Hilti HIT-RE 100 mortar with rebar (as anchor)

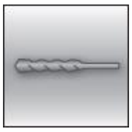
Injection mortar system		Benefits
	Hilti HIT-RE 100 330 ml, 500 ml and 1400 ml foil pack	- suitable for non-cracked and cracked concrete C 20/25 to C 50/60 - high loading capacity - suitable for dry and water saturated concrete - large diameter applications - long working time at elevated temperatures - odourless epoxy - embedment depth range: from 60 … 160 mm for Ø8 to 128 … 640 mm for Ø32
	Statik mixer	
	rebar BSt 500 S	

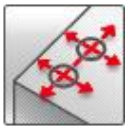
Base material


Concrete (non-cracked)


Concrete (cracked)

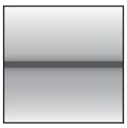
Installation conditions


Hammer drilled holes


Small edge distance and spacing


Variable embedment depth

Load conditions


Static/quasi-static

Other informations

European Technical Assessment

CE conformity

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment[a)]	DIBt, Berlin	ETA-15/0882 / 2016-04-22

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
- Temperate range I
  (min. base material temperature -40°C, max. long term/short term base material temperature: +24°C/40°C)
- Installation temperature range +5°C to +40°C

Embedment depth and base material thickness for the basic loading data

Anchor size		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
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

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

For hammer drilled holes:

Mean ultimate resistance

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
Non cracked concrete													
Tensile $N_{Ru,m}$	BSt 500 S	[kN]	*29,4*	*45,2*	*65,1*	87,6	93,7	148,6	204,0	233,9	297,4	322,6	348,4
Shear $V_{Ru,m}$	BSt 500 S	[kN]	*14,7*	*23,1*	*32,6*	*44,1*	*57,8*	*90,3*	*141,8*	*153,3*	*177,5*	*203,7*	*232,1*
Cracked concrete													
Tensile $N_{Ru,m}$	BSt 500 S	[kN]	-	26,3	38,5	47,4	54,2	85,1	131,4	137,2	173,4	196,1	220,2
Shear $V_{Ru,m}$	BSt 500 S	[kN]	-	*23,1*	*32,6*	*44,1*	*57,8*	*90,3*	*141,8*	*153,3*	*177,5*	*203,7*	*232,1*

Characteristic resistance

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
Non cracked concrete													
Tensile N_{Rk}	BSt 500 S	[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}	BSt 500 S	[kN]	*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}	BSt 500 S	[kN]	-	19,8	29,0	35,7	40,8	64,1	99,0	103,3	130,6	147,7	165,9
Shear V_{Rk}	BSt 500 S	[kN]	-	*22,0*	*31,0*	*42,0*	*55,0*	*86,0*	*135,0*	*146,0*	*169,0*	*194,0*	*221,0*

Design resistance

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
Non cracked concrete													
Tensile N_{Rd}	BSt 500 S	[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}	BSt 500 S	[kN]	*11,2*	*17,6*	*24,8*	*33,6*	*44,0*	*68,8*	*108,0*	*116,8*	*135,2*	*155,2*	*176,8*
Cracked concrete													
Tensile N_{Rd}	BSt 500 S	[kN]	-	9,4	13,8	17,0	19,4	30,5	47,1	49,2	62,2	70,3	79,0
Shear V_{Rd}	BSt 500 S	[kN]	-	*17,6*	*24,8*	*33,6*	38,9	61,0	94,2	98,4	124,4	140,7	158,0

Recommended loads

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
Non cracked concrete													
Tensile N_{rec}	BSt 500 S	[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_{rec}	BSt 500 S	[kN]	8,0	12,6	17,7	24,0	31,4	49,1	77,1	83,4	96,6	110,9	126,3
Cracked concrete													
Tensile N_{rec}	BSt 500 S	[kN]	-	6,7	9,9	12,2	13,9	21,8	33,7	35,1	44,4	50,2	56,4
Shear V_{rec}	BSt 500 S	[kN]	-	12,6	17,7	24,0	27,8	43,6	67,3	70,3	88,9	100,5	112,8

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.

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 +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.

Materials

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
Nominal tensile strength f_{uk}	BSt 500 S	[N/mm²]	550	550	550	550	550	550	550	550	550	550	550
Yield strength f_{yk}	BSt 500 S	[N/mm²]	500	500	500	500	500	500	500	500	500	500	500
Stressed cross-section A_s	BSt 500 S	[mm²]	50,3	78,5	113,1	153,9	201,1	314,2	490,9	531,0	615,8	707,0	804,2
Moment of resistance W	BSt 500 S	[mm³]	50,3	98,2	169,6	269,4	402,1	785,4	1534	1726	2155	2651	3217

Material quality

Part	Material
rebar BSt 500 S	Geometry and mechanical properties according to DIN 488-2:1986 or E DIN 488-2:2006

Setting

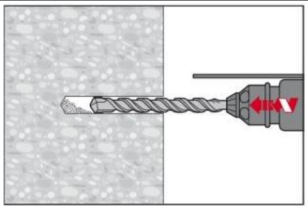
Installation equipment

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
Rotary hammer	TE 2 – TE 16					TE 40 – TE 70					
Other tools	compressed air gun or blow out pump, set of cleaning brushes, dispenser										

Setting instruction

Bore hole drilling

Hammer drilling



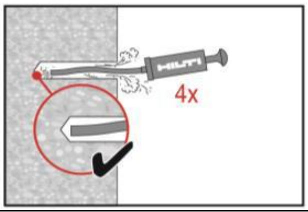
Drill Hole to the required embedment depth with a hammer drill set in rotation-hammer mode using an appropriately sized carbide drill bit.

Bore hole cleaning

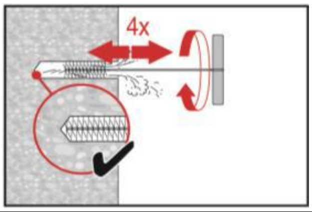
Just before setting an anchor, the bore hole must be free of dust and debris. Inadequate hole cleaning = poor load values.

Manual Cleaning (MC)

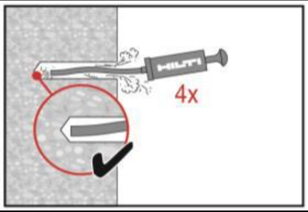
Non-cracked concrete only.
For bore hole diameters $d_0 \leq 20$mm and bore hole depth $h_0 \leq 10d$.



The Hilti manual pump may be used for blowing out bore holes up to diameters $d_0 \leq 20$ mm and embedment depths up to $h_{ef} \leq 10d$.
Blow out at least 4 times from the back of the bore hole until return air stream is free of noticeable dust



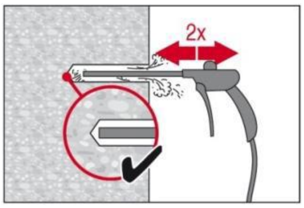
Brush 4 times with the specified brush size (brush diameter ≥ bore hole) by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the bore hole - if not the brush is too small and must be replaced with the proper brush diameter.



Blow out again with manual pump at least 4 times until return air stream is free of noticeable dust.

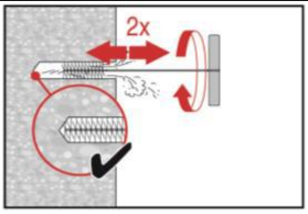
Compressed air cleaning (CAC)

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

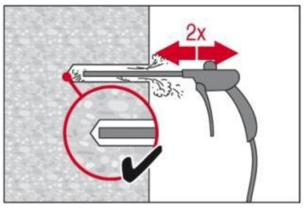


Blow 2 times from the back of the hole (if needed with nozzle extension) over the hole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust.

Bore hole diameter ≥ 32 mm the compressor must supply a minimum air flow of 140 m³/hour.



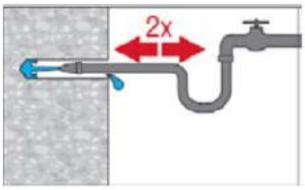
Brush 2 times with the specified brush size by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the bore hole - if not the brush is too small and must be replaced with the proper brush diameter.



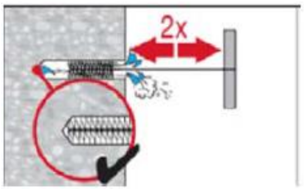
Blow again with compressed air 2 times until return air stream is free of noticeable dust.

Cleaning on flooded holes

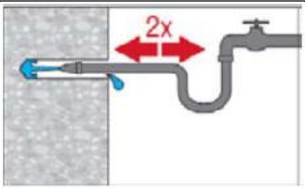
For all bore hole diameters d_0 and all bore hole depth h_0



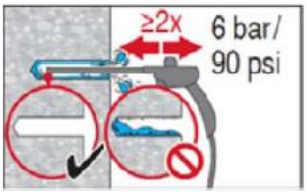
Flush 2 times the hole by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.



Brush 2 times with the specified brush size by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the bore hole - if not the brush is too small and must be replaced with the proper brush diameter.

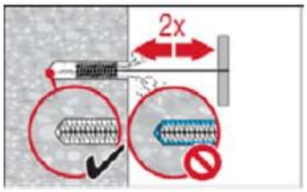


Flush 2 times the hole by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.

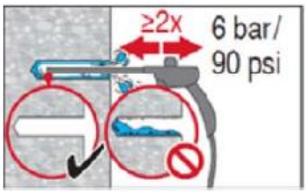


Blow 2 times from the back of the hole (if needed with nozzle extension) over the hole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust and water.

For bore hole diameters ≥ 32 mm the compressor must supply a minimum air flow of 140 m³/hour.

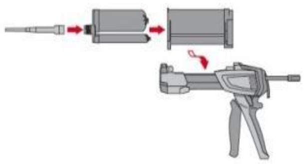


Brush 2 times with the specified brush size by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the bore hole - if not the brush is too small and must be replaced with the proper brush diameter.

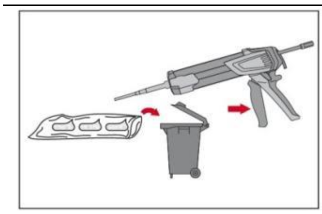


Blow again with compressed air 2 times until return air stream is free of noticeable dust and water.

Injection preparation



Tightly attach new Hilti mixing nozzle HIT-RE-M to foil pack manifold (snug fit). Do not modify the mixing nozzle. Observe the instruction for use of the dispenser and mortar.
Check foil pack holder for proper function. Do not use damaged foil packs / holders.
Insert foil pack into foil pack holder and put holder into HIT-dispenser.

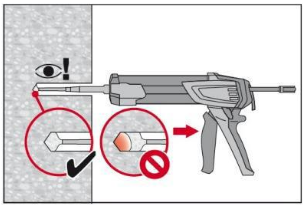


The foil pack opens automatically as dispensing is initiated. Discard initial adhesive. Depending on the size of the foil pack an initial amount of adhesive has to be discarded.
Discard quantities are:

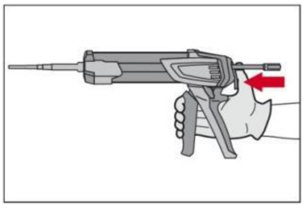
- 2 strokes for 330 ml foil pack,
- 3 strokes for 500 ml foil pack,
- 65 ml for 1400 ml foil pack.

Inject adhesive

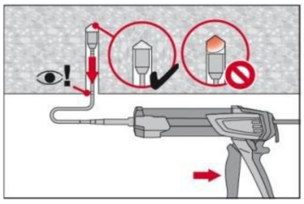
From the back of the borehole without forming air voids



Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull.
Fill holes approximately 2/3 full. It is required that the annular gap between the anchor and the concrete is completely filled with adhesive along the embedment length.

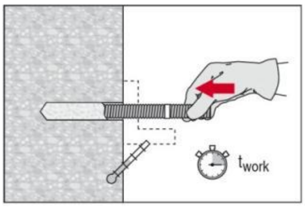


After injection is completed, depressurize the dispenser by pressing the release trigger. This will prevent further adhesive discharge from the mixer.

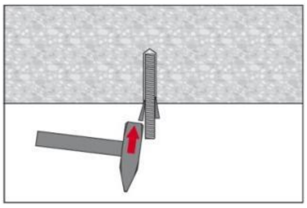


Overhead installation and/or installation with embedment depth h_{ef} > 250mm.
For overhead installation the injection is only possible with the aid of extensions and piston plugs. Assemble HIT-RE-M mixer, extension(s) and appropriately sized piston plug HIT-SZ. Insert piston plug to back of the hole and inject adhesive. During injection the piston plug will be naturally extruded out of the bore hole by the adhesive pressure.

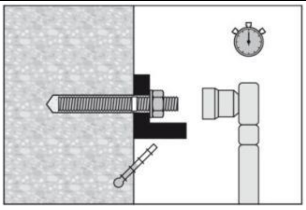
Setting the element



Before use, verify that the element is dry and free of oil and other contaminants.
Mark and set element to the required embedment depth untill working time t_{work} has elapsed.



For overhead installation use piston plugs and fix embedded parts with e.g. wedges HIT-OHW.



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

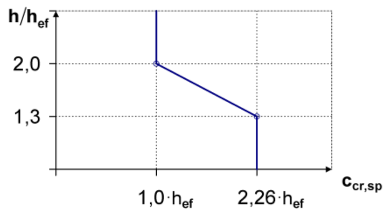
For detailed information on installation see instruction for use given with the package of the product.

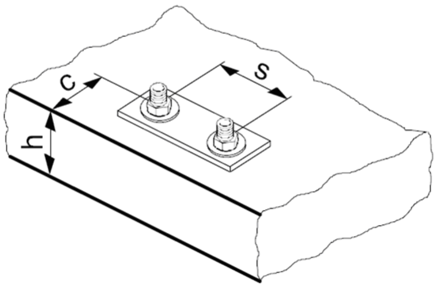
Curing time for general conditions

Temperature of the base material	Working time in which anchor can be inserted and adjusted t_{gel}	Curing time before anchor can be fully loaded t_{cure}
40 °C	12 min	4 h
30 °C to 39 °C	12 min	8 h
20 °C to 29 °C	20 min	12 h
15 °C to 19 °C	30 min	24 h
10 °C to 14 °C	90 min	48 h
5 °C to 9 °C	120 min	72 h

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[1)]	12/14[1)]	14/16[1)]	18	20	25/24[1)]	32/30[1)]	32	35	37	40
Effective anchorage and drill hole depth range [a)]	$h_{ef,min}$	[mm]	60	60	70	75	80	90	100	104	112	120	128
	$h_{ef,max}$	[mm]	160	200	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	70	80	100	125	130	140	150	160
Minimum edge distance	c_{min}	[mm]	40	50	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 [b)]	$c_{cr,sp}$	[mm]	**1,0 · h_{ef}** for h / h_{ef} ≥ 2,0 **4,6 h_{ef} - 1,8 h** for 2,0 > h / h_{ef} > 1,3 **2,26 h_{ef}** for h / h_{ef} ≤ 1,3										
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	2 $c_{cr,N}$										
Critical edge distance for concrete cone failure [c)]	$c_{cr,N}$	[mm]	1,5 h_{ef}										





1) Each of the two given values can be used.

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

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

b) h: base material thickness (h ≥ 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.