8	34,5	42,0	52,2	61,2	73,2
	HIT-V-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		10,4	18,4	27,2	50,4	46,4	-	-	-	-	-	-
Cracked concrete													
Tension N_{Rec}	HIT-V 5.8	[kN]	6,2	10,1	15,8	23,9	38,0	52,2	63,7	76,1	-	-	-
	HIT-V-R		6,2	10,1	15,8	23,9	38,0	52,2	57,4	70,2	-	-	-
	HIT-V-HCR		6,2	10,1	15,8	23,9	38,0	52,2	63,7	76,1	-	-	-
	HIS-N		16,7	27,7	33,5	53,2	70,4	-	-	-	-	-	-
Shear V_{Rec}	HIT-V 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0	-	-	-
	HIT-V-R		6,0	9,2	13,7	25,2	39,4	56,8	34,5	42,0	-	-	-
	HIT-V-HCR		8,6	13,1	19,4	36,0	56,0	56,0	65,7	80,0	-	-	-
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-	-	-	-

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 [a]:

Characteristic resistance

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rk}	HIT-V 5.8	[kN]	*18,0*	*29,0*	*42,0*	70,6	111,9	153,7	187,8	224,0
	HIT-V 8.8, AM 8.8		24,1	33,9	49,8	70,6	111,9	153,7	187,8	224,0
Shear V_{Rk}	HIT-V 5.8	[kN]	*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*	*115,0*	*140,0*
	HIT-V 8.8, AM 8.8		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141,0*	*184,0*	*224,0*

a) No data for HIS-N when diamond coring without roughening tools.

Design resistance

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rd}	HIT-V 5.8	[kN]	12,0	18,8	27,6	33,6	53,3	73,2	89,4	106,7
	HIT-V 8.8, AM 8.8		13,4	18,8	27,6	33,6	53,3	73,2	89,4	106,7
Shear V_{Rd}	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0
	HIT-V 8.8, AM 8.8		12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2

a) No data for HIS-N when diamond coring without roughening tools.

Recommended loads [b]

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tensile N_{Rec}	HIT-V 5.8	[kN]	8,6	13,5	19,7	24,0	38,1	52,3	63,9	76,2
Shear V_{Rec}	HIT-V 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0

a) No data for HIS-N when diamond coring without roughening tools.
b) 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

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Anchor HIT-V strength class 8.8, anchor AM 8.8
- Base material thickness, as specified in the table
- One typical embedment depth as specified in the table
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- 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		M8	M10	M12	M16	M20	M24	M27	M30
HIT-V									
Eff. Anchorage depth	[mm]	80	90	110	125	170	210	240	270
Base material thickness	[mm]	110	120	140	165	220	270	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 HIT-V rods.

For hammer drilled holes, hollow drill bit and diamond cored with roughening tool:

Characteristic resistance in case of seismic performance category C2 using Hilti seismic filling set

Anchor size				M8	M10	M12	M16	M20	M24	M27	M30
Tensile N_{Rk}	HIT-V 8.8, AM 8.8	[kN]		-	-	-	34,6	57,7	80,8	-	-
Shear V_{Rk}	HIT-V 8.8, AM 8.8	[kN]		-	-	-	*46,0*	*77,0*	*103,0*	-	-
	HIT-V-F 8.8 AM-HDG 8.8			-	-	-	30,0	46,0	66,0	-	-

Design resistance in case of seismic performance category C2 using Hilti seismic filling set

Anchor size				M8	M10	M12	M16	M20	M24	M27	M30
Tensile N_{Rd}	HIT-V 8.8, AM 8.8	[kN]		-	-	-	23,0	38,5	53,8	-	-
Shear V_{Rd}	HIT-V 8.8, AM 8.8	[kN]		-	-	-	36,8	61,6	82,4	-	-
	HIT-V-F 8.8 AM-HDG 8.8			-	-	-	24,0	36,8	52,8	-	-

For hammer drilled holes and hammer drilled holes with Hilti hollow drill bit:

Characteristic resistance in case of seismic performance category C1

Anchor size				M8	M10	M12	M16	M20	M24	M27	M30
Tensile N_{Rk}	HIT-V 8.8, AM 8.8	[kN]		12,1	19,8	32,8	42,8	67,8	93,1	113,8	135,8
	HIS-N 8.8			*25,0*	35,3	42,8	67,8	89,8	-	-	-
Shear V_{Rk}	HIT-V 8.8, AM 8.8	[kN]		*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141,0*	*184,0*	*224,0*
	HIS-N 8.8			*9,0*	*16,0*	*24,0*	*44,0*	*41,0*	-	-	-

Design resistance in case of seismic performance category C1

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Tensile N_{Rd}	HIT-V 8.8, AM 8.8	[kN]	8,0	13,2	21,8	28,5	45,2	62,1	75,9	90,5
	HIS-N 8.8		16,7	23,5	28,5	45,2	59,9	-	-	-
Shear V_{Rd}	HIT-V 8.8, AM 8.8	[kN]	12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2
	HIS-N 8.8		7,2	12,8	19,2	35,2	32,8	-	-	-

Materials

Mechanical properties for HIT-V

Anchor size			ETA-16/0143, issue 2017-07-12								Hilti Technical data		
			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Nominal tensile strength f_{uk}	HIT-V 5.8(F)	[N/mm²]	500	500	500	500	500	500	500	500	500	500	500
	HIT-V 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
	HIT-V-R		700	700	700	700	700	700	500	500	500	500	500
	HIT-V-HCR		800	800	800	800	800	700	700	700	500	500	500
Yield strength f_{yk}	HIT-V 5.8(F)	[N/mm²]	400	400	400	400	400	400	400	400	400	400	400
	HIT-V 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
	HIT-V-R		450	450	450	450	450	450	210	210	210	210	210
	HIT-V-HCR		640	640	640	640	640	400	400	400	250	250	250
Stressed cross-section A_s	HIT-V AM 8.8	[mm²]	36,6	58,0	84,3	157	245	353	459	561	694	817	976
Moment of resistance W	HIT-V 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-16/0143, issue 2017-07-12				
			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	108,0	169,1	256,1	237,6
	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 HIT-V

Part	Material
Zinc coated steel	
Threaded rod, HIT-V 5.8 (F)	Strength class 5.8; Elongation at fracture A5 > 8% ductile Electroplated zinc coated ≥ 5μm; (F) hot dip galvanized ≥ 45 μm
Threaded rod, HIT-V 8.8 (F)	Strength class 8.8; Elongation at fracture A5 > 12% ductile Electroplated zinc coated ≥ 5μm; (F) hot dip galvanized ≥ 45 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 ≥ 45 μm
Washer	Electroplated zinc coated ≥ 5 μm, hot dip galvanized ≥ 45 μm
Nut	Strength class of nut adapted to strength class of threaded rod. Electroplated zinc coated ≥ 5μm, hot dip galvanized ≥ 45 μm
Stainless Steel	
Threaded rod, HIT-V-R	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, HIT-V-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 V3 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 +70 °C	+43 °C	+70 °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.

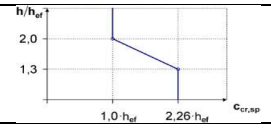
Working time and curing time

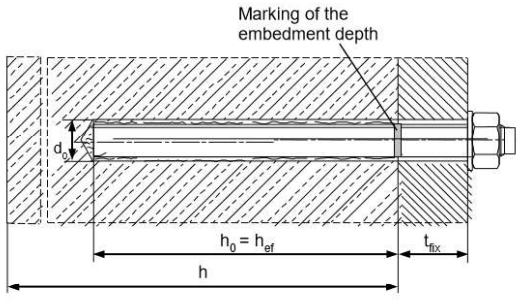
Temperature of the base material T	Working time t_{work}	Minimum curing time t_{cure} [1)]
-5 °C to -1 °C	2 h	168 h
0 °C to 4 °C	2 h	48 h
5 °C to 9 °C	2 h	24 h
10 °C to 14 °C	1,5 h	16 h
15 °C to 19 °C	1 h	12 h
20 °C to 24 °C	30 min	7 h
25 °C to 29 °C	20 min	6 h
30 °C to 34 °C	15 min	5 h
35 °C to 39 °C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

Setting details for HIT-V

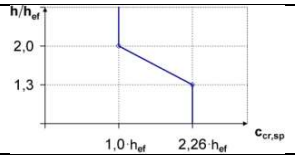
			ETA-16/0143, issue 2017-07-12								Hilti Technical data		
Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**	**M33**	**M36**	**M39**
Nominal diameter of drill bit	d_0	[mm]	10	12	14	18	22	28	30	35	37	40	42
Effective anchorage and drill hole depth range [a)]	$h_{ef,min}$	[mm]	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. torque moment	T_{max}	[mm]	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
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)]	$c_{cr,N}$	[mm]	1,5 h_{ef}										





Setting details for HIS-N

Anchor size			M8	M10	M12	M16	M20
Nominal diameter of drill	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
Minimum base 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
Minimum spacing	s_{min}	[mm]	60	70	90	115	130
Minimum 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 · 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]	$c_{cr,N}$	[mm]	1,5 h_{ef}				
Max. torque moment [a]	T_{max}	[Nm]	10	20	40	80	150

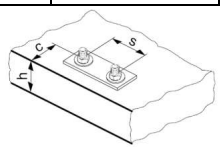


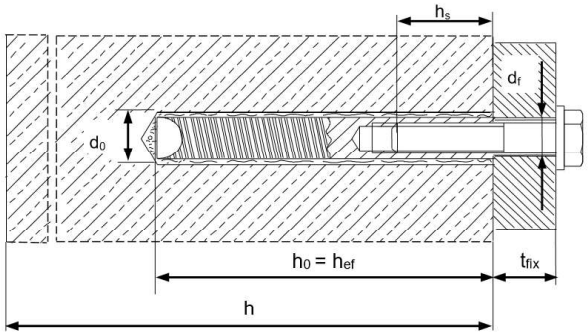
For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

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

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

c) The critical 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 save side.





Installation equipment

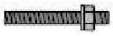
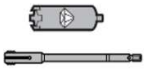
Anchor size		M8	M10	M12	M16	M20	M24	M27	M30	M36	M39
Rotary hammer	HIT-V	TE 2 – TE 16				TE 40 – TE 80				Not available from Hilti	
	HIS-N	TE 2 – TE 16		TE 40 – TE 80			-				
Other tools		compressed air gun, set of cleaning brushes, dispenser									
		roughening tools TE-YRT								-	
Additional Hilti recommended tools		DD EC-1, DD 100 … DD 160 [a]								-	

a) For anchors in diamond drilled holes load values for combined pull-out and concrete cone resistance have to be reduced

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

Parameters of cleaning and setting tools

HIT-V	HIS-N	Drill bit diameters d_0 [mm]				Installation	
		Hammer drill (HD)	Hollow Drill Bit (HDB)	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	-	-	-	37	37
M36	-	40	-	-	-	40	40
M39	-	42	-	-	-	42	42

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

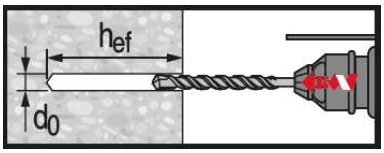
Setting instructions

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

Safety regulations.

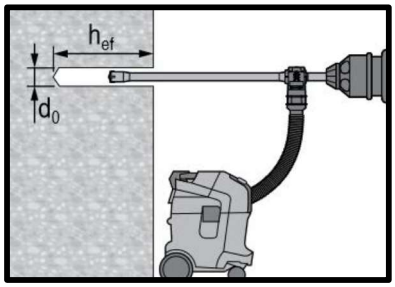
Review the Material Safety Data Sheet (MSDS) before use for proper and safe handling! Wear well-fitting protective goggles and protective gloves when working with Hilti HIT-RE 500 V3.

Drilling



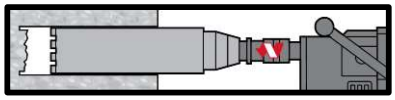
Hammer drilled hole

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



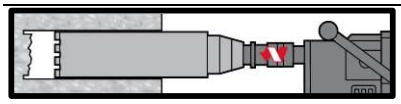
Hammer drilled hole with Hollow Drilled Bit (HDB)

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



Diamond Coring

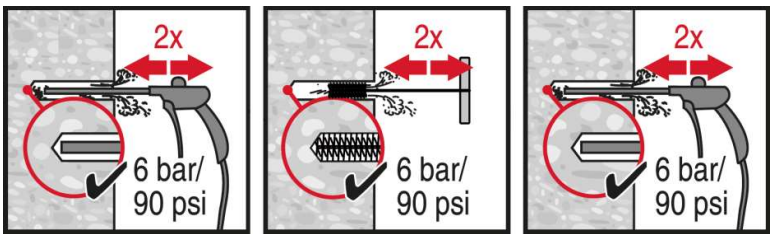
For dry and wet concrete, only.



Diamond Coring + Roughening Tool

For dry and wet concrete only.
Before roughening, the borehole needs to be dry.

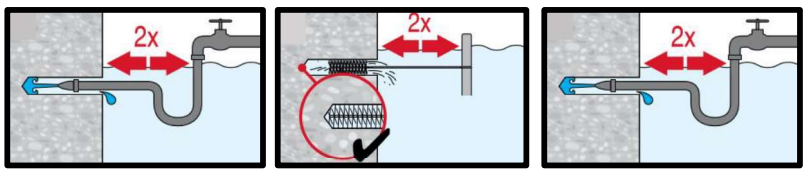
Cleaning (Inadequate hole cleaning=poor load values.)



Hammer Drilling:

Compressed air cleaning (CAC)

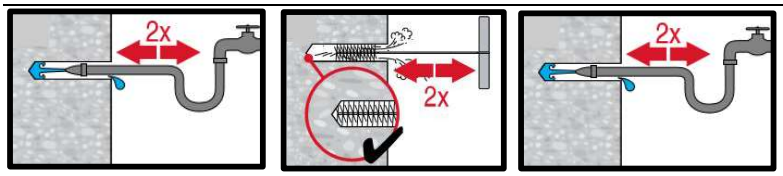
For all drill hole diameters d_0 and all drill hole depths h_0.



Hammer drilling:

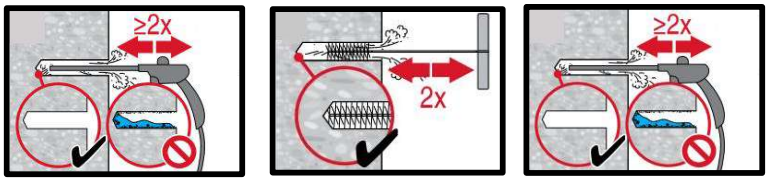
Cleaning for under water:

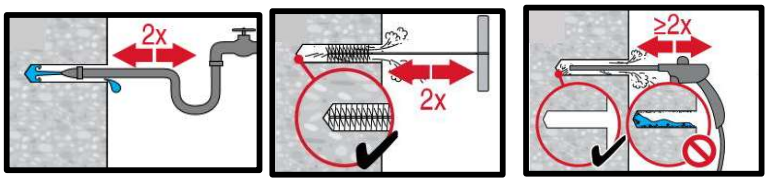
For all bore hole diameters d_0 and all bore hole depth h_0.



Hammer drilled flooded holes and diamond cored holes:

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

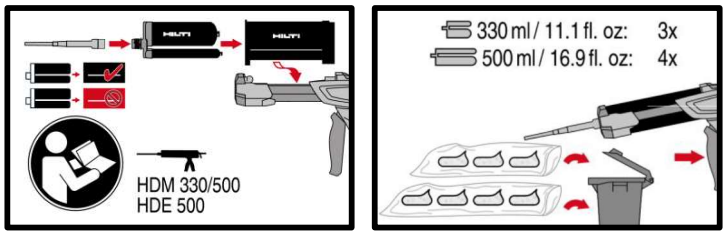




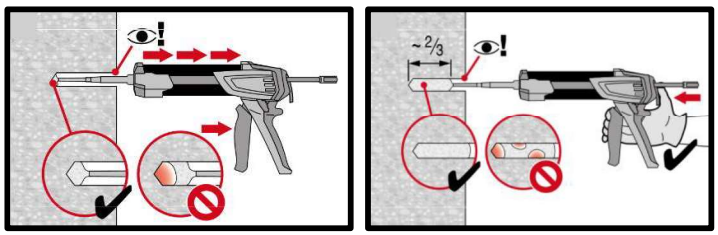
Diamond cored holes with Hilti roughening tool:

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

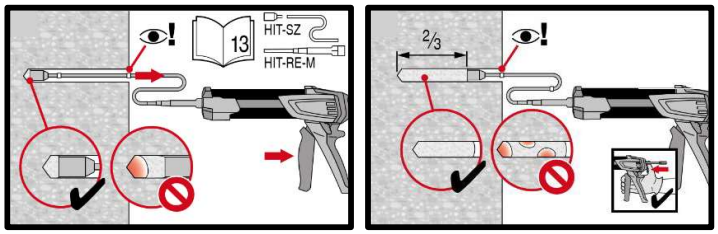
Injection preparation



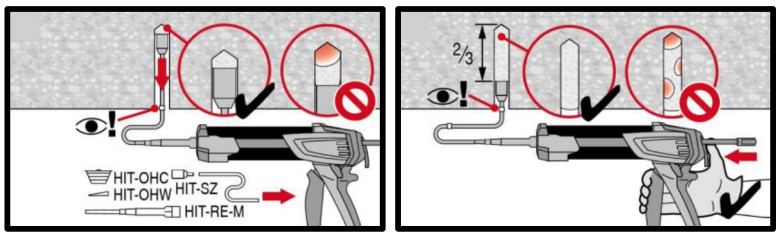
Injection system preparation.



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

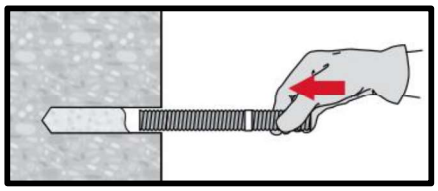


Injection method for drill hole depth $h_{ef} > 250$mm.

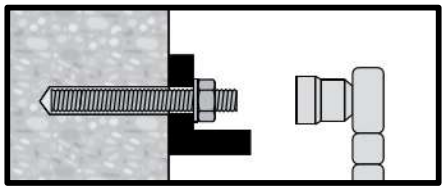


Injection method for overhead application.

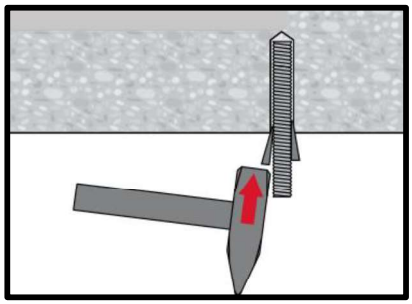
Setting the element



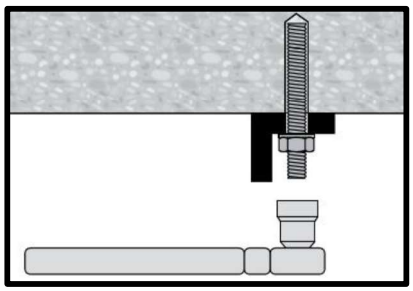
Setting element, observe working time "t_{work}",



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



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 $T_{max.}$