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

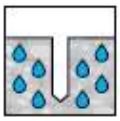
- Suitable for cracked and non-cracked concrete C 20/25 to C 50/60
- High loading capacity
- Suitable for dry and water saturated concrete
- Large diameter applications
- Long working time at elevated temperatures
- Odourless epoxy

Base material

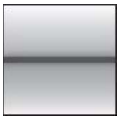

Concrete (non-cracked)


Concrete (cracked)

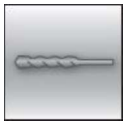

Dry concrete

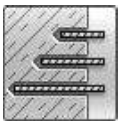

Wet concrete

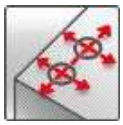
Load conditions


Static/ quasi-static

Installation conditions


Hammer drilling


Variable embedment depth


Small edge distance and spacing

Hilti **SafeSet** technology

Other informations

European Technical Assessment

CE conformity

A4 316
Corrosion resistance

HCR highMo
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 N/mm²
- Temperate range I
  (min. base material temperature -40°C, max. long term/short term base material temperature: +24°C/40°C)

Embedment depth and base material thickness

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 γ=1,4. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

Materials

Mechanical properties

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Nominal tensile strength f_{uk}	HIT-V 5.8 HAS-(E) 5.8	[N/mm²]	500	500	500	500	500	500	500	500
	HIT-V 8.8 HAS-(E) 8.8	[N/mm²]	800	800	800	800	800	800	800	800
	HIT-V-R HAS-(E)R	[N/mm²]	700	700	700	700	700	700	500	500
	HIT-V-HCR HAS-(E)HCR	[N/mm²]	800	800	800	800	800	700	700	700
Yield strength f_{yk}	HIT-V 5.8 HAS-(E) 5.8	[N/mm²]	400	400	400	400	400	400	400	400
	HIT-V 8.8 HAS-(E) 8.8	[N/mm²]	640	640	640	640	640	640	640	640
	HIT-V-R HAS-(E)R	[N/mm²]	450	450	450	450	450	450	210	210
	HIT-V-HCR HAS-(E)HCR	[N/mm²]	640	640	640	640	640	400	400	400
Stressed cross-section A_s	HIT-V	[mm²]	36,6	58,0	84,3	157	245	353	459	561
	HAS-(E)	[mm²]	32,8	52,3	76,2	144,0	225,0	324,0	427,0	519,0
Moment of resistance W	HIT-V	[mm³]	31,2	62,3	109	277	541	935	1387	1874
	HAS-(E)	[mm³]	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 ≥ 5μm; (F) hot dip galvanized ≥ 45 μm
Threaded rod, HIT-V 8.8 (F) HAS-(E) 8.8	Strength class 8.8; Elongation at fracture A5 > 12% ductile Electroplated zinc coated ≥ 5μm; (F) hot dip galvanized ≥ 45 μm
Washer	Electroplated zinc coated ≥ 5 μm, hot dip galvanized ≥ 45 μm
Nut	Strength class of nut adapted to strength class of threaded rod. Electroplated zinc coated ≥ 5μm, hot dip galvanized ≥ 45 μm
Stainless Steel	
Threaded rod, HIT-V-R HAS-(E)-R	Strength class 70 for ≤ 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 ≤ 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.

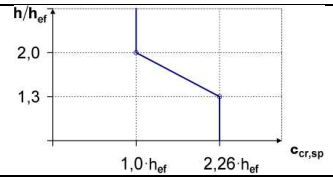
Working time and curing time

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 °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			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 ≥ 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 · 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 [b]	$c_{cr,N}$	[mm]	1,5 h_{ef}							
Torque moment [c]	T_{max}	[Nm]	10	20	40	80	150	200	270	300

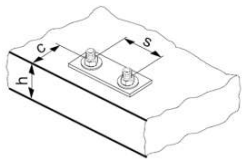


For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

a) $h_{ef,min} \le h_{ef} \le h_{ef,max}$ (h_{ef}: embedment depth) h: base material thickness ($h \ge h_{min}$)

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 save side.

c) This is the maximun recommended torque moment to avoid splitting failure during installation for anchors with minimun 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**

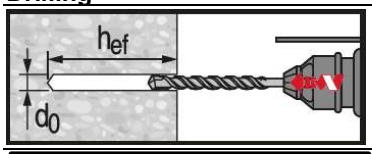
Setting instructions

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

Safety regulations.

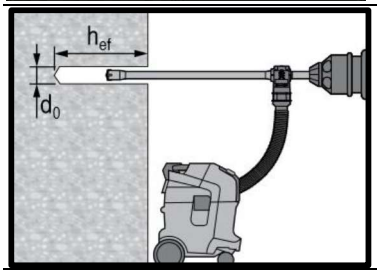
Review the Material Safety Data Sheet (MSDS) before use for proper and safe handling! Wear well-fitting protective goggles and protective gloves when working with Hilti HIT-RE 100.

Drilling



Hammer drilled hole

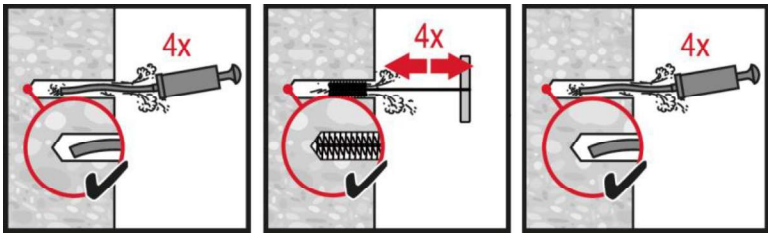
For dry and wet concrete.



Hammer drilled hole with Hollow Drilled Bit (HDB)

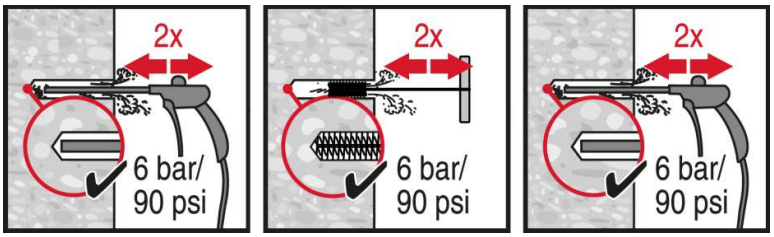
No cleaning required.

Cleaning

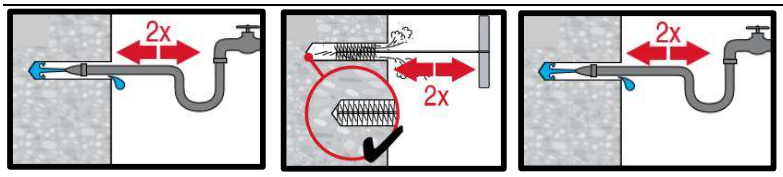


Manual cleaning (MC)
Non-cracked concrete only

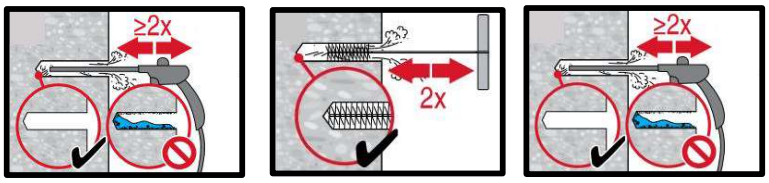
for drill diameters $d_0 \leq 20$ mm and drill hole depth $h_0 \leq 10 \cdot d$.



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

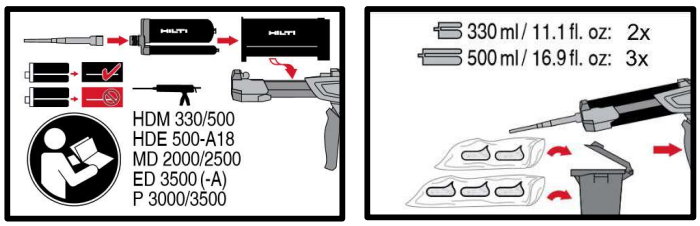


Compressed air cleaning (CAC)
cleaning of flooded holes

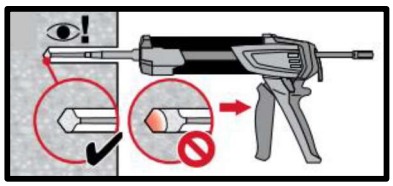
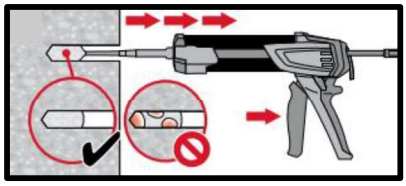


for all drill hole diameters d_0 and drill hole depths h_0 .

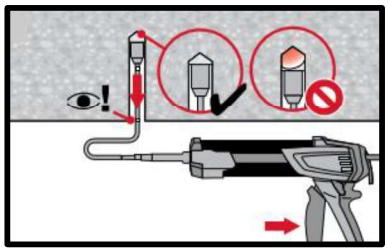
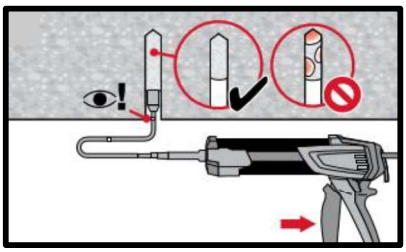
Injection system



Injection system preparation.

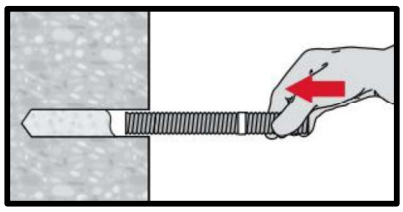



Injection method for drill hole depth $h_{ef} \leq 250$ mm.

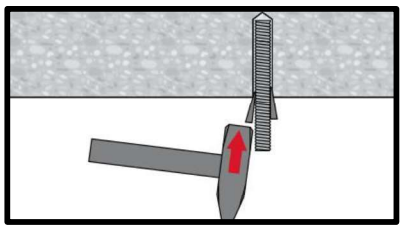



Injection method for overhead application and/or installation with embedment depth $h_{ef} > 250$ mm.

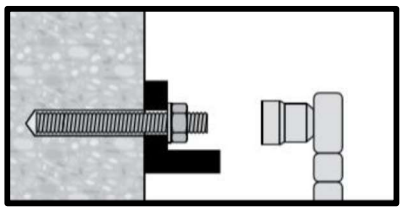
Setting the element



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.