




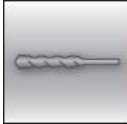
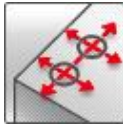
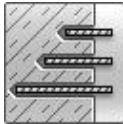
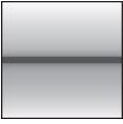






Hilti HIT-RE 100 mortar with HIT-V / HAS-(E) rods

Injection mortar system	Benefits
 <p>Hilti HIT-RE 100 330 ml, 500 ml and 1400 ml foil pack</p>  <p>Statik mixer</p>  <p>HIT-V rod</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

<p>Base material</p>  <p>Concrete (non-cracked)</p>  <p>Concrete (cracked)</p>	<p>Installation conditions</p>  <p>Hammer drilled holes</p>  <p>Small edge distance and spacing</p>  <p>Variable embedment depth</p>
<p>Load conditons</p>  <p>Static/quasi-static</p>	<p>Other informations</p>  <p>European Technical Assessment</p>  <p>CE conformity</p>  <p>Corrosion resistance</p>  <p>High corrosion resistance</p>

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical assessment	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
- Anchor HIT-V with strength class 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: $+24^\circ\text{C}/40^\circ\text{C}$)
- Installation temperature range $+5^\circ\text{C}$ to $+40^\circ\text{C}$

Embedment depth ^{a)} and base material thickness

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

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

For hammer drilled holes:

Mean ultimate resistance

Anchor size	M8	M10	M12	M16	M20	M24	M27	M30
Non cracked concrete								
Tensile $N_{Ru,m}$ HIT-V [kN]	19,2	30,5	44,3	82,4	128,6	185,3	241,0	294,5
Shear $V_{Ru,m}$ HIT-V [kN]	9,6	15,2	22,1	41,2	64,3	92,7	120,5	147,3
Cracked concrete								
Tensile $N_{Ru,m}$ HIT-V [kN]	19,2	26,3	38,5	54,2	85,1	126,1	148,6	185,8
Shear $V_{Ru,m}$ HIT-V [kN]	9,6	15,2	22,1	41,2	64,3	92,7	120,5	147,3

Characteristic resistance

Anchor size	M8	M10	M12	M16	M20	M24	M27	M30
Non cracked concrete								
Tensile N_{Rk} HIT-V [kN]	18,3	29,0	42,2	78,5	111,9	153,7	187,8	224,0
Shear V_{Rk} HIT-V [kN]	9,2	14,5	21,1	39,3	61,3	88,3	114,8	140,3
Cracked concrete								
Tensile N_{Rk} HIT-V [kN]	18,3	19,8	29,0	40,8	64,1	95,0	112,0	140,0
Shear V_{Rk} HIT-V [kN]	9,2	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										
Tensile N_{Rd}	HIT-V	[kN]	12,2	19,3	27,7	44,2	53,3	73,2	89,4	106,7
Shear V_{Rd}	HIT-V	[kN]	7,3	11,6	16,9	31,4	49,0	70,6	91,8	112,2
Cracked concrete										
Tensile N_{Rd}	HIT-V	[kN]	12,2	9,4	13,8	19,4	30,5	45,2	53,3	66,6
Shear V_{Rd}	HIT-V	[kN]	7,3	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										
Tensile N_{rec}	HIT-V	[kN]	8,7	13,8	19,8	31,6	38,1	52,3	63,9	76,2
Shear V_{rec}	HIT-V	[kN]	5,2	8,3	12,0	22,4	35,0	50,4	65,6	80,1
Cracked concrete										
Tensile N_{Rec}	HIT-V	[kN]	8,7	6,7	9,9	13,9	21,8	32,3	38,1	47,6
Shear V_{Rec}	HIT-V	[kN]	5,2	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.

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

Mechanical properties of HIT-V

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

Part	Material
Threaded rod HIT-V 5.8 HAS-(E) 5.8	Strength class 5.8, A5 > 8% ductile Electroplated zinc coated $\geq 5\mu\text{m}$ Hot dip galvanized $\geq 45\mu\text{m}$
Threaded rod HIT-V 8.8 HAS-(E) 8.8	Strength class 8.8, A5 > 12% ductile Electroplated zinc coated $\geq 5\mu\text{m}$ Hot dip galvanized $\geq 45\mu\text{m}$
Threaded rod HIT-V-R HAS-(E)-R	Strength class 70 for $\leq M24$ and class 50 for $> M24$, A5 > 8% ductile Stainless steel 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362
Threaded rod HIT-V-HCR HAS-(E)-HCR	Strength class 70 for $\leq M24$ and class 50 for $> M24$, A5 > 8% ductile High corrosion resistant steel 1.4528, 1.4565
Washer	High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014
Nut	Strength class of nut adapted to strength class of threaded rod. High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014

Setting

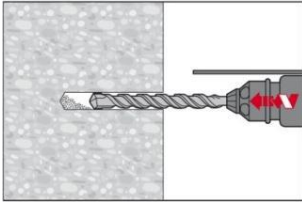
Installation equipment

Anchor size	M8	M10	M12	M16	M20	M24	M27	M30	
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.

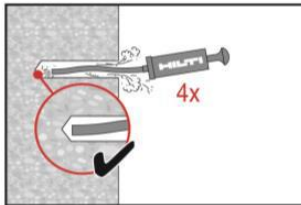
Bore hole cleaning

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

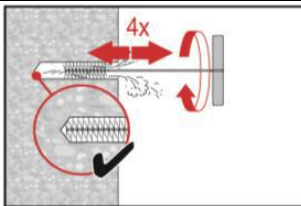
Manual Cleaning (MC)

Non-cracked concrete only.

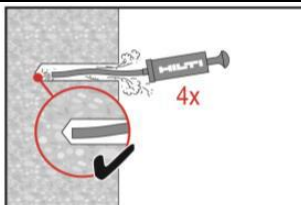
For bore hole diameters $d_0 \leq 20\text{mm}$ and bore hole depth $h_0 \leq 10d$.



The Hilti manual pump may be used for blowing out bore holes up to diameters $d_0 \leq 20\text{ mm}$ 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



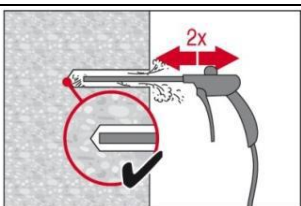
Brush 4 times with the specified brush size (brush diameter \geq bore hole) by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the bore hole - if not the brush is too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

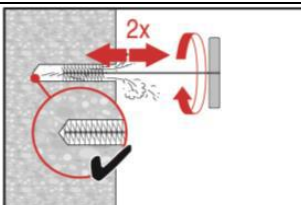
Compressed air cleaning (CAC)

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

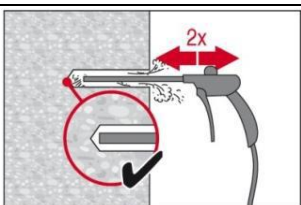


Blow 2 times from the back of the hole (if needed with nozzle extension) over the hole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust.

Bore hole diameter $\geq 32\text{ mm}$ the compressor must supply a minimum air flow of 140 m³/hour.



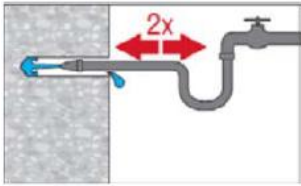
Brush 2 times with the specified brush size by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the bore hole - if not the brush is too small and must be replaced with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



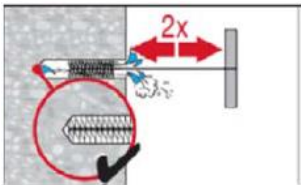
Blow again with compressed air 2 times until return air stream is free of noticeable dust.

Cleaning on flooded holes

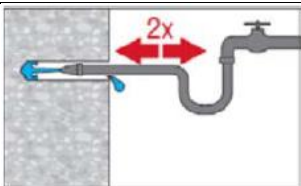
For all bore hole diameters d_0 and all bore hole depth h_0



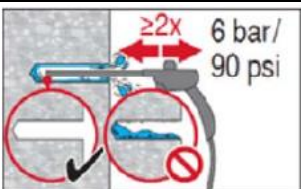
Flush 2 times the hole by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.



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.

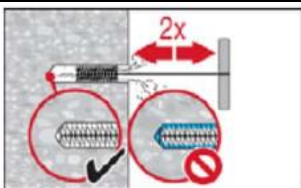


Flush 2 times the hole by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.

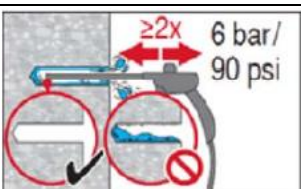


Blow 2 times from the back of the hole (if needed with nozzle extension) over the hole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust and water.

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

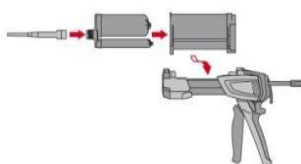


Brush 2 times with the specified brush size by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the bore hole - if not the brush is too small and must be replaced with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



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

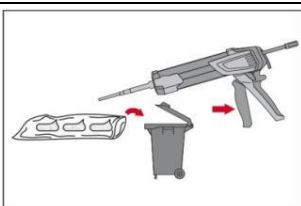
Injection preparation



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.



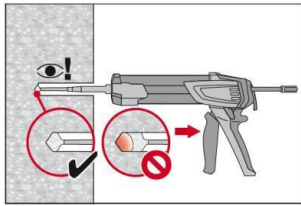
The foil pack opens automatically as dispensing is initiated. Discard initial adhesive. Depending on the size of the foil pack an initial amount of adhesive has to be discarded.

Discard quantities are:

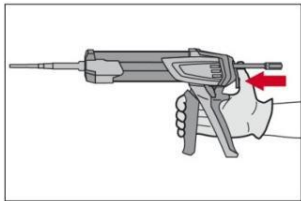
- 2 strokes for 330 ml foil pack,
- 3 strokes for 500 ml foil pack,
- 65 ml for 1400 ml foil pack.

Inject adhesive

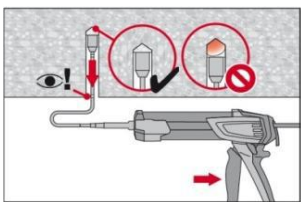
From the back of the borehole without forming air voids



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.



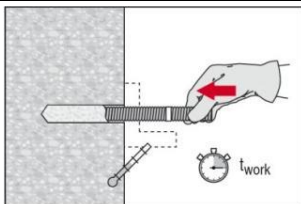
After injection is completed, depressurize the dispenser by pressing the release trigger. This will prevent further adhesive discharge from the mixer.



Overhead installation and/or installation with embedment depth $h_{ef} > 250\text{mm}$.

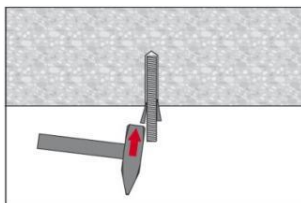
For overhead installation the injection is only possible with the aid of extensions and piston plugs. Assemble HIT-RE-M mixer, extension(s) and appropriately sized piston plug HIT-SZ. Insert piston plug to back of the hole and inject adhesive. During injection the piston plug will be naturally extruded out of the bore hole by the adhesive pressure.

Setting the element

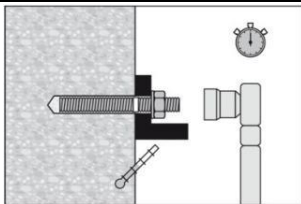


Before use, verify that the element is dry and free of oil and other contaminants.

Mark and set element to the required embedment depth until 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		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	75	90	115	120	140
Minimum edge distance	c_{min} [mm]	40	45	45	50	55	60	75	80
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 ^{c)}	$c_{cr,N}$ [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 : 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.