HIT-HY 170 injection mortar

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

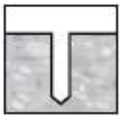
Injection mortar system		Benefits
	Hilti HIT-HY 170 500 ml foil pack (also available as 330 ml foil pack)	- Suitable for non-cracked and cracked [a] concrete C 20/25 to C 50/60 - Suitable for dry and water saturated concrete - Small edge distance and anchor spacing possible - High corrosion / corrosion resistant - In service temperature range up to 80ºC short term / 50ºC long term
	Anchor rod: HIT-V HIT-V-F HIT-V-R HIT-V-HCR (M8-M24)	
	Internally threaded sleeve: HIS-N HIS-RN (M8-M16)	

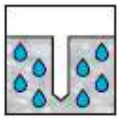
a) Applications only with HIT-V anchor rods.

Base material

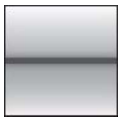

Concrete (non-cracked)


Concrete (cracked) [a]

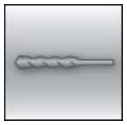

Dry concrete

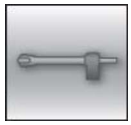

Wet concrete

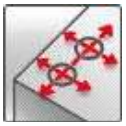
Load conditions


Static/ quasi-static

Installation conditions


Hammer drilled holes


Hollow drill-bit drilling


Small edge embedment depth

Other information

SAFE-SET
Hilti **SafeSet** technology


European Technical Assessment


CE conformity

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 Approval [a]	DIBt, Berlin, Germany	ETA-14/0457 / 2017-12-14

a) All data given in this section according to ETA-14/0457, issue 2017-12-14.

Basic loading data (for a single anchor)

All data in this section applies to:

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Base material thickness as specified in the table
- One typical embedment depth, as specified in the table
- One anchor material, as specified in the tables
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- Temperature range I (min. base material temp. -40°C, max. long/short term base material temp.: +24°C/40°C)

Embedment depth a)

Anchor size			M8	M10	M12	M16	M20	M24
HIT-V								
Embedment depth	h_{ef}	[mm]	80	90	110	125	170	210
Base material thickness	h	[mm]	110	120	140	165	220	270
HIS-N								
Embedment depth	h_{ef}	[mm]	90	110	125	170	-	-
Base material thickness	h	[mm]	120	150	170	230	-	-

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

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

Characteristic resistance

Anchor size			M8	M10	M12	M16	M20	M24
Non-cracked concrete								
Tension N_{Rk}	HIT-V 5.8	[kN]	*18,0*	*28,3*	*41,5*	62,8	106,8	153,7
	HIS-N 8.8		*25*	*46,0*	*67,0*	111,9	-	-
Shear V_{Rk}	HIT-V 5.8	[kN]	*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*
	HIS-N 8.8		*13,0*	*23,0*	*34,0*	*63,0*	-	-
Cracked concrete								
Tension N_{Rk}	HIT-V 5.8	[kN]	-	15,6	22,8	34,6	-	-
Shear V_{Rk}	HIT-V 5.8	[kN]	-	*15,0*	*21,0*	*39,0*	-	-

Design resistance

Anchor size			M8	M10	M12	M16	M20	M24
Non-cracked concrete								
Tension N_{Rd}	HIT-V 5.8	[kN]	12,0	18,8	27,6	41,9	71,2	102,5
	HIS-N 8.8		16,7	30,7	44,7	74,6	-	-
Shear V_{Rd}	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4
	HIS-N 8.8		10,4	18,4	27,2	50,4	-	-
Cracked concrete								
Tension N_{Rd}	HIT-V 5.8	[kN]	-	10,4	15,2	23,0	-	-
Shear V_{Rd}	HIT-V 5.8		-	12,0	16,8	31,2	-	-

Recommended loads [a)]

Anchor size			M8	M10	M12	M16	M20	M24
Non-cracked concrete								
Tension N_{Rec}	HIT-V 5.8	[kN]	8,6	13,5	19,7	29,9	50,9	73,2
	HIS-N 8.8		11,9	21,9	31,9	53,3	-	-
Shear V_{Rec}	HIT-V 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3
	HIS-N 8.8		7,4	13,1	19,4	36,0	-	-
Cracked concrete								
Tension N_{Rec}	HIT-V 5.8	[kN]	-	7,4	10,9	16,5	-	-
Shear V_{Rec}	HIT-V 5.8		-	8,6	12,0	22,3	-	-

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.

Materials

Materials properties for HIT-V

Anchor size			M8	M10	M12	M16	M20	M24
Nominal tensile strength f_{uk}	HIT-V 5.8	[N/mm²]	500	500	500	500	500	500
	HIT-V 8.8		800	800	800	800	800	800
	HIT-V-R		700	700	700	700	700	700
	HIT-V-HCR		800	800	800	800	800	700
Yield strength f_{yk}	HIT-V 5.8	[N/mm²]	400	400	400	400	400	400
	HIT-V 8.8		640	640	640	640	640	640
	HIT-V-R		450	450	450	450	450	450
	HIT-V-HCR		640	640	640	640	640	400
Stressed cross-section A_s	HIT-V	[mm²]	36,6	58,0	84,3	157	245	353
Moment of resistance W	HIT-V	[mm³]	31,2	62,3	109	277	541	935

Mechanical properties for HIS-N

Anchor size			M8	M10	M12	M16
Nominal tensile strength f_{uk}	HIS-N	[N/mm²]	490	490	490	490
	Screw 8.8		800	800	800	800
	HIS-RN		700	700	700	700
	Screw A4-70		700	700	700	700
Yield strength f_{yk}	HIS-N	[N/mm²]	390	390	390	390
	Screw 8.8		640	640	640	640
	HIS-RN		350	350	350	350
	Screw A4-70		450	450	450	450
Stressed cross-section A_s	HIS-(R)N	[mm²]	51,5	108,0	169,1	256,1
	Screw		36,6	58	84,3	157
Moment of resistance W	HIS-(R)N	[mm³]	145	430	840	1595
	Screw		31,2	62,3	109	277

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 range

-5ºC to +40ºC

In service temperature range

Hilti HIT-HY 170 injection mortar with anchor rod HIT-V may be applied in the temperature ranges given below. An elevated base material temperature leads to a reduction of the design bond resistance.

Temperature in the base material

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 +80 °C	+50 °C	+80 °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.

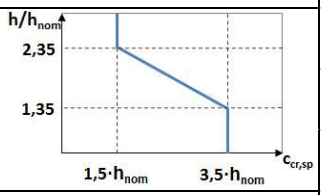
Curing and working time a)

Temperature of the base material	Maximum working time t_{work}	Maximum curing time t_{cure}
-5 °C ≤ T_{BM} ≤ 0 °C a)	10 min	12 hours
0 °C ≤ T_{BM} ≤ 5 °C a)	10 min	5 hours
5 °C ≤ T_{BM} ≤ 10 °C	8 min	2,5 hours
10°C ≤ T_{BM} ≤ 20 °C	5 min	1,5 hours
20 °C ≤ T_{BM} ≤ 30 °C	3 min	45 min
30 °C ≤ T_{BM} ≤ 40 °C	2 min	30 min

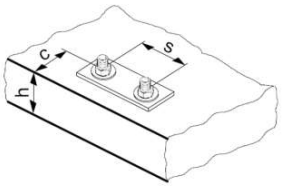
a) The curing time data are valid for dry base material only. In wet base material the curing times must be doubled.

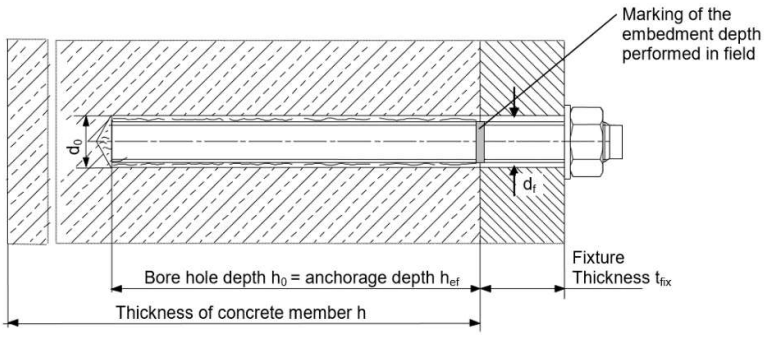
Setting details for HIT-V

Anchor size			M8	M10	M12	M16	M20	M24
Nominal diameter of drill bit	d_0	[mm]	10	12	14	18	22	28
Diameter of the element	d	[mm]	8	10	12	16	20	24
Eff. embedment depth and drill hole depth a)	$h_{ef,min}$	[mm]	60	60	70	80	90	96
	$h_{ef,ma}$	[mm]	96	120	144	192	240	288
Min. base material thickness	h_{min}	[mm]	h_{ef} + 30 mm ≥100 mm			h_{ef} + 2 d_0		
Max. diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22	26
Max. torque moment b)	T_{max}	[mm]	10	20	40	80	150	200
Min. spacing	s_{min}	[mm]	40	50	60	80	100	120
Min. edge distance	c_{min}	[mm]	40	50	60	80	100	120
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$					
Critical edge distance for splitting failure c)	$c_{cr,sp}$	[mm]	**1,0 · h_{ef}** for h / h_{ef} ≥ 2,00 **4,6 h_{ef} – 1,8 h** for 2,00 > 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 $c_{cr,sp}$					
Critical edge distance for concrete cone failure d)	$c_{cr,N}$	[mm]	1,5 h_{ef}					



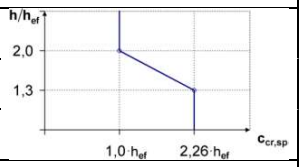
For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.$h_{ef,min}$ ≤ h_{ef} ≤ $h_{ef,max}$ (h_{ef}: embedment depth)
a) Maximum recommended torque moment to avoid splitting failure during instalation with minimum spacing and edge distance
b) h: base material thickness (h ≥ 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.





Setting details for HIS-N

Anchor size			M8	M10	M12	M16
Nominal diameter of drill bit	d_0	[mm]	14	18	22	28
Diameter of element	d	[mm]	12,5	16,5	20,5	25,4
Eff. embedment depth and drill hole depth a)	h_{ef}	[mm]	90	110	125	170
	h_{min}	[mm]	120	150	170	230
Diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18
Thread engagement length min-max	h_s	[mm]	8-20	10-25	12-30	16-40
Min. spacing	s_{min}	[mm]	60	75	90	115
Min. edge distance	c_{min}	[mm]	40	45	55	65
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$			
Critical edge distance for splitting failure a)	$c_{cr,sp}$	[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 b)	$c_{cr,N}$	[mm]	1,5 h_{ef}			
Torque moment c)	T_{max}	[Nm]	10	20	40	80

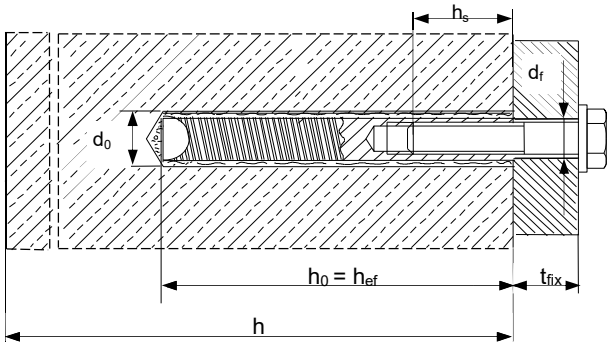


For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

a) h: base material thickness (h ≥ h_{min}), h_{ef}: embedment depth

b) 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.

c) Maximum recommended torque moment to avoid splitting failure during installation with minimun spacing and/or edge distance.



Installation equipment

Anchor size		M8	M10	M12	M16	M20	M24
Rotary hammer	HIT-V	TE 2 (-A) – TE 30 (-A)				TE 40 - TE 80	
	HIS-N	TE 2 (-A) – TE 30 (-A)		TE 40 - TE 80		-	
Other tools		compressed air gun and blow out pump, set of cleaning brushes, dispenser					

Drilling and cleaning parameters

HIT-V	HIS-N	Drill bit diameters d_0 [mm]		Installation size [mm]	
		Hammer drill (HD)	Hollow Drill Bit (HDD)	Brush HIT-RB	Piston plug HIT-SZ
					
M8	**-**	10	-	10	-
M10	**-**	12	-	12	12
M12	**M8**	14	14	14	14
M16	**M10**	18	18	18	18
M20	**M12**	22	22	22	22
M24	**M16**	28	28	28	28

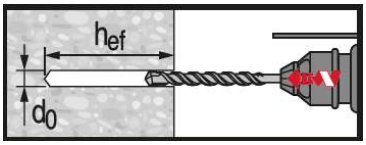
Setting instructions

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

Safety regulations.

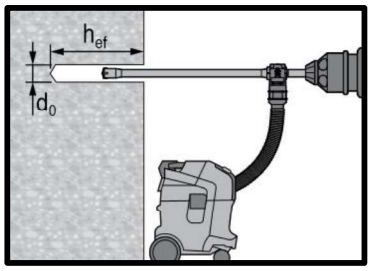
Review the Material Safety Data Sheet (MSDS) before use for proper and safe handling! Wear well-fitting protective goggles and protective gloves when working with Hilti HIT-HY 170.

Drilling



Hammer drilled hole

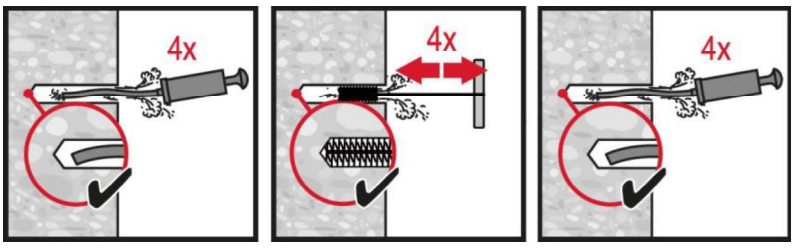
For dry and wet concrete.



Hammer drilled hole with Hollow Drilled Bit (HDB)

No cleaning required.

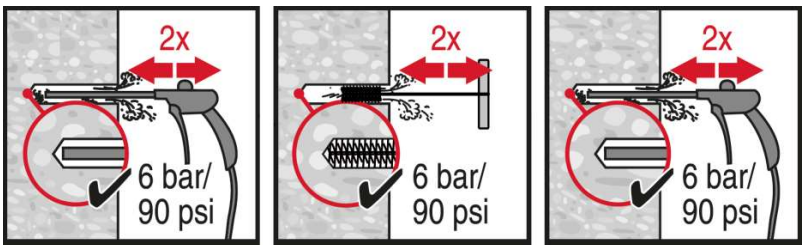
Cleaning



Manual cleaning (MC)

Non-cracked concrete only

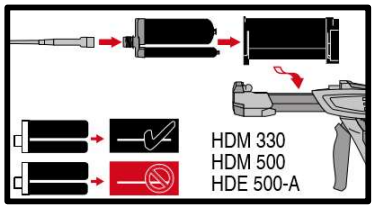
for drill diameters $d_0 \leq 18$ mm and drill hole depth $h_0 \leq 10 \cdot d$.

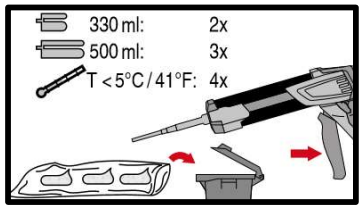


Compressed air cleaning (CAC)

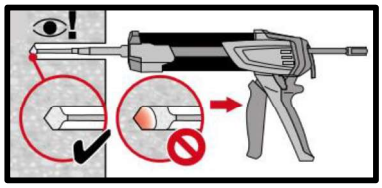
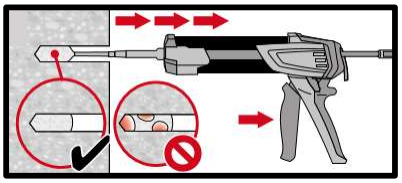
for all drill hole diameters d_0 and drill hole depths h_0 .

Injection

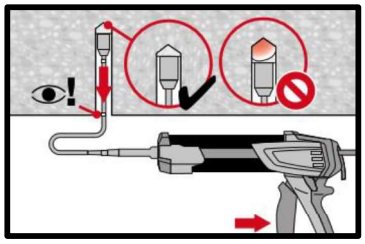
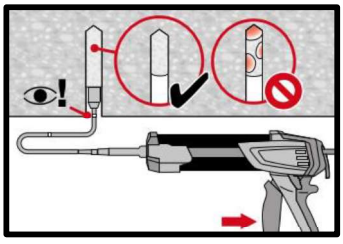




Injection system preparation.

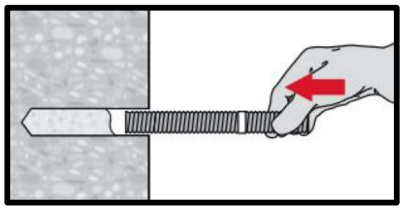



Injection method for drill hole

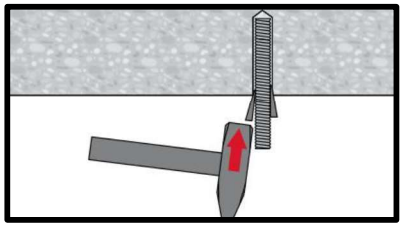



Injection method for overhead application and/or installation with embedment depth h_{ef} > 250 mm.

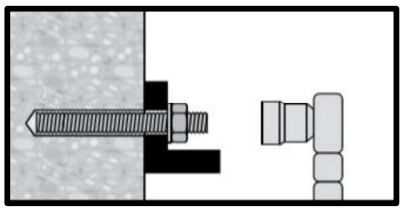
Setting the element



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



Setting element for overhead applications



Loading the anchor after required curing time t_{cure}