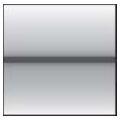
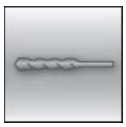
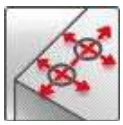
HIT-RE 100 injection mortar

Anchor design (ETAG 001) / Rebar elements / Concrete

Injection mortar system		Benefits
	Hilti HIT-RE 100 330 ml foil pack (also available as 500 ml and 1400 ml foil pack)	- Suitable for cracked and non-cracked concrete C 20/25 to C 50/60 - High loading capacity - Suitable for dry and water saturated concrete - Large diameter applications - Long working time at elevated temperatures - Odourless epoxy
	Rebar B500B (ϕ8-ϕ32)	

Base material				Load conditions
				
Concrete (non-cracked)	Concrete (cracked)	Dry concrete	Wet concrete	Static/ quasi-static

Installation conditions			Other informations	
				
Hammer drilling	Variable embedment depth	Small edge distance and spacing	European Technical Assessment	CE conformity

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical assessment [a)]	CSTB, Marne la Vallée	ETA-15/0882 / 2017-12-11

b) All data given in this section according to ETA-15/0882 issue 2017-12-11.

Static and quasi-static loading (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
-Temperate range I
(min. base material temperature -40°C, max. long term/short term base material temperature: +24°C/40°C)

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

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Typical embedment depth	[mm]	80	90	110	125	125	170	210	230	270	285	300
Base material thickness	[mm]	110	120	140	161	165	220	274	294	340	359	380

Characteristic resistance

Anchor- size B500 B		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Non-cracked concrete												
Tensile N_{Rk}	[kN]	*28,0*	39,6	58,1	66,0	70,6	111,9	153,7	176,2	224,0	243,0	262,4
Shear V_{Rk}		*14,0*	*22,0*	*31,0*	*42,0*	*55,0*	*86,0*	*135,0*	*146,0*	*169,0*	*194,0*	*221,0*
Cracked concrete												
Tensile N_{Rk}	[kN]	-	19,8	29,0	35,7	40,8	64,1	99,0	103,3	130,6	147,7	165,9
Shear V_{Rk}		-	*22,0*	*31,0*	*42,0*	*55,0*	*86,0*	*135,0*	*146,0*	*169,0*	*194,0*	*221,0*

Design resistance

Anchor- size B500 B		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Non-cracked concrete												
Tensile N_{Rd}	[kN]	13,4	18,8	27,6	31,4	33,6	53,3	73,2	83,9	106,7	115,7	125,0
Shear V_{Rd}		11,2	14,7	20,7	28,0	36,7	57,3	90,0	97,3	129,3	129,3	147,3
Cracked concrete												
Tensile N_{Rd}	[kN]	-	9,4	13,8	17,0	19,4	30,5	47,1	49,2	62,2	70,3	79,0
Shear V_{Rd}		-	14,7	20,7	28,0	36,7	57,3	90,0	97,3	129,3	129,3	147,3

Recommended loads [a)]

Anchor- size B500 B		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Non-cracked concrete												
Tensile N_{Rd}	[kN]	9,6	13,5	19,7	22,4	24,0	38,1	52,3	59,9	76,2	82,6	89,3
Shear V_{Rd}		8,0	10,5	14,8	20,0	26,2	41,0	64,3	69,5	80,5	92,4	105,2
Cracked concrete												
Tensile N_{Rd}	[kN]	-	6,7	9,9	12,2	13,9	21,8	33,7	35,1	44,4	50,2	56,4
Shear V_{Rd}		-	10,5	14,8	20,0	26,2	41,0	64,3	69,5	80,5	92,4	105,2

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	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Nominal tensile strength f_{uk}	[N/mm²]	550	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	500
Stressed cross- section A_s	[mm²]	50,3	78,5	113,1	153,9	201,1	314,2	490,9	531	615,8	707	804,2
Moment of resistance W	[mm³]	50,3	98,2	169,6	269,4	402,1	785,4	1534	1726	2155	2651	3217

Material quality

Part	Material
Rebar EN 1992-1-1:2004	Bars and de-coiled rods class B or C II according to NDP or NCL of EN 1992-1-1/NA:2013

Setting information

Installation temperature
+ 5°C to + 40°C

Service temperature range
Hilti HIT-RE 100 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 + 58 °C	+ 35 °C	+ 58 °C
Temperature range III	-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,

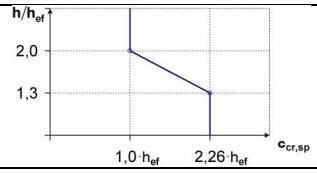
Working time and curing time

Temperature of the base material	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} < 10 °C	2 h	72 h
10 °C ≤ T_{BM} < 15 °C	1,5 h	48 h
15 °C ≤ T_{BM} < 20 °C	30 min	24 h
20 °C ≤ T_{BM} < 30 °C	20 min	12 h
30 °C ≤ T_{BM} < 40 °C	12 min	8 h
40 °C	12 min	4 h

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

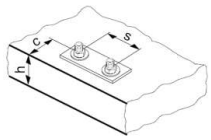
Setting details

Anchor size			Ø8	Ø10	Ø12		Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
Nominal diameter of drill bit	d_0	[mm]	10 / 12[a)]	12 / 14[a)]	14[a)]	16[a)]	18	20	24 / 25[a)]	30 / 32[a)]	32	35	37	40
Effective anchorage and drill hole depth range [b)]	$h_{ef,mi}$	[mm]	60	60	70	70	75	80	90	100	104	112	120	128
	$h_{ef,ma}$	[mm]	160	200	240	240	280	320	400	500	520	560	600	640
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	100	125	130	140	150	160
Minimum edge	c_{min}	[mm]	40	50	60	60	70	80	100	125	130	140	150	160
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,



Installation equipment

Anchor size	ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Rotary hammer	TE 2– TE 16					TE 40 – TE 80					
Other tools	Compressed air gun or blow out pump Set of cleaning brushes, dispenser, piston plug										

Drilling and cleaning parameters

Rebar [mm]	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)]	12 [a)]	10 / 12 [a)]	- / 12 [a)]
ϕ10	12 / 14 [a)]	12 / 14 [a)]	12 / 14 [a)]	12 / 14 [a)]
ϕ12	14 / 16 [a)]	14 / 16 [a)]	14 / 16 [a)]	14 / 16 [a)]
ϕ14	18	18	18	18
ϕ16	20	20	20	20
ϕ20	24 / 25[a)]	24 / 25[a)]	24 / 25[a)]	24 / 25[a)]
ϕ25	30 / 32[a)]	32[a)]	30 / 32[a)]	30 / 32[a)]
ϕ26	32	32	32	32
ϕ28	35	-	35	35
ϕ30	37	-	37	37
ϕ32	40	-	40	40

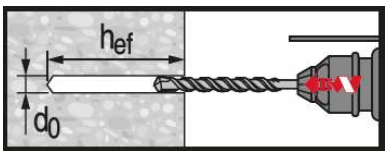
a) Both of the two given values can be used

Setting instructions

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

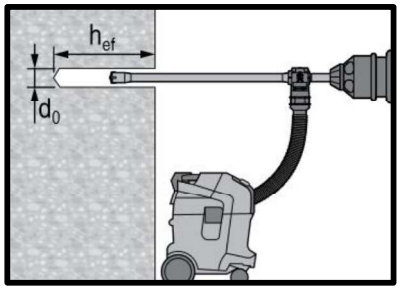
Safety regulations,

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-RE 100,



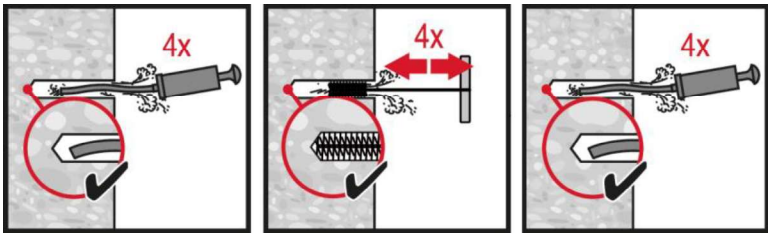
Hammer drilled hole

For dry and wet concrete,



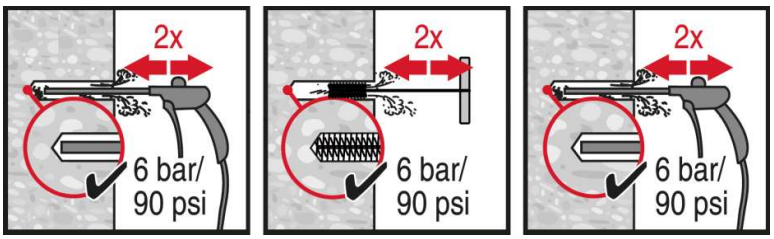
Hammer drilled hole with Hollow Drilled Bit (HDB)

No cleaning required,



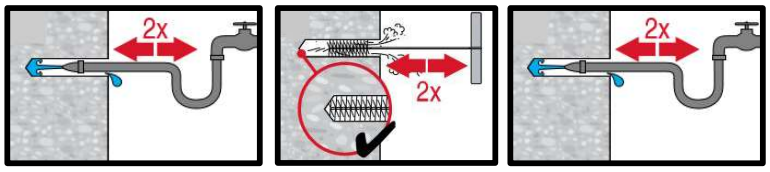
Manual cleaning (MC)
Non-cracked concrete only

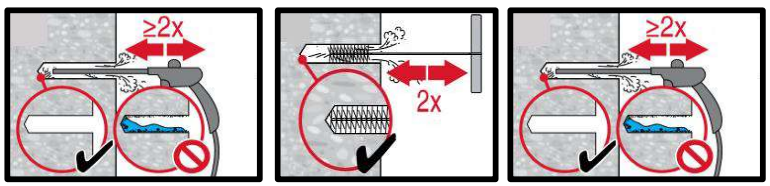
for drill diameters $d_0 \leq 20$ mm and drill hole depth $h_0 \leq 10 \cdot d$,



Hammer Drilling:

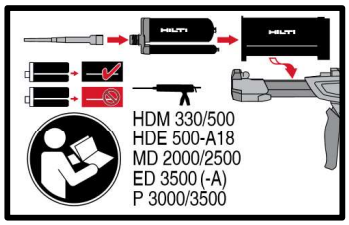
Compressed air cleaning (CAC)
for all drill hole diameters d_0 and drill hole depths $h_0 \leq 20 \cdot d$,

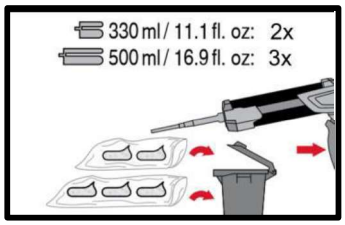




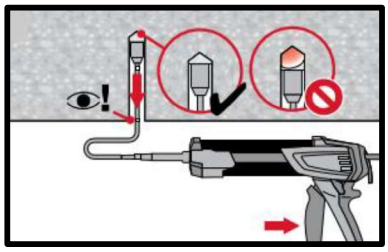
Compressed air cleaning (CAC) cleaning of flooded holes

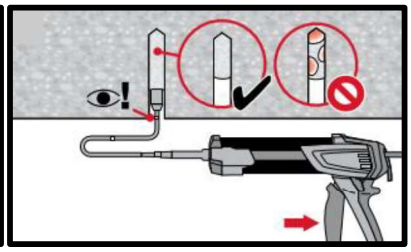
for all drill hole diameters d_0 and drill hole depths h_0,



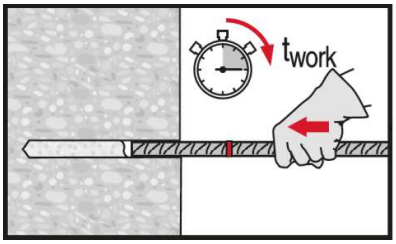


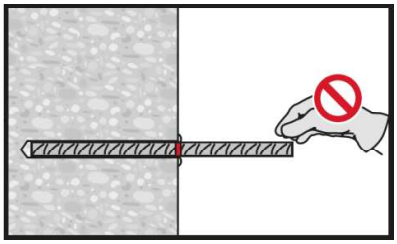
Injection system preparation,



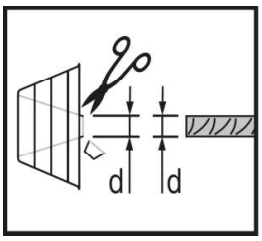


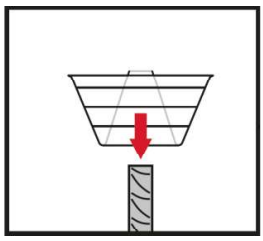
Injection method for overhead application and/or installation with embedment depth $h_{ef} \leq 250$ mm

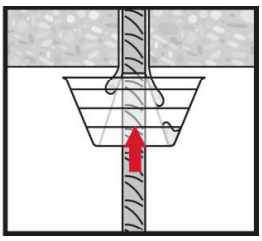


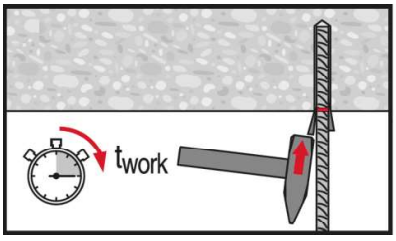


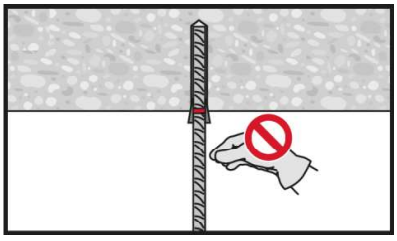
Setting element, observe working time "t_{work}",











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