



HIT-RE 100 INJECTION MORTAR

Technical Datasheet

Update: Jan-19





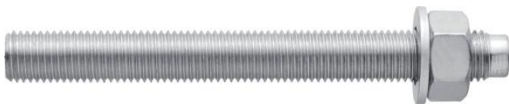
HIT-RE 100 injection mortar

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

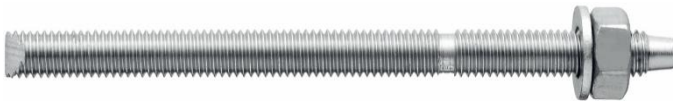
Injection mortar system



Hilti HIT-RE 100
500 ml foil pack
(also available as
330 ml foil pack)



Anchor rods:
HIT-V
HIT-V-F
HIT-V-R
HIT-V-HCR
(M8-M30)



Anchor rods:
HAS-(E)
HAS-(E)-R
HAS-(E)-HCR
(M8-M30)

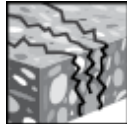
Benefits

- 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

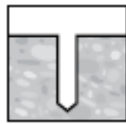
Base material



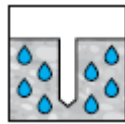
Concrete (non-cracked)



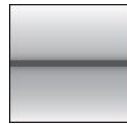
Concrete (cracked)



Dry concrete



Wet concrete



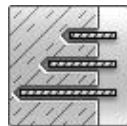
Static/
quasi-static

Load conditions

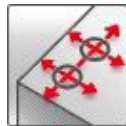
Installation conditions



Hammer
drilling



Variable
embedment
depth



Small edge
distance and
spacing

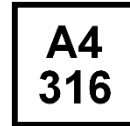
Other informations



European
Technical
Assessment



CE
conformity



Corrosion
resistance



High
corrosion
resistance

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical assessment ^{a)}	DIBt, Berlin	ETA-15/0882 / 2017-12-11

a) 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
- Anchor HIT-V and HAS-(E) with strength 5.8
- Base material thickness, as specified in the table
- One typical embedment depth, as specified in the table
- Concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$
- Temperature range I
(min. base material temperature -40°C , max. long term/short term base material temperature: $+24^\circ\text{C}/40^\circ\text{C}$)

Embedment depth and base material thickness

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Typical embedment depth	[mm]	80	90	110	125	170	210	240	270
Base material thickness	[mm]	110	120	140	165	220	270	300	340

Characteristic resistance

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete									
Tension N_{Rk}	HIT-V, HAS-(E) [kN]	18,3	29,0	42,2	70,6	111,9	153,7	187,8	224,0
Shear V_{Rk}	HIT-V, HAS-(E) [kN]	9,2	14,5	21,1	39,3	61,3	88,3	114,8	140,3
Cracked concrete									
Tension N_{Rk}	HIT-V, HAS-(E) [kN]	-	19,8	29,0	40,8	64,1	95,0	112,0	140,0
Shear V_{Rk}	HIT-V, HAS-(E) [kN]	-	14,5	21,1	39,3	61,3	88,3	114,8	140,3

Design resistance

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete									
Tension N_{Rd}	HIT-V, HAS-(E) [kN]	12,2	19,3	27,7	33,6	53,3	73,2	89,4	106,7
Shear V_{Rd}	HIT-V, HAS-(E) [kN]	7,3	11,6	16,9	31,4	49,0	70,6	91,8	112,2
Cracked concrete									
Tension N_{Rd}	HIT-V, HAS-(E) [kN]	-	9,4	13,8	19,4	30,5	45,2	53,3	66,6
Shear V_{Rd}	HIT-V, HAS-(E) [kN]	-	11,6	16,9	31,4	49,0	70,6	91,8	112,2

Recommended loads ^{a)}

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete									
Tension N_{Rec}	HIT-V, HAS-(E) [kN]	8,7	13,8	19,8	24,0	38,1	52,3	63,9	76,2
Shear V_{Rec}	HIT-V, HAS-(E) [kN]	5,2	8,3	12,0	22,4	35,0	50,4	65,6	80,1
Cracked concrete									
Tension N_{Rec}	HIT-V, HAS-(E) [kN]	-	6,7	9,9	13,9	21,8	32,3	38,1	47,6
Shear V_{Rec}	HIT-V, HAS-(E) [kN]	-	8,3	12,0	22,4	35,0	50,4	65,6	80,1

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

Materials

Mechanical properties

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Nominal tensile strength f_{uk}	HIT-V 5.8 HAS-(E) 5.8 [N/mm ²]	500	500	500	500	500	500	500	500
	HIT-V 8.8 HAS-(E) 8.8 [N/mm ²]	800	800	800	800	800	800	800	800
	HIT-V-R HAS-(E)R [N/mm ²]	700	700	700	700	700	700	500	500
	HIT-V-HCR HAS-(E)HCR [N/mm ²]	800	800	800	800	800	700	700	700
Yield strength f_{yk}	HIT-V 5.8 HAS-(E) 5.8 [N/mm ²]	400	400	400	400	400	400	400	400
	HIT-V 8.8 HAS-(E) 8.8 [N/mm ²]	640	640	640	640	640	640	640	640
	HIT-V-R HAS-(E)R [N/mm ²]	450	450	450	450	450	450	210	210
	HIT-V-HCR HAS-(E)HCR [N/mm ²]	640	640	640	640	640	400	400	400
Stressed cross-section A_s	HIT-V [mm ²]	36,6	58,0	84,3	157	245	353	459	561
	HAS-(E) [mm ²]	32,8	52,3	76,2	144,0	225,0	324,0	427,0	519,0
Moment of resistance W	HIT-V [mm ³]	31,2	62,3	109	277	541	935	1387	1874
	HAS-(E) [mm ³]	27,0	54,1	93,8	244,0	474,0	809,0	1274,0	1706,0

Material quality for HIT-V

Part	Material
Zinc coated steel	
Threaded rod, HIT-V 5.8 (F) HAS-(E) 5.8	Strength class 5.8; Elongation at fracture A5 > 8% ductile Electroplated zinc coated $\geq 5\mu\text{m}$; (F) hot dip galvanized $\geq 45\mu\text{m}$
Threaded rod, HIT-V 8.8 (F) HAS-(E) 8.8	Strength class 8.8; Elongation at fracture A5 > 12% ductile Electroplated zinc coated $\geq 5\mu\text{m}$; (F) hot dip galvanized $\geq 45\mu\text{m}$
Washer	Electroplated zinc coated $\geq 5\mu\text{m}$, hot dip galvanized $\geq 45\mu\text{m}$
Nut	Strength class of nut adapted to strength class of threaded rod. Electroplated zinc coated $\geq 5\mu\text{m}$, hot dip galvanized $\geq 45\mu\text{m}$
Stainless Steel	
Threaded rod, HIT-V-R HAS-(E)-R	Strength class 70 for $\leq M24$ 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 HAS-(E)-HCR	Strength class 80 for $\leq M20$ 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

Setting information

Installation temperature range:

+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}
$5\text{ °C} \leq T_{BM} < 10\text{ °C}$	2 h	72 h
$10\text{ °C} \leq T_{BM} < 15\text{ °C}$	1,5 h	48 h
$15\text{ °C} \leq T_{BM} < 20\text{ °C}$	30 min	24 h
$20\text{ °C} \leq T_{BM} < 30\text{ °C}$	20 min	12 h
$30\text{ °C} \leq T_{BM} < 40\text{ °C}$	12 min	8 h
40 °C	12 min	4 h

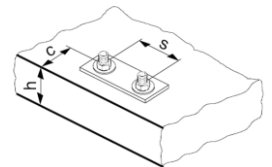
The curing time data are valid for dry base material only. In wet base material the curing times must be doubled.

Setting details

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Nominal diameter of drill bit	d_0 [mm]	10	12	14	18	22	28	30	35
Diameter of element	d [mm]	8	10	12	16	20	24	27	30
Effective anchorage and drill hole depth	h_{ef} [mm]	60 to 160	60 to 200	70 to 240	80 to 320	90 to 400	96 to 480	108 to 540	120 to 600
Minimum base material thickness	h_{min} [mm]	$h_{ef} + 30 \geq 100$ mm			$h_{ef} + 2 d_0$				
Diameter of clearance hole in the fixture	d_f [mm]	9	12	14	18	22	26	30	33
Minimum spacing	s_{min} [mm]	40	50	60	80	100	120	135	150
Minimum edge distance	c_{min} [mm]	40	50	60	80	100	120	135	150
Critical spacing for splitting failure	$s_{cr,sp}$ [mm]	$2 C_{cr,sp}$							
Critical edge distance for splitting failure ^{a)}	$c_{cr,sp}$ [mm]	$1,0 \cdot h_{ef}$ 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 ^{b)}	$c_{cr,N}$ [mm]	$1,5 h_{ef}$							
Torque moment ^{c)}	T_{max} [Nm]	10	20	40	80	150	200	270	300

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) h : base material thickness ($h \geq h_{min}$)
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 safe side.
c) This is the maximum recommended torque moment to avoid splitting failure during installation for anchors with minimum spacing and/or edge distance.



Installation equipment

Anchor size	M8	M10	M12	M16	M20	M24	M27	M30	
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

HIT-V HAS	Drill bit diameters d_0 [mm]		Installation size [mm]	
	Hammer drill (HD)	Hollow Drill Bit (HDB)	Brush HIT-RB	Piston plug HIT-SZ
M8	10	-	10	-
M10	12	12	12	12
M12	14	14	14	14
M16	18	18	18	18
M20	22	22	22	22
M24	28	28	28	28
M27	30	-	30	30
M30	35	35	35	35

Setting instructions

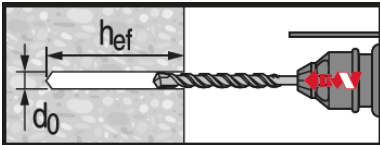
*For detailed information on installation see instruction for use given with the package of the product.



Safety regulations.

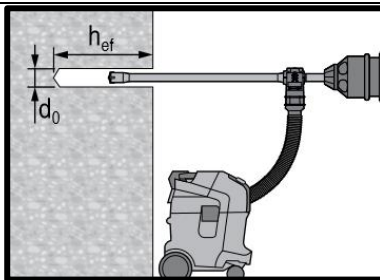
Review the Material Safety Data Sheet (MSDS) before use for proper and safe handling! Wear well-fitting protective goggles and protective gloves when working with Hilti HIT-RE 100.

Drilling



Hammer drilled hole

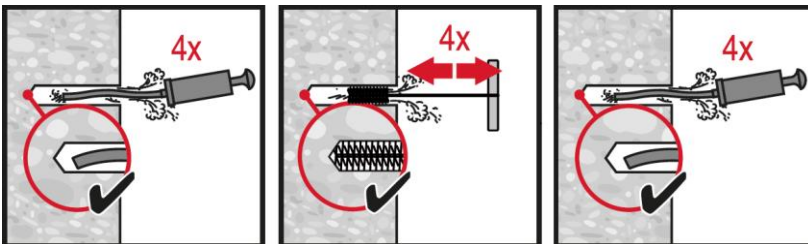
For dry and wet concrete.



Hammer drilled hole with Hollow Drilled Bit (HDB)

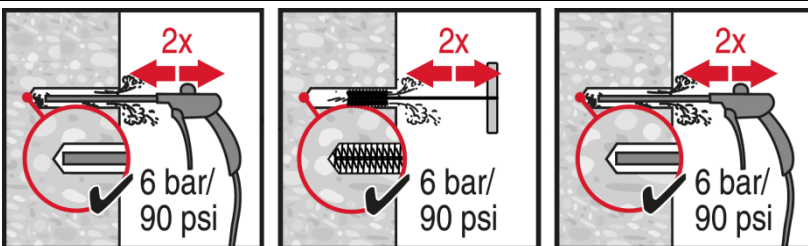
No cleaning required.

Cleaning



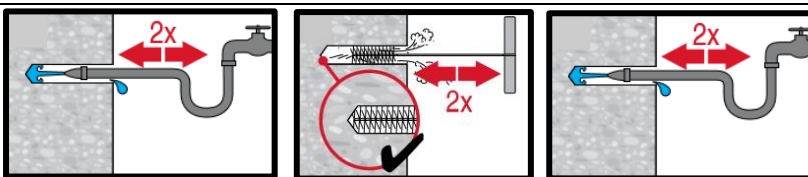
Manual cleaning (MC) Non-cracked concrete only

for drill diameters $d_0 \leq 20$ mm and drill hole depths $h_0 \leq 10 \cdot d$.



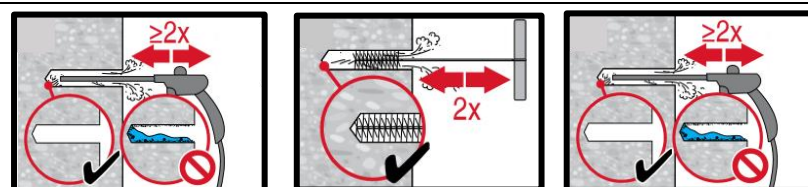
Compressed air cleaning (CAC)

for all drill hole diameters d_0 and drill hole depths $h_0 \leq 20 \cdot d$.

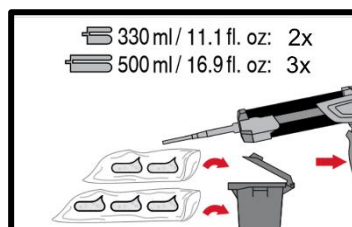
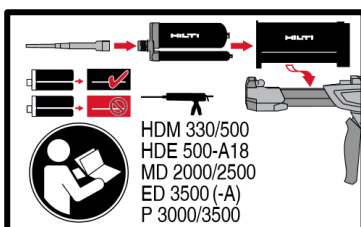


Compressed air cleaning (CAC) cleaning of flooded holes

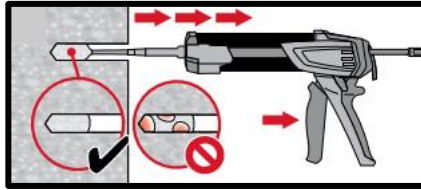
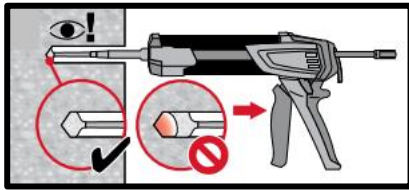
for all drill hole diameters d_0 and drill hole depths h_0 .



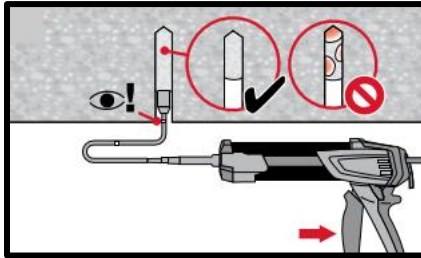
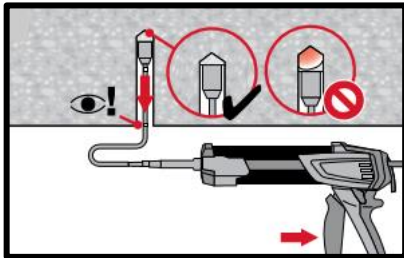
Injection system



Injection system preparation.

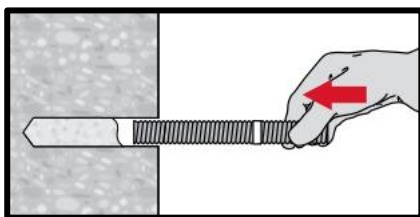


Injection method for drill hole depth $h_{ef} \leq 250$ mm.

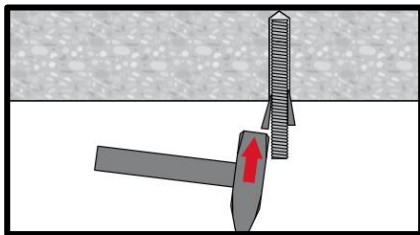


Injection method for overhead application and/or installation with embedment depth $h_{ef} > 250$ mm.

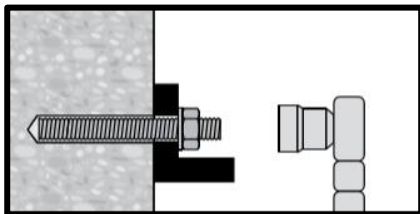
Setting the element



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



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



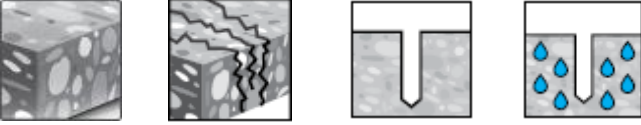

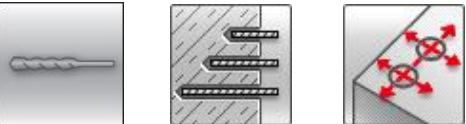

Loading the anchor: After required curing time t_{cure} the anchor can be loaded.



HIT-RE 100 injection mortar

Anchor design (ETAG 001) / Rebar elements / Concrete

Injection mortar system	Benefits
 <p>Hilti HIT-RE 100 330 ml foil pack (also available as 500 ml and 1400 ml foil pack)</p> <p>Rebar B500B ($\phi 8$-$\phi 32$)</p>	<ul style="list-style-type: none"> - 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

Base material	Load conditions
 <p>Concrete (non-cracked)</p> <p>Concrete (cracked)</p> <p>Dry concrete</p> <p>Wet concrete</p>	 <p>Static/ quasi-static</p>
Installation conditions	Other informations
 <p>Hammer drilling</p> <p>Variable embedment depth</p> <p>Small edge distance and spacing</p>	 <p>European Technical Assessment</p> <p>CE conformity</p>

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, $f_{ck,cube} = 25 \text{ N/mm}^2$
- Temperate range I
(min. base material temperature -40°C , max. long term/short term base material temperature: $+24^\circ\text{C}/40^\circ\text{C}$)

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

Anchor- size	$\phi 8$	$\phi 10$	$\phi 12$	$\phi 14$	$\phi 16$	$\phi 20$	$\phi 25$	$\phi 26$	$\phi 28$	$\phi 30$	$\phi 32$
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	$\phi 8$	$\phi 10$	$\phi 12$	$\phi 14$	$\phi 16$	$\phi 20$	$\phi 25$	$\phi 26$	$\phi 28$	$\phi 30$	$\phi 32$
Non-cracked concrete											
Tensile N_{Rk}	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}	-	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	$\phi 8$	$\phi 10$	$\phi 12$	$\phi 14$	$\phi 16$	$\phi 20$	$\phi 25$	$\phi 26$	$\phi 28$	$\phi 30$	$\phi 32$
Non-cracked concrete											
Tensile N_{Rd}	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}	-	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	$\phi 8$	$\phi 10$	$\phi 12$	$\phi 14$	$\phi 16$	$\phi 20$	$\phi 25$	$\phi 26$	$\phi 28$	$\phi 30$	$\phi 32$
Non-cracked concrete											
Tensile N_{Rd}	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}	-	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 $\gamma=1,4$, 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/mm ²]	550	550	550	550	550	550	550	550	550	550	550
Yield strength f_{yk} [N/mm ²]	500	500	500	500	500	500	500	500	500	500	500
Stressed cross-section A_s [mm ²]	50,3	78,5	113,1	153,9	201,1	314,2	490,9	531	615,8	707	804,2
Moment of resistance W [mm ³]	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,

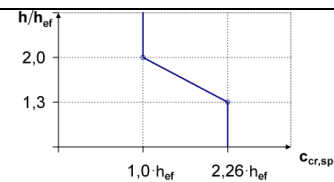
Working time and curing time

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]	$h_{ef} + 30 \text{ mm}$ $\geq 100 \text{ mm}$				$h_{ef} + 2 d_0$							
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]	$1,0 \cdot h_{ef}$				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 ^{d)}	$c_{cr,N}$ [mm]	$1,5 h_{ef}$											



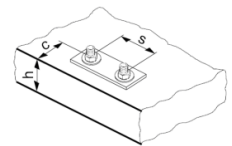
For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced,

a) Both given values for drill bit diameter can be used

b) $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$ (h_{ef} : embedment depth)

c) h : base material thickness ($h \geq h_{min}$)

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	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
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
Ø8	10 / 12 ^{a)}	12 ^{a)}	10 / 12 ^{a)}	- / 12 ^{a)}
Ø10	12 / 14 ^{a)}	12 / 14 ^{a)}	12 / 14 ^{a)}	12 / 14 ^{a)}
Ø12	14 / 16 ^{a)}	14 / 16 ^{a)}	14 / 16 ^{a)}	14 / 16 ^{a)}
Ø14	18	18	18	18
Ø16	20	20	20	20
Ø20	24 / 25 ^{a)}	24 / 25 ^{a)}	24 / 25 ^{a)}	24 / 25 ^{a)}
Ø25	30 / 32 ^{a)}	32 ^{a)}	30 / 32 ^{a)}	30 / 32 ^{a)}
Ø26	32	32	32	32
Ø28	35	-	35	35
Ø30	37	-	37	37
Ø32	40	-	40	40

a) Both of the two given values can be used

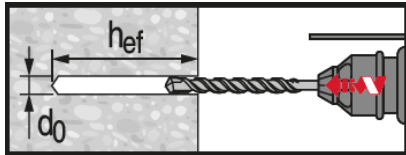
Setting instructions

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



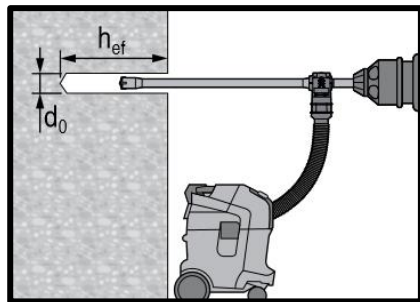
Safety regulations,

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,



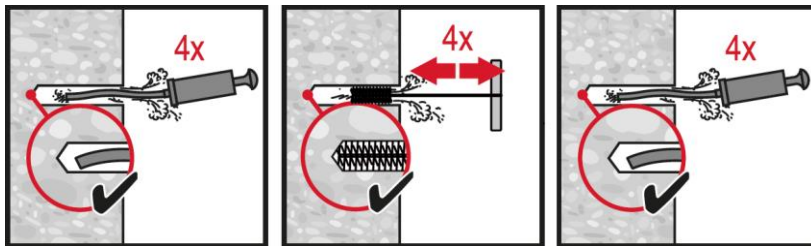
Hammer drilled hole

For dry and wet concrete,



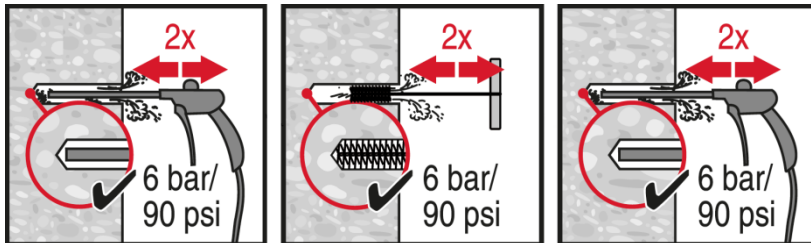
Hammer drilled hole with Hollow Drilled Bit (HDB)

No cleaning required,



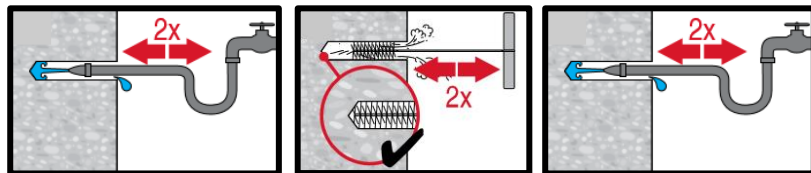
**Manual cleaning (MC)
Non-cracked concrete only**

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

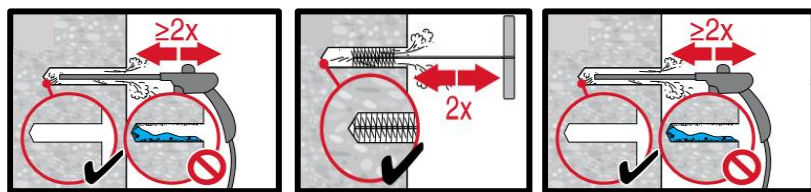


**Hammer Drilling:
Compressed air cleaning (CAC)**

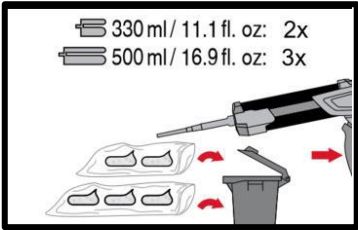
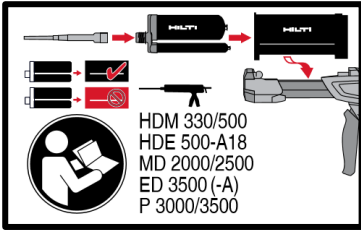
for all drill hole diameters d_0 and drill hole depths $h_0 \leq 20 \cdot d_0$,



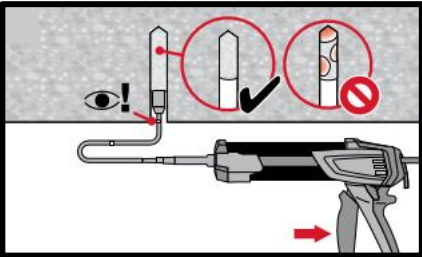
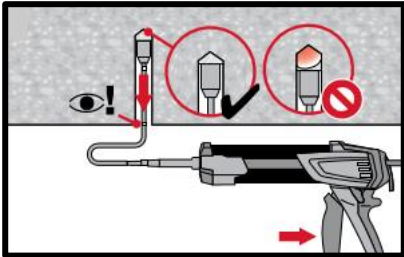
**Compressed air cleaning (CAC)
cleaning of flooded holes**



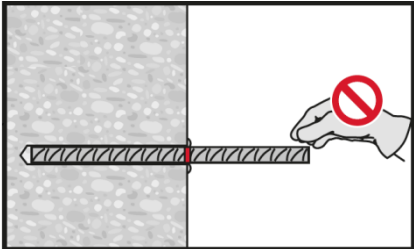
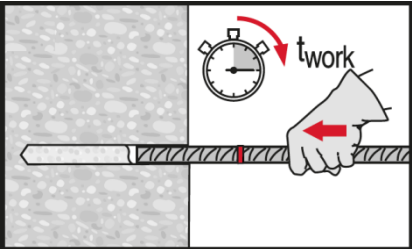
for all drill hole diameters d_0 and drill hole depths h_0 ,



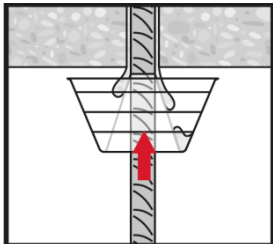
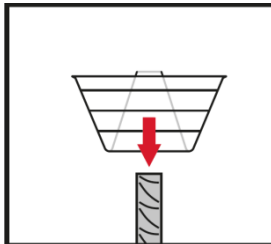
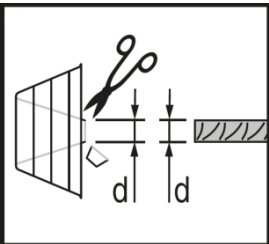
Injection system preparation,



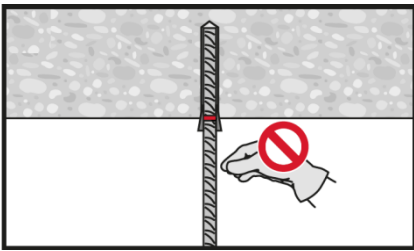
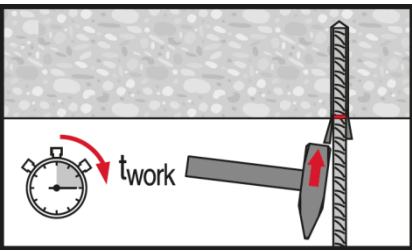
Injection method for overhead application and/or installation with embedment depth $h_{ef} \leq 250$ mm



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




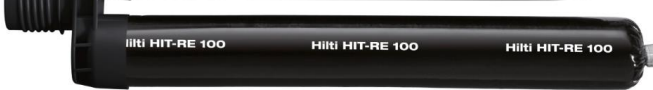

Setting element for overhead applications, observe working time " t_{work} ",



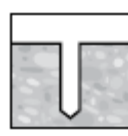
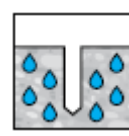
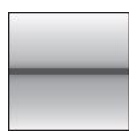

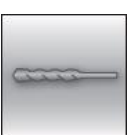







HIT-RE 100 injection mortar

Rebar design (EN 1992-1) / Rebar elements / Concrete

Injection mortar system	Benefits
  	<p>Hilti HIT-RE 100 330 ml foil pack (also available as 500 ml and 1400 ml foil pack)</p> <p>Rebar B500 B ($\phi 8 - \phi 40$)</p> <ul style="list-style-type: none"> - Suitable for concrete C 12/15 to C 50/60 - High loading capacity - Suitable for dry and water saturated concrete - For rebar diameters up to 40 mm - Non corrosive to rebar elements - Long working time at elevated temperatures - Suitable for embedment length till 3200 mm

Base material	Load conditions
 <p>Concrete (non-cracked)</p>  <p>Concrete (cracked)</p>  <p>Dry concrete</p>  <p>Wet concrete</p>	 <p>Static/ quasi-static</p>  <p>Fire resistance</p>
Installation conditions	Other information
 <p>Hammer drilling</p>  <p>Diamond coring</p>	 <p>European Technical Assessment</p>  <p>CE conformity</p>

Approvals / certificates

Description	Authority / Laboratory	No, / date of issue
European technical assessment ^{a)}	DIBt, Berlin	ETA – 15/0883 / 2017-12-06
Fire report	MFPA, Leipzig	GS 3,2/15-431-4 / 2016-04-29

c) All data given in this section according to the approvals mentioned above ETA-15/0883 issue 2017-12-06,

Basic design data

Static EC2 design

Design bond strength in N/mm² according to ETA 15/0883 for good bond conditions

Rebar-size	Concrete class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
All allowed hammer drilling methods									
φ8 - φ32	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
φ34	1,6	2,0	2,3	2,6	2,9	3,3	3,6	3,9	4,2
φ36	1,5	1,9	2,2	2,6	2,9	3,3	3,6	3,8	4,1
φ40	1,5	1,8	2,1	2,5	2,8	3,1	3,4	3,7	4,0
Diamond coring wet									
φ8 - φ32	1,6	2,0	2,3	2,7					
φ34	1,6	2,0	2,3	2,6					
φ36	1,5	1,9	2,2	2,6					
φ40	1,5	1,8	2,1	2,5					

For poor bond conditions multiply the values by 0,7, Values valid for non-cracked and cracked concrete

Minimum anchorage length and minimum lap length

The minimum anchorage length $l_{b,min}$ and the minimum overlap length $l_{0,min}$ according to EN 1992-1-1 shall be multiplied by the relevant **Amplification factor** in the table below,

Amplification factor α_{lb} for the min, anchorage length and min, lap length according to EN 1992-1-1 for:

Rebar - size	Concrete class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
All allowed hammer drilling methods									
φ8 - φ40	1,0								
Diamond coring dry and wet									
φ8 - φ40	1,5								

Pre-calculated values¹⁾ – anchorage length

Rebar yield strength $f_{yk}=500$ N/mm², concrete C25/30, good bond conditions

Rebar-size	Anchorage length	Design value	Mortar volume ²⁾	Anchorage length	Design value	Mortar volume ²⁾	
	l_{bd} [mm]	N_{Rd} [KN]	V_M [ml]		l_{bd} [mm]	N_{Rd} [KN]	V_M [ml]
$\alpha_1=\alpha_2=\alpha_3=\alpha_4=\alpha_5=1,0$							
φ8	100	6,8	8	100	9,7	8	
	170	11,5	13		140	13,6	11
	250	17,0	19		180	17,4	14
	322,1	21,9	24		225,4	21,9	17
φ10	121	10,3	11	121	14,7	11	
	220	18,7	20		170	20,6	15
	310	26,3	28		230	27,9	21
	402,6	34,1	36		281,8	34,1	25
φ12	145	14,8	15	145	21,1	15	
	260	26,5	27		210	30,5	22
	370	37,7	39		270	39,3	29
	483,1	49,2	51		338,2	49,2	36
φ14	169	20,1	20	169	28,7	20	
	300	35,6	36		240	40,7	29
	430	51,1	52		320	54,3	39
	563,6	66,9	68		394,5	66,9	48

Pre-calculated values¹⁾ – anchorage length

Rebar yield strength $f_{yk}=500$ N/mm², concrete C25/30, good bond conditions

Rebar-size	Anchorage length	Design value	Mortar volume ²⁾	Anchorage length	Design value	Mortar volume ²⁾
	l_{bd} [mm]	N_{Rd} [KN]	V_M [ml]		l_{bd} [mm]	N_{Rd} [KN]
	$\alpha_1=\alpha_2=\alpha_3=\alpha_4=\alpha_5=1,0$				$\alpha_1=\alpha_3=\alpha_4=1,0 \quad \alpha_2 \text{ or } \alpha_5=0,7$	
φ16	193	26,2	26	193	37,4	26
	340	46,1	46	280	54,3	38
	490	66,5	67	370	71,7	50
	644	87,4	87	450,9	87,4	61
φ18	217	33,1	33	217	47,3	33
	380	58	57	310	67,6	47
	540	82,4	81	410	89,4	62
	724,6	110,6	109	507,2	110,6	76
φ20	242	41,1	51	242	58,6	51
	390	66,2	83	350	84,8	74
	550	93,3	117	460	111,5	98
	805,2	136,6	171	563,6	136,6	120
φ22	266	49,6	75	266	70,9	75
	410	76,5	116	380	101,3	107
	560	104,5	158	500	133,3	141
	885,7	165,3	250	620	165,3	175
φ24	290	59	122	290	84,3	122
	430	87,5	182	420	122,1	177
	560	114	236	550	160	232
	966,2	196,7	408	676,3	196,7	286
φ25	302	64	114	302	91,5	114
	430	91,2	162	430	130,3	162
	570	120,9	214	570	172,7	214
	1006,4	213,4	378	704,5	213,4	265
φ28	350	83,1	145	338	114,7	140
	595	141,3	247	480	162,9	200
	875	207,8	364	635	215,5	264
	1127,2	267,7	469	789	267,7	328
φ30	374	95,2	165	374	136	165
	635	161,6	281	528	191,9	233
	935	237,9	413	700	254,5	309
	1207,7	307,3	534	845,4	307,3	374
φ32	400	108,6	217	400	155,1	217
	680	184,6	369	580	224,9	315
	1000	271,4	543	800	310,2	434
	1288,2	349,7	699	901,8	349,7	490
φ36	450	132,3	387	440	184,8	379
	765	225	658	640	268,8	551
	1125	330,8	968	900	378,1	774
	1505,0	442,6	1295	1053,5	442,6	907
φ40	500	157,1	520	485	217,7	505
	850	267	884	700	314,2	728
	1000	314,2	1040	990	444,3	1030
	1739,1	546,4	1810	1217,4	546,4	1267

1) Values corresponding to the minimum anchorage length, The maximum permissible load is valid for "good bond conditions" as described in EN 1992-1-1, For all other conditions multiply by the value by 0,7,

2) The volume of mortar corresponds to the formula " $1,2 \cdot (d_o^2 - d_s^2) \cdot \pi \cdot l / 4$ " for hammer drilling

Pre-calculated values – overlap length

Rebar yield strength $f_{yk}=500 \text{ N/mm}^2$, concrete c25/30, good bond conditions

Rebar-size	Overlap length	Design value	Mortar volume ²⁾	Overlap length	Design value	Mortar volume ²⁾
	l_0 [mm]	N_{Rd} [KN]	V_M [ml]		l_0 [mm]	N_{Rd} [KN]
$\alpha_1=\alpha_2=\alpha_3=\alpha_4=\alpha_5=1,0$				$\alpha_1=\alpha_3=\alpha_4=1,0 \quad \alpha_2 \text{ or } \alpha_5=0,7$		
$\phi 8$	200	13,6	15	200	19,4	15
	240	16,3	18	210	20,4	16
	280	19	21	220	21,3	17
	322,1	21,9	24	225,4	21,9	17
$\phi 10$	200	17	18	200	24,2	18
	270	22,9	24	230	27,9	21
	340	28,8	31	250	30,3	23
	402,6	34,1	36	281,8	34,1	25
$\phi 12$	200	20,4	21	200	29,1	21
	290	29,5	31	250	36,4	26
	390	39,7	41	290	42,2	31
	483,1	49,2	51	338,2	49,2	36
$\phi 14$	210	24,9	25	210	35,6	25
	330	39,2	40	270	45,8	33
	450	53,4	54	330	56	40
	563,6	66,9	68	394,5	66,9	48
$\phi 16$	240	32,6	33	240	46,5	33
	370	50,2	50	310	60,1	42
	510	69,2	69	380	73,7	52
	644	87,4	87	450,9	87,4	61
$\phi 18$	270	41,2	41	270	58,9	41
	410	62,6	62	350	76,3	53
	560	85,5	84	430	93,8	65
	724,6	110,6	109	507,2	110,6	76
$\phi 20$	300	50,9	64	300	72,7	64
	430	72,9	91	390	94,5	83
	570	96,7	121	480	116,3	102
	805,2	136,6	171	563,6	136,6	120
$\phi 22$	330	61,6	93	330	88	93
	450	84	127	430	114,6	122
	580	108,2	164	520	138,6	147
	885,7	165,3	250	620	165,3	175
$\phi 24$	360	73,3	152	360	104,7	152
	470	95,7	198	470	136,7	198
	590	120,1	249	570	165,8	241
	966,2	196,7	408	676,3	196,7	286
$\phi 25$	375	79,5	141	375	113,6	141
	430	91,2	162	480	145,4	181
	570	120,9	214	590	178,7	222
	1006,4	213,4	378	704,5	213,4	265
$\phi 28$	420	99,8	175	420	142,5	175
	595	141,3	247	530	179,8	220
	875	207,8	364	635	215,5	264
	1127,2	267,7	469	789	267,7	328

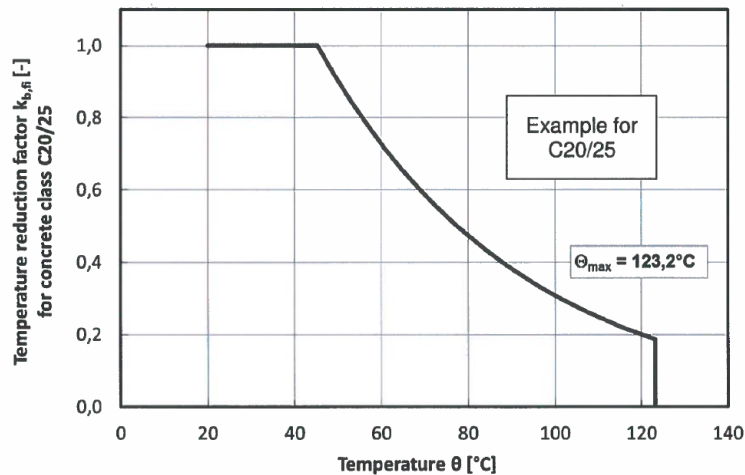
Pre-calculated values – overlap length

Rebar yield strength $f_{yk}=500 \text{ N/mm}^2$, concrete c25/30, good bond conditions

Rebar-size	Overlap length	Design value	Mortar volume ²⁾	Overlap length	Design value	Mortar volume ²⁾
	l_o [mm]	N_{Rd} [KN]	V_M [ml]		l_o [mm]	N_{Rd} [KN]
	$\alpha_1=\alpha_2=\alpha_3=\alpha_4=\alpha_5=1,0$			$\alpha_1=\alpha_3=\alpha_4=1,0 \quad \alpha_2 \text{ or } \alpha_5=0,7$		
$\phi 30$	450	114,5	199	450	163,6	199
	635	161,6	281	528	191,9	233
	935	237,9	413	700	254,5	309
	1207,7	307,3	534	845,4	307,3	374
$\phi 32$	480	130,3	261	480	186,1	261
	680	184,6	369	650	252	353
	1000	271,4	543	800	310,2	434
	1288,2	349,7	699	901,8	349,7	490
$\phi 36$	540	158,8	465	540	218,1	465
	765	225,0	658	720	290,0	620
	1125	330,8	968	900	363,5	774
	1505,0	442,6	1295	1053,5	442,6	907
$\phi 40$	600	188,5	624	600	269,3	624
	850	267,0	884	750	336,6	780
	1000	314,2	1040	990	444,3	1030
	1739,1	505,9	1676	1217,4	546,4	1267

- 1) Values corresponding to the minimum anchorage length, The maximum permissible load is valid for "good bond conditions" as described in EN 1992-1-1, For all other conditions multiply by the value by 0,7,
- 2) The volume of mortar corresponds to the formula " $1,2 \cdot (d_o^2 - d_s^2) \cdot \pi \cdot l_b / 4$ " for hammer drilling

Fire resistance



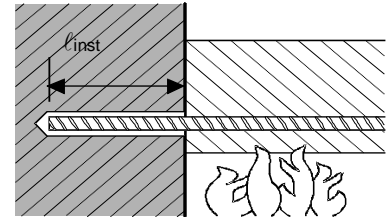
The design value of the bond strength $f_{bd,fi}$ under fire exposure has to be calculated by the following equation:

$$f_{bd,fi} = k_{b,fi}(\theta) \cdot f_{bd} \cdot \gamma_c / \gamma_{M,fi}$$

With: $\theta \leq 123,2^\circ\text{C}$: $k_{b,fi}(\theta) = 26,424 \cdot e^{-0,0215 \cdot \theta} / f_{bd} \cdot 4,3 \leq 1,0$
 $\theta > 123,2^\circ\text{C}$: $k_{b,fi}(\theta) = 0,0$

$f_{bd,fi}$ design value of the ultimate bond stress in case of fire in N/mm^2
 θ temperature in $^\circ\text{C}$ in the mortar layer
 $k_{b,fi}(\theta)$ reduction factor under fire exposure
 f_{bd} design values of the ultimate bond stress in N/mm^2 in cold condition
 γ_c partially safety factor according to EN 1992-1-1
 $\gamma_{M,fi}$ partially safety factor according to EN 1992-1-2

a) Anchoring application



Anchoring application beam-wall connections with a concrete cover of 20 mm

Maximum force ($F_{s,T,max}$) in rebar in conjunction with HIT-RE 100 as a function of embedment depth (l_{inst}) for the fire resistance classes F30 to F240 according to EC2,

Rebar-size	$F_{s,T,max}$ [kN]	l_{inst} [mm]	Fire resistance of bar [kN]						
			R30	R60	R90	R120	R180	R240	
$\phi 8$	16,8	100	3,4	1,0	0,2	-	-	-	
		110	4,3	1,7	0,5	-	-	-	
		140	6,9	4,2	2,2	0,9	-	-	
		160	8,6	6,0	3,9	2,1	0,5	-	
		260	16,8	16,8	14,6	12,5	10,7	7,7	5,3
		290			15,1	13,3	10,3	7,9	
		310			16,8	15,1	12,1	9,6	
		330				13,8	11,4		
		370				16,8	14,8		
		400				16,8	16,8		
$\phi 10$	26,2	110	5,3	2,1	0,6	-	-	-	
		140	8,6	5,3	2,7	1,2	-	-	
		160	10,8	7,4	4,8	2,7	0,6	-	
		260	21,6	18,3	15,7	13,4	9,7	6,6	
		290	24,8	21,5	18,9	16,7	12,9	9,9	
		310	26,2	26,2	23,7	21,1	18,8	15,1	12,0
		340			24,3	22,1	18,3	15,3	
		360			26,2	24,2	20,5	17,5	
		380				26,2	22,7	19,6	
		450				26,2	26,2	26,2	
26,2	26,2								
$\phi 12$	37,7	130	9,0	5,0	2,2	0,8	-	-	
		140	10,3	6,3	3,2	1,4	-	-	
		160	12,9	8,9	5,8	3,2	0,8	-	
		260	25,9	21,9	18,8	16,1	11,6	7,9	
		360	37,7	37,7	35,0	31,8	29,1	24,6	20,9
		390			35,7	33,0	28,5	24,8	
		450			37,7	37,7	36,3	32,6	
					37,7	37,7			
$\phi 14$	51,3	160	15,1	10,4	6,8	3,7	0,9	-	
		260	30,2	25,6	21,9	18,8	13,5	9,3	
		360	45,4	40,8	37,1	33,9	28,7	24,4	
		400	51,3	51,3	46,8	43,2	40,0	34,8	30,5
		450			50,8	47,6	42,4	38,1	
		500			51,3	51,3	50,0	45,7	
					51,3	51,3			
550	51,3	51,3							



Maximum force ($F_{s,T,max}$) in rebar in conjunction with HIT-RE 100 as a function of embedment depth (l_{inst}) for the fire resistance classes F30 to F240 according to EC2,

Rebar-size	$F_{s,T,max}$ [kN]	l_{inst} [mm]	Fire resistance of bar [kN]						
			R30	R60	R90	R120	R180	R240	
φ16	67,0	180	20,7	15,4	11,2	7,6	2,7	0,9	
		260	34,5	29,3	25,1	21,5	15,5	10,6	
		360	51,9	46,6	42,4	38,8	32,8	27,9	
		450	67,0	67,0	62,2	58,0	54,4	48,4	43,5
		500			66,7	63,1	57,1	52,2	
		550			67,0	67,0	65,8	60,9	
		600			67,0	67,0	67,0	67,0	
φ18	84,8	200	27,2	21,2	16,5	12,4	5,9	2,6	
		260	38,9	32,9	28,2	24,1	17,4	11,9	
		360	58,4	52,4	47,7	43,6	36,9	31,4	
		500	84,8	84,8	79,7	75,0	71,0	64,2	58,7
		550			80,7	74,0	68,5		
		600			84,8	84,8	83,8	78,2	
		650			84,8	84,8	84,8	84,8	
φ20	104,7	220	34,5	27,9	22,7	18,2	10,7	5,5	
		260	43,2	36,6	31,3	26,8	19,4	13,2	
		360	64,9	58,3	53,0	48,5	41,0	34,9	
		550	104,7	104,7	99,4	94,2	89,7	82,2	76,1
		600			104,7	100,5	93,1	86,9	
		650			104,7	104,7	103,9	97,8	
		700			104,7	104,7	104,7	104,7	
φ22	126,7	240	42,7	35,5	29,7	24,7	16,5	9,9	
		360	71,3	64,1	58,3	53,3	45,1	38,4	
		500	104,7	97,5	91,7	86,7	78,5	71,8	
		600	126,7	126,7	121,3	115,5	110,6	102,4	95,6
		650			122,5	114,3	107,5		
		700			126,7	126,7	126,7	126,2	119,5
		750			126,7	126,7	126,7	126,7	
φ24	150,8	270	54,4	46,5	40,2	34,8	25,8	18,5	
		360	77,8	69,9	63,6	58,2	49,2	41,9	
		650	150,8	150,8	145,3	139,1	133,6	124,7	117,3
		700			146,6	137,7	130,3		
		750			150,8	150,8	150,7	143,3	
		800			150,8	150,8	150,8	150,8	
φ25	163,6	280	59,4	51,1	44,6	38,9	29,6	22,0	
		360	81,1	72,8	66,3	60,6	51,3	43,6	
		700	163,6	163,6	158,4	152,8	143,4	135,8	
		750			157,0	149,3			
		800			163,6	163,6	162,9		
		850			163,6	163,6	163,6		
φ26	177,0	290	64,6	56,0	49,2	43,3	33,6	25,6	
		360	84,3	75,7	68,9	63,0	53,3	45,4	
		700	177,0	177,0	171,5	164,7	158,9	149,2	141,2
		750			173,0	163,2	155,3		
		800			177,0	177,0	177,0	177,0	169,4
		850			177,0	177,0	177,0		
φ27	190,9	300	70,0	61,1	54,0	47,9	37,8	29,6	
		500	128,5	119,6	112,5	106,4	96,4	88,1	
		750	190,9	190,9	185,7	179,6	169,5	161,2	
		800			184,2	175,9			
		850			190,9	190,9	190,9	190,5	
		900			190,9	190,9	190,9		
φ28	205,3	300	75,6	66,4	59,0	52,7	42,3	33,7	
		500	133,3	124,0	116,7	110,4	99,9	91,3	
		750	205,3	205,3	199,9	192,6	186,3	175,8	167,2
		800			201,4	191,0	182,4		
		850			205,3	205,3	205,3	197,6	
		900			205,3	205,3	205,3	205,3	

Maximum force ($F_{s,T,max}$) in rebar in conjunction with HIT-RE 100 as a function of embedment depth (ℓ_{inst}) for the fire resistance classes F30 to F240 according to EC2,

Rebar-size	$F_{s,T,max}$ [kN]	ℓ_{inst} [mm]	Fire resistance of bar [kN]					
			R30	R60	R90	R120	R180	R240
$\phi 30$	235,6	330	87,5	77,6	69,8	63,0	51,8	42,6
		500	142,8	132,9	125,0	118,3	107,1	97,9
		800	235,6	230,4	222,6	215,8	204,6	195,4
		850		235,6	235,6	235,6	232,1	220,9
		900	227,9					
		950	235,6					
$\phi 32$	268,1	350	100,3	89,7	81,4	74,1	62,2	
		500	152,3	141,8	133,4	126,2	114,2	104,4
		850	268,1	263,2	254,8	247,5	235,6	225,8
		900		268,1	268,1	264,9	252,9	243,1
		950	268,1	268,1	268,1	268,1	260,5	
		$\phi 34$	302,6	370	113,9	102,7	93,8	86,1
500	161,8			150,6	141,7	134,0	121,3	110,9
900	302,6			298,0	289,1	281,4	268,8	258,3
950				302,6	302,6	299,9	287,2	276,8
$\phi 36$	339,3			400	132,3	120,5	111,0	102,9
		600	210,4	198,5	189,1	180,9	167,5	156,5
		800	288,4	276,5	267,1	259,0	245,5	234,5
		950	339,3	335,1	325,6	317,5	304,1	293,0
		$\phi 40$	385,5	450	168,7	155,5	145,1	136,0
600	233,8			220,6	210,1	201,0	186,1	173,9
800	320,5			307,3	296,8	287,8	272,8	260,6
950	385,5			372,3	361,8	352,8	337,9	325,6

*For additional values please check GS 3,2/15-431-4 fire report, Characteristic yield strength $f_{yk} = 500 \text{ N/mm}^2$

Steel failure

b) Overlap joint application

Max, bond stress, $f_{bd,FIRE}$, depending on actual clear concrete cover for classifying the fire resistance,

It must be verified that the actual force in the bar during a fire, $F_{s,T}$, can be taken up by the bar connection of the selected length, ℓ_{inst} , Note: Cold design for ULS is mandatory,

$$F_{s,T} \leq (\ell_{inst} - c_f) \cdot \phi \cdot \pi \cdot f_{bd,FIRE} \quad \text{where: } (\ell_{inst} - c_f) \geq \ell_s;$$

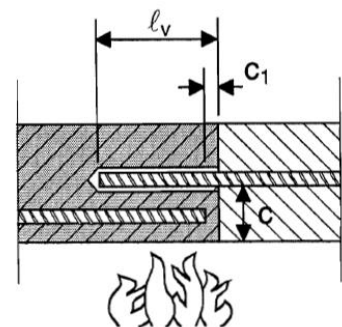
ℓ_s = lap length

ϕ = nominal diameter of bar

$\ell_{inst} - c_f$ = selected overlap joint length; this must be at least ℓ_s ,

but may not be assumed to be more than 80ϕ

$f_{bd,FIRE}$ = bond stress when exposed to fire



Critical temperature-dependent bond stress, $f_{bd,FIRE}$, concerning "overlap joint" for Hilti HIT-RE 100 injection adhesive in relation to fire resistance class and required minimum concrete coverage c ,

Clear concrete cover c [mm]	Max, bond stress, τ_c [N/mm ²]					
	R30	R60	R90	R120	R180	R240
50	0,9					
60	1,7					
70	2,7					
80	3,5	1,0				
90		1,6				
100		2,3	1,0			
110		3,0	1,4			



Critical temperature-dependent bond stress, $f_{bd, FIRE}$, concerning “overlap joint” for Hilti HIT-RE 100 injection adhesive in relation to fire resistance class and required minimum concrete coverage c ,

Clear concrete cover c [mm]	Max, bond stress, τ_c [N/mm ²]					
	R30	R60	R90	R120	R180	R240
120			1,9	1,0		
130			2,5	1,4		
140			3,1	1,9	0,7	
150				2,4	1,0	
160				2,9	1,3	
170				3,4	1,7	0,9
180					2,1	1,1
190		3,5			2,5	1,4
200			3,5		2,9	1,7
210					3,3	2,1
220				3,5		2,5
230						2,8
240					3,5	3,1
250						3,5
260						3,5

Materials

Material quality

Part	Material
Rebar EN 1992-1-1:2004+AC:2010	Bars and de-coiled rods class B or C with f_{yk} and k according to NDP or NCL of EN 1992-1-1/NA:2013 $f_{uk} = f_{tk} = k \cdot f_{yk}$

Fitness for use

Some creep tests have been conducted in accordance with ETAG guideline 001 part 5 and TR 023 in the following conditions: **in dry environment at 50 °C during 90 days,**

These tests show an excellent behaviour of the post-installed connection made with HIT-RE 100: low displacements with long term stability, failure load after exposure above reference load,

Resistance to chemical substances

Chemical	Resistance	Chemical	Resistance
Acetic acid 100%	o	Methanol 100%	o
Acetic acid 10%	+	Peroxide of hydrogen 30%	o
Hydrochloric Acid 20%	+	Solution of phenol (sat,)	-
Nitric Acid 40%	-	Sodium hydroxide pH=14	+
Phosphoric Acid 40%	+	Solution of chlorine (sat,)	+
Sulphuric acid 40%	+	Solution of hydrocarbons (60 % vol Toluene, 30 % vol Xylene, 10 % vol Methyl naphthalene)	+
Ethyl acetate 100%	o	Salted solution 10%	+
Acetone 100%	-	sodium chloride	
Ammoniac 5%	o	Suspension of concrete (sat,)	+
Diesel 100%	+	Chloroform 100%	+
Gasoline 100%	+	Xylene 100%	+
Ethanol 96%	o		
Machine oils 100%	+		

- + resistant
- o resistant in short term (max, 48h) contact

- not resistant

Electrical Conductivity

HIT-RE 100 in the hardened state is **not conductive electrically**, Its electric resistivity is $1,4 \cdot 10^{10} \Omega \cdot m$ (DIN IEC 93 – 12,93), It is adapted well to realize electrically insulating anchorings (ex: railway applications, subway),

Installation temperature range:

+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	Maximum long term base material temperature	Maximum short term base material temperature
Temperature range I	-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^{a)}

Temperature IN the base material T_{BM}	Maximum working time t_{work}	Initial curing time $t_{cure,ini}^{b)}$	Minimum curing time t_{cure}
$5\text{ °C} \leq T_{BM} < 9\text{ °C}$	2 hours	18 hours	72 hours
$10\text{ °C} \leq T_{BM} < 14\text{ °C}$	1,5 hours	12 hours	48 hours
$15\text{ °C} \leq T_{BM} < 19\text{ °C}$	30 min	8 hours	24 hours
$20\text{ °C} \leq T_{BM} < 24\text{ °C}$	25 min	6 hours	12 hours
$25\text{ °C} \leq T_{BM} < 29\text{ °C}$	20 min	5 hours	10 hours
$30\text{ °C} \leq T_{BM} \leq 39\text{ °C}$	12 min	4 hours	8 hours
40 °C	12 min	2 hours	4 hours

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

b) After $t_{cure,ini}$ has elapsed preparation work may continue

Setting information

Installation equipment

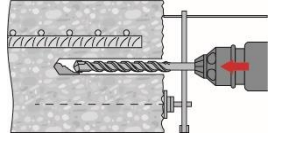
Rebar – size	$\phi 8\text{-}\phi 16$	$\phi 18\text{-}\phi 40$
Rotary hammer	TE2(-A) – TE30(-A)	TE40 – TE80
Other tools	Blow out pump ($h_{ef} \leq 10 \cdot d$)	-
	Compressed air gun ^{a)} Set of cleaning brushes ^{b)} , dispenser, piston plug	

a) Compressed air gun with extension hose for all drill holes deeper than 250 mm (for $\phi 8$ to $\phi 12$) or deeper than $20 \cdot \phi$ (for $\phi > 12$ mm)

b) Automatic brushing with round brush for all drill holes deeper than 250 mm (for $\phi 8$ to $\phi 12$) or deeper than $20 \cdot \phi$ (for $\phi > 12$ mm)

Minimum concrete cover c_{min} of the post-installed rebar

Drilling method	Rebar – size [mm]	Minimum concrete cover c_{min} [mm]	
		Without drilling aid	With drilling aid
Hammer drilling (HD)	$\phi < 25$	$30 + 0,06 \cdot l_v \geq 2 \cdot \phi$	$30 + 0,02 \cdot l_v \geq 2 \cdot \phi$
	$\phi \geq 25$	$40 + 0,06 \cdot l_v \geq 2 \cdot \phi$	$40 + 0,02 \cdot l_v \geq 2 \cdot \phi$
Compressed air drilling (CA)	$\phi < 25$	$50 + 0,08 \cdot l_v$	$50 + 0,02 \cdot l_v$
	$\phi \geq 25$	$60 + 0,08 \cdot l_v \geq 2 \cdot \phi$	$60 + 0,02 \cdot l_v \geq 2 \cdot \phi$
Diamond coring dry (PCC) or wet (DD)	$\phi < 25$	Drill stand is used as drilling aid	$30 + 0,02 \cdot l_v \geq 2 \cdot \phi$
	$\phi \geq 25$		$40 + 0,02 \cdot l_v \geq 2 \cdot \phi$


Drilling and cleaning diameters

Rebar [mm]	Drill bit diameters d_0 [mm]			Diamond core d_0 [mm]		Installation size [mm]	
	Hammer drill (HD)	Compressed air drill (CA)	Hollow Drill Bit (HDB)	Wet (DD)	Dry (PCC) ^{b)}	Brush HIT-RB	Air nozzle HIT-RB
$\phi 8$	12 (10 ^{a)})	-	-	12 (10 ^{a)})	-	12 (10 ^{a)})	12 (10 ^{a)})
$\phi 10$	14 (12 ^{a)})	-	-	14 (12 ^{a)})	-	14 (12 ^{a)})	14 (12 ^{a)})
$\phi 12$	16 (14 ^{a)})	-	-	16 (14 ^{a)})	-	16 (14 ^{a)})	16 (14 ^{a)})
	-	17	-	-	-	18	16
$\phi 14$	18	17	-	18	-	18	18
$\phi 16$	20	-	-	20	-	20	20
	-	20	-	-	-	22	20
$\phi 18$	22	22	-	22	-	22	22
$\phi 20$	25 (24 ^{a)})	-	-	25	-	25 (24 ^{a)})	25 (24 ^{a)})
	-	26	-	-	-	28	25
$\phi 22$	28	28	-	28	-	28	28
$\phi 24$	32	32	-	32	-	32	32
	-	-	35	-	35	-	
$\phi 25$	32 (30 ^{a)})	32 (30 ^{a)})	-	32 (30 ^{a)})	-	32 (30 ^{a)})	
	-	-	35	-	35	-	
$\phi 26$	35	35	35	35	35	35	
$\phi 28$	35	35	35	35	35	35	
$\phi 30$	-	35	35	35	35	35	
	37	-	-	-		37	
$\phi 32$	40	40	47	40	47	40	
$\phi 34$	-	42	-	42	47	42	
	45	-	47	-		45	
$\phi 36$	45	45	-	-	47	45	
	-	-	47	47		47	
$\phi 40$	-	-	52	52	52	52	
	55	57	-	-		55	

- a) Both of a given values can be used,
b) No cleaning required,

Dispenser and corresponding maximum embedment depth $l_{v,max}$

Rebar	Dispenser	
	HDM 330, HDM 500	HDE 500
	$l_{v,max}$ [mm]	
$\phi 8$ to $\phi 10$	1000	1000
$\phi 12$ to $\phi 14$		1200
$\phi 16$		1500
$\phi 18$ to $\phi 20$	700	1300
$\phi 22$ to $\phi 25$		1000
$\phi 26$ to $\phi 28$	500	700



$\phi 30$ to $\phi 32$	-	
$\phi 34$ to $\phi 40$		500

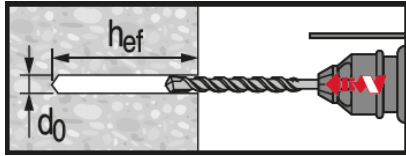
Setting instructions

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



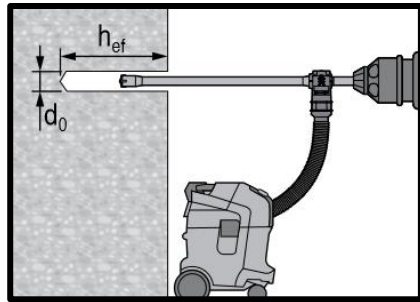
Safety regulations,

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,



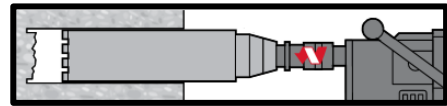
Hammer drilled hole

For dry and wet concrete,

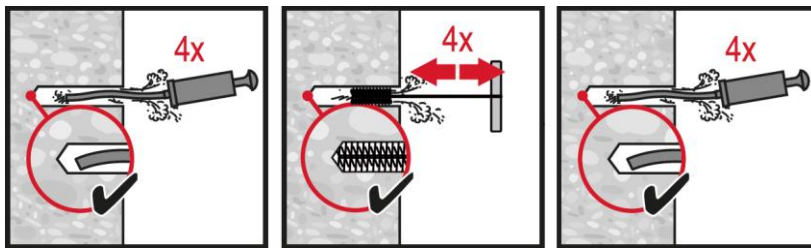


Hammer drilled hole with Hollow Drilled Bit (HDB)

No cleaning required,



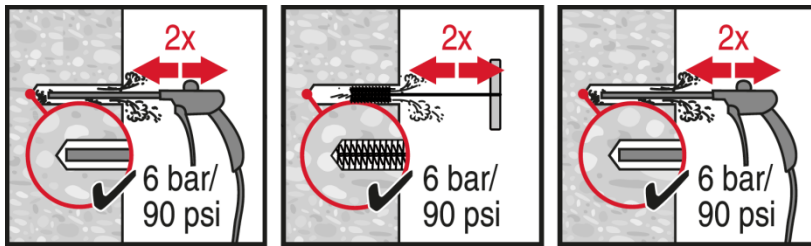
Diamond Drilling (DD)



Hammer Drilling:

Manual cleaning (MC)

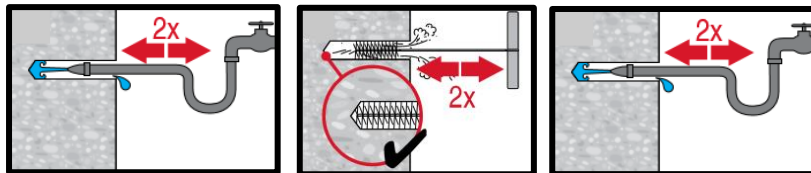
for drill diameters $d_0 \leq 20$ mm and drill hole depth $h_0 \leq 10 \cdot d$,



Hammer Drilling:

Compressed air cleaning (CAC)

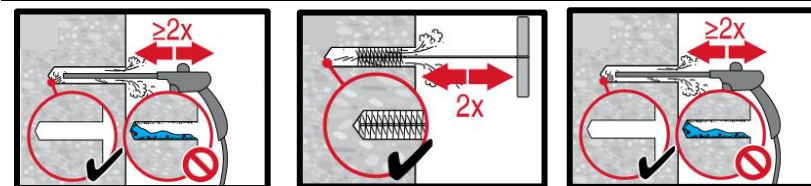
for all drill hole diameters d_0 and drill hole depths $h_0 \leq 20 \cdot d$,



Wet diamond coring:

Compressed air cleaning (CAC)

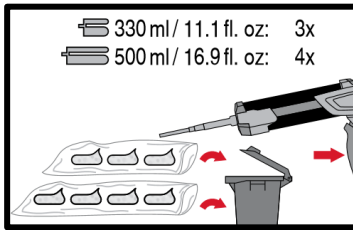
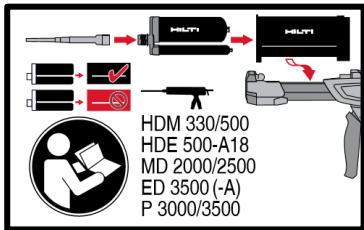
for all drill hole diameters d_0 and drill hole depths h_0 ,



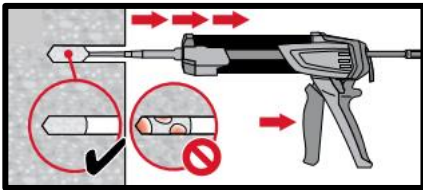
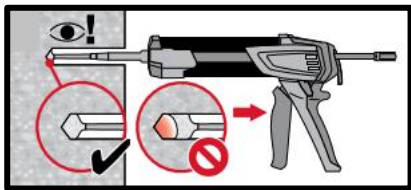
Dry diamond coring:

Compressed air cleaning (CAC)

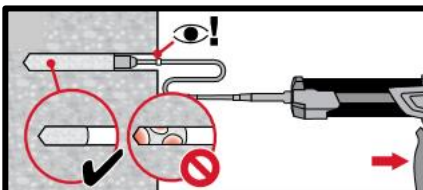
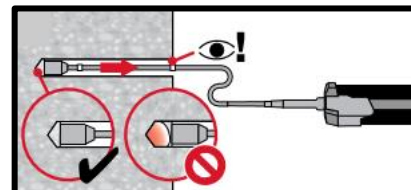
for all drill hole diameters d_0 and drill hole depths h_0 ,



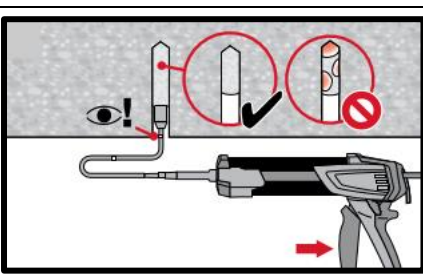
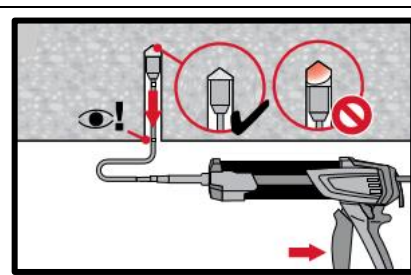
Injection system preparation,



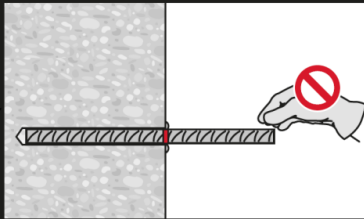
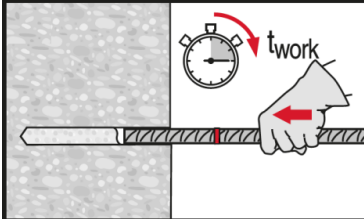
Injection method for drill hole depth
 $h_{ef} \leq 250$ mm,



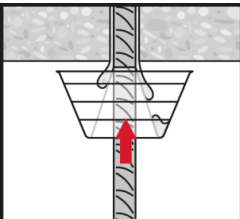
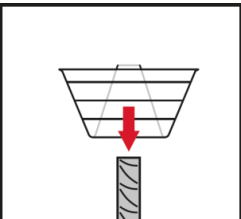
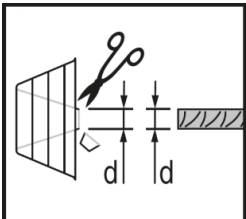
Injection method for drill hole depth
 $h_{ef} > 250$ mm,



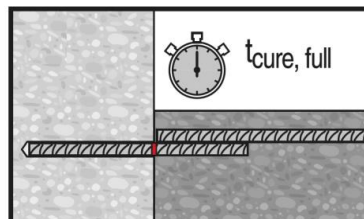
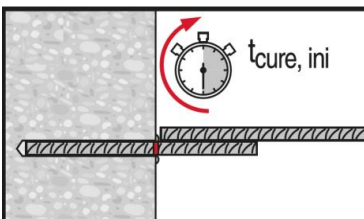
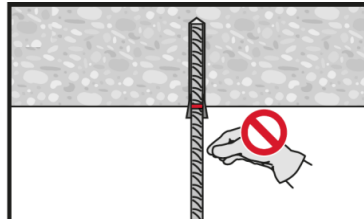
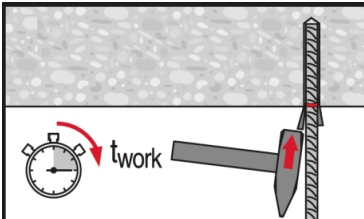
Injection method for overhead application,



Setting element, observe working time
“ t_{work} ”,



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



Apply full load only after curing time
“ t_{cure} ”,

