HIT-HY 170 injection mortar

Anchor design (ETAG 001) / Rebar elements / 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 concrete C 12/15 to C 50/60 - Suitable for dry and water saturated concrete - High loading capacity and fast cure - In service temperature range up to 80°C short term/50°C long term - Manual cleaning for drill hole sizes ≤ 18 mm and embedment depth h_{ef} ≤ 10d
	Rebar B500 B (ϕ8-ϕ25)	

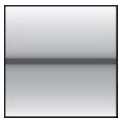
Base material

Concrete (non-cracked)

Dry concrete

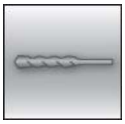
Wet concrete

Load conditions

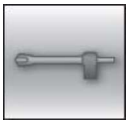


Static/ quasi-static

Installation conditions



Hammer drilling



Hollow drill-bit drilling

Variable embedment depth

Other information

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
Hilti Technical Data [a)]	Hilti	2017-11-28

a) All data given in this section according to Hilti Technical Data.

Static and quasi-static loading (for a single anchor)

All data in this section applies to
-Correct setting
-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
-Temperate range I
(min. base material temperature -40°C, max. long term/short term base material temperature: +50°C/80°C)

Embedment depth [a] and base material thickness for static and quasi-static loading data

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ18	ϕ20	ϕ22	ϕ24	ϕ25
Typical embedment depth	[mm]	80	90	110	125	145	155	170	185	200	210
Base material thickness	[mm]	110	120	140	161	185	199	220	237	256	274

a) The allowed range of embedment depth is shown in the setting details. The corresponding load values can be calculated according to the simplified design method.

Characteristic resistance

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ18	ϕ20	ϕ22	ϕ24	ϕ25
Tensile N_{Rk}	[kN]	20,1	28,3	41,5	58,9	72,9	87,7	106,8	127,1	142,8	153,7
Shear V_{Rk}		*14,0*	*22,0*	*31,0*	*42,0*	*55,0*	*70,0*	*86,0*	*104,0*	*124,0*	*135,0*

Design resistance

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ18	ϕ20	ϕ22	ϕ24	ϕ25
Tensile N_{Rd}	[kN]	13,4	18,8	27,6	39,3	48,6	58,4	71,2	84,7	95,2	102,5
Shear V_{Rd}		*11,2*	*17,6*	*24,8*	*33,6*	*44,0*	*56,0*	*68,8*	*83,2*	*99,2*	*108,0*

Recommended loads[a]

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ18	ϕ20	ϕ22	ϕ24	ϕ25
Tensile N_{Rec}	[kN]	9,6	13,5	19,7	28,0	34,7	41,7	50,9	60,5	68,0	73,2
Shear V_{Rec}		8,0	12,6	17,7	24,0	31,4	40,0	49,1	59,4	70,9	77,1

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.

Materials

Mechanical properties

Anchor size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ18	ϕ20	ϕ22	ϕ24	ϕ25
Nominal tensile strength f_{uk}	[N/mm²]	550	550	550	550	550	550	550	550	550	550
Yield strength f_{yk}	[N/mm²]	500	500	500	500	500	500	500	500	500	500
Stressed cross-section A_s	[mm²]	50,3	78,5	113,1	153,9	201,1	254,0	314,2	380	452	490,9
Moment of resistance W	[mm³]	50,3	98,2	169,6	269,4	402,1	572,6	785,4	1045,3	1357,2	1534

Material quality

Part	Material
Rebar EN 1992-1-1	Bars and de-coiled rods class B or C with f_{yk} and k according to NDP or NCL of EN 1992-1-1 $f_{uk} = f_{tk} = k \cdot f_{yk}$

Setting information

Installation temperature
-5°C to +40°C

Service temperature range
Hilti HIT-HY 170 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 + 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.

Working time and curing time

Temperature of the base material	Max. working time in which rebar can be inserted and adjusted t_{work}	Min. curing time before rebar can be fully loaded t_{cure}
-5 °C ≤ T_{BM} ≤ 0 °C [a)]	10 min	12 h
0 °C ≤ T_{BM} ≤ 5 °C [a)]	10 min	5 h
5 °C ≤ T_{BM} ≤ 10 °C	8 min	2,5 h
10°C ≤ T_{BM} ≤ 20 °C	5 min	1,5 h
20 °C ≤ T_{BM} ≤ 30 °C	3 min	45 min
30 °C ≤ T_{BM} ≤ 40 °C	2 min	30 min

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

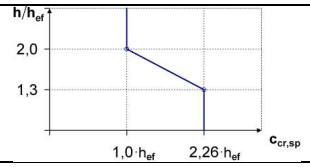
Installation equipment

Rebar – size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø18	Ø20	Ø22	Ø24	Ø25
Rotary hammer	TE2(-A) – TE30(-A)					TE40 – TE80				
Other tools	Blow out pump or Compressed air gun [a)] Set of cleaning brushes [b)], dispenser, piston plug									

a) Compressed air gun with extension hose for all drill holes deeper than 250 mm (for ϕ 8 to ϕ 12) or deeper than 20·ϕ (for ϕ > 12 mm)
b) Automatic brushing with round brush for all drill holes deeper than 250 mm (for ϕ 8 to ϕ 12) or deeper than 20·ϕ (for ϕ > 12 mm

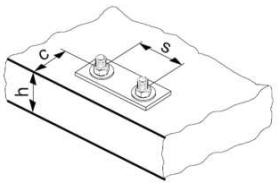
Setting details

Anchor size			Ø8	Ø10	Ø12		Ø14	Ø16	Ø18	Ø20	Ø22	Ø24	Ø25
Nominal diameter of drill bit	d_0	[mm]	10 / 12 a)	12 / 14 a)	14 a)	16 a)	18	20	22	25	26	28	32
Effective anchorage and drill hole depth range b)	$h_{ef,min}$	[mm]	60	60	70	70	75	80	85	90	95	100	100
	$h_{ef,max}$	[mm]	96	120	144	144	168	192	216	240	264	288	300
Minimum base material thickness	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm				h_{ef} + 2 d_0						
Minimum spacing	s_{min}	[mm]	40	50	60	60	70	80	90	100	110	120	125
Minimum edge distance	c_{min}	[mm]	40	50	60	60	70	80	90	100	110	120	125
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} ≥ 2,0 **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 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.

a) Both given values for drill bit diameter can be used
b) $h_{ef,min} \le h_{ef} \le h_{ef,max}$ (h_{ef}: embedment depth)
c) h: base material thickness ($h \ge h_{min}$)
d) 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.



Drilling and cleaning parameters

Rebar	Drill bit diameters d_0 [mm]		Installation size [mm]	
	Hammer drill (HD)	Hollow Drill Bit (HDB)	Brush HIT-RB	Piston plug HIT-SZ
				
ϕ8	10 / 12 a)	-	10 / 12 a)	- / 12
ϕ10	12 / 14 a)	14	12 / 14 a)	12 / 14 a)
ϕ12	14 / 16 a)	16 (14 a))	14 / 16 a)	14 / 16 a)
ϕ14	18	18	18	18
ϕ16	20	20	20	20
ϕ18	22	22	22	22
ϕ20	25	25	25	25
ϕ22	28	28	28	28
ϕ24	32	32	32	32
ϕ25	32	32	32	32

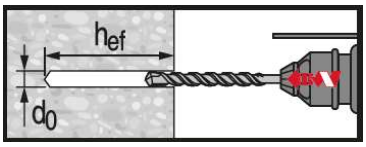
a) Each of the two given values can be used

Setting instructions

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

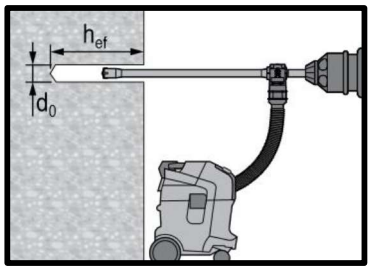
Safety regulations.

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.



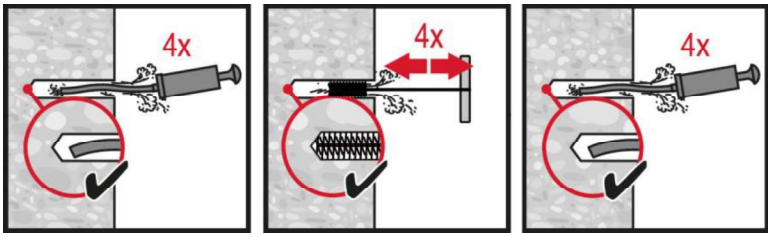
Hammer drilled hole

For dry and wet concrete.

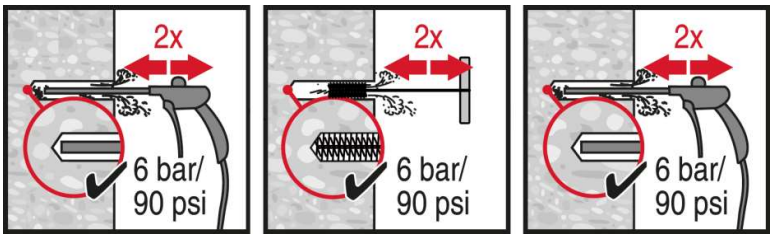


Hammer drilled hole with Hollow Drilled Bit (HDB)

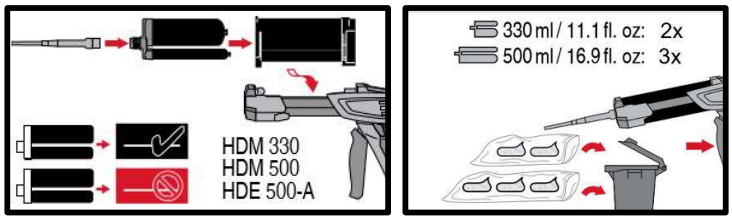
No cleaning required.



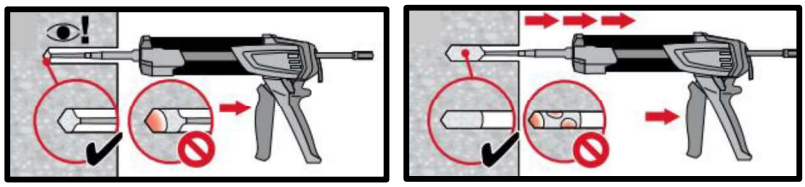
Manual cleaning (MC)
for drill diameters $d_0 \leq 20$ mm and drill hole depth $h_0 \leq 10 \cdot d$.



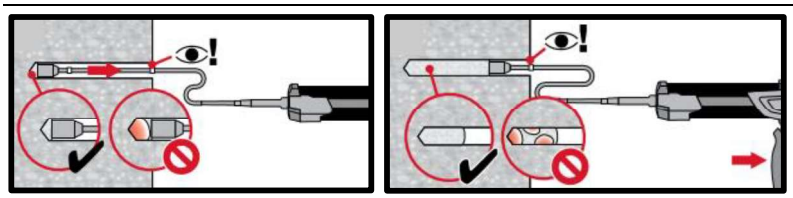
Compressed air cleaning (CAC)
for all drill hole diameters d_0 and drill hole depths $h_0 \leq 20 \cdot d$.



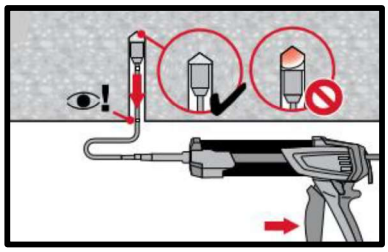
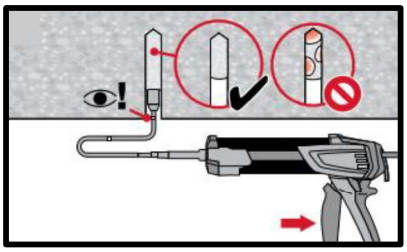
Injection system preparation.



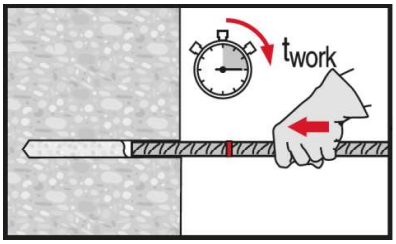
Injection method for drill hole depth $h_{ef} \leq 250$ mm.

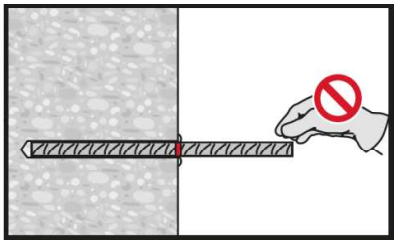


Injection method for drill hole depth $h_{ef} > 250$mm.

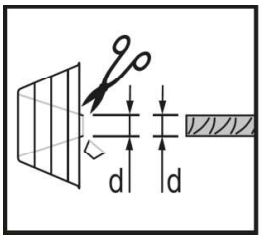



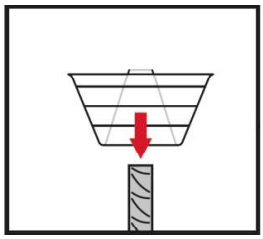
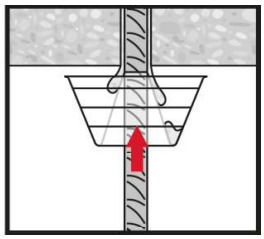
Injection method for overhead application.



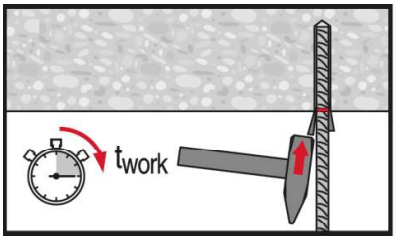


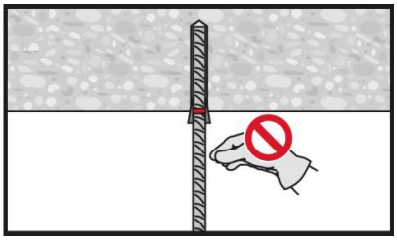
Setting element, observe working time "t_{work}".



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





Loading the anchor: After required curing time t_{cure} the anchor can be loaded.