




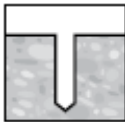

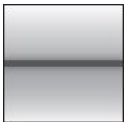







HIT-MM Plus injection mortar

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

Injection mortar system	Benefits
	<p>Hilti HIT-MM Plus 300 ml foil pack (also available as 500 ml foil pack)</p>
	<p>Anchor rods: HIT-V HIT-V-F HIT-V-R (M8-M24)</p>
	<p>Anchor rods: HAS-(E) HAS-(E)R (M8-M24)</p>
	<p>Internally threaded sleeves: HIS-N (M8-M16)</p>

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

Installation conditions	Other information
 <p>Hammer drilling</p>	  <p>Corrosion resistance Technical Approval</p>

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment ^{a)}	DIBt, Berlin	ETA-17/0199 / 2017-04-03
Hilti Technical Data ^{b)}	Hilti	2019-09-23

a) All data given in this section according to ETA 17/0199 (issued 2017-04-03).
 b) All data given in this section according to Hilti Technical Data.

Basic loading data (for a single anchor)

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
- Non-cracked 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 for HIT-V and HAS-(E) rods

Threaded rods			M8	M10	M12	M16	M20	M24
Embedment depth	h_{ef}	[mm]	80	90	110	125	170	210
Base material	h	[mm]	110	120	140	161	214	266

Recommended loads ^{a)} for HIT-V and HAS-(E) rods

Threaded rods			M8	M10	M12	M16	M20	M24
Tension	N_{Rec}	[kN]	5,0	7,0	10,0	12,0	15,0	18,0

a) The data provided in the table is intended for product comparison only and not suitable for the complete design of an anchorage.

Materials

Material quality for HIT-V

Part	Material
Zinc coated steel	
Threaded rod, HIT-V 5.8 (F) HAS-(E)	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)R	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	Strength class 70 for $\leq \text{M24}$ and strength class 50 for $> \text{M24}$; 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

Material quality for HIS-N

Part	Material	
HIS-N	Internal threaded sleeve	C-steel 1.0718; Steel galvanized $\geq 5\mu\text{m}$
	Screw 8.8	Strength class 8.8, A5 > 8 % Ductile; Steel galvanized $\geq 5\mu\text{m}$
HIS-RN	Internal threaded sleeve	Stainless steel 1.4401, 1.4571
	Screw 70	Strength class 70, A5 > 8 % Ductile Stainless steel 1.4401; 1.4404, 1.4578; 1.4571; 1.4439; 1.4362

Setting information

Installation temperature range:
0°C to +40°C

In service temperature range

Hilti HIT-HY MM+ injection mortar with anchor rods may be applied in the temperature ranges given below. An elevated base material temperature leads 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	-40 °C to + 40 °C	+ 24 °C	+ 40 °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.

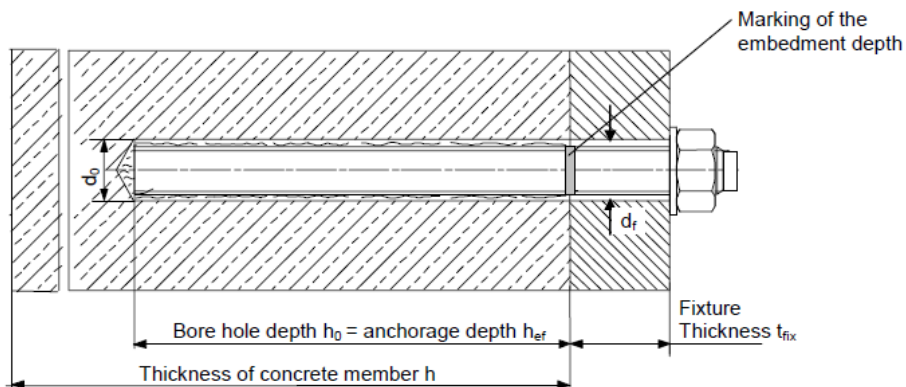
Working time and curing time

Temperature of the base material T	Working time t_{gel}	Minimum curing time $t_{cure}^{1)}$
0 °C	10 min	4 h
0 °C < TBM < 5 °C	10 min	2.5 h
5 °C < TBM ≤ 10 °C	8 min	1.5 h
10 °C < TBM ≤ 20 °C	5 min	45 min
20 °C < TBM ≤ 30 °C	3 min	30 min
30 °C < TBM ≤ 40 °C	2 min	20 min

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

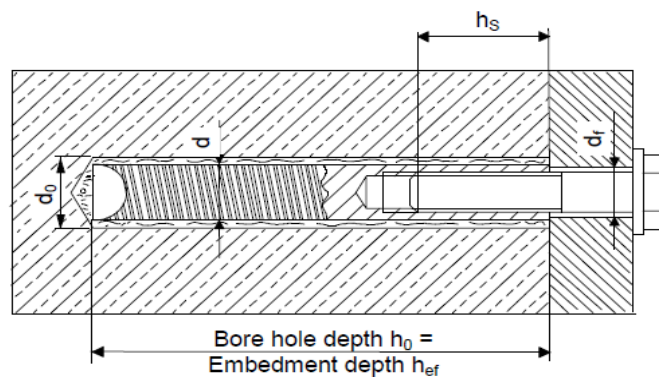
Setting details for HIT-V / HAS

Threaded rods	M8	M10	M12	M16	M20	M24
Nominal diameter of d_0 [mm]	10	12	14	18	22	28
Effect. anchorage h_{ef} [mm]	80	90	110	125	170	210
Min. base material h_{min} [mm]	110	120	140	161	214	266
Diameter of clearance hole in d_f [mm]	9	12	14	18	22	26
Minimum spacing s_{min} [mm]	40	50	60	80	100	120
Minimum edge c_{min} [mm]	40	50	60	80	100	120
Torque moment T_{max} [Nm]	10	20	40	80	150	200



Setting details for HIS-N

Anchor size			M8	M10	M12	M16
Nominal diameter of drill bit	d_0	[mm]	14	18	22	28
Diameter of element	d	[mm]	12,5	16,5	20,5	25,4
Effective anchorage depth	h_{ef}	[mm]	12,5	16,5	20,5	170
Minimum base material thickness	h_{min}	[mm]	120	146	169	226
Diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18
Thread engagement length; min – max	h_s	[mm]	8-20	10-25	12-30	16-40
Torque moment	T_{max}	[Nm]	10	20	40	80
Minimum spacing	s_{min}	[mm]	60	75	90	115
Minimum edge distance	c_{min}	[mm]	40	45	55	65



Installation equipment

Anchor size	M8	M10	M12	M16
Rotary hammer	TE2 – TE16			
Other tools	blow out pump, set of cleaning brushes, dispenser			

Drilling and cleaning parameters

HIT-V HAS	HIS-N	Hammer drill	Brush HIT-RB	Piston plug HIT-SZ
		d_0 [mm]	size [mm]	
M8	-	10	10	-
M10	-	12	12	12
M12	M8	14	14	14
M16	M10	18	18	18
-	M12	22	22	22
-	M16	28	28	28

Setting instructions

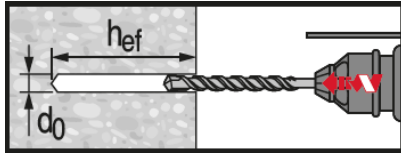
*For detailed information on installation see instruction for use given with the package of the product.



Safety regulations.

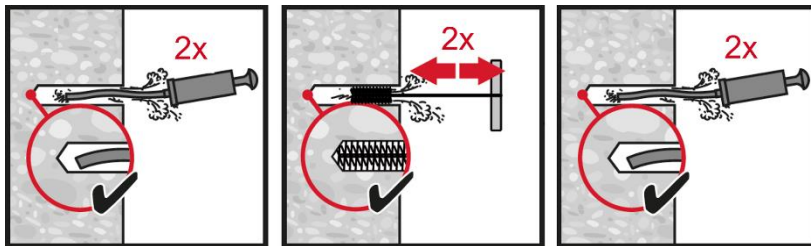
Review the Material Safety Data Sheet (MSDS) before use for proper and safe handling! Wear well-fitting protective goggles and protective gloves when working with Hilti HIT-MM Plus.

Drilling



Hammer drilled hole (HD)

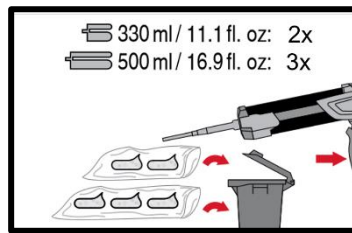
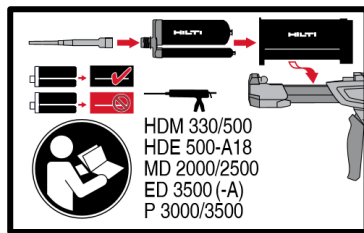
Cleaning



Manual cleaning (MC)
Non-cracked concrete only

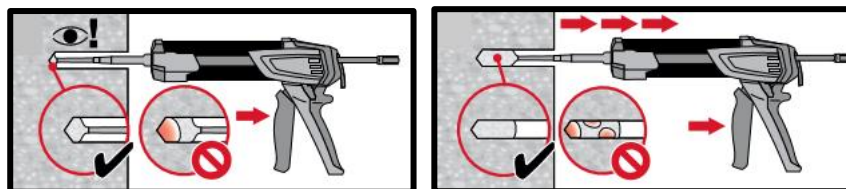
for drill diameters $d_0 \leq 18$ mm and drill hole depth $h_0 \leq 10 \cdot d$.

Injection system



Injection system preparation.

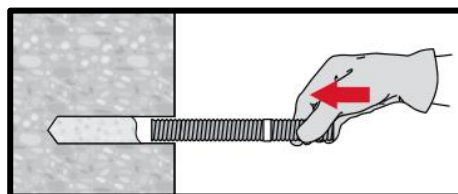
Injection system



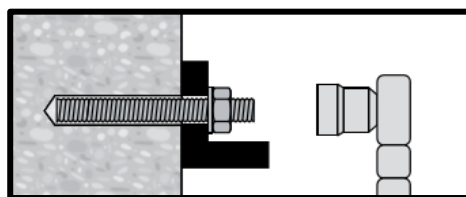
Injection method for drill hole depth

$h_{ef} \leq 250$ mm.

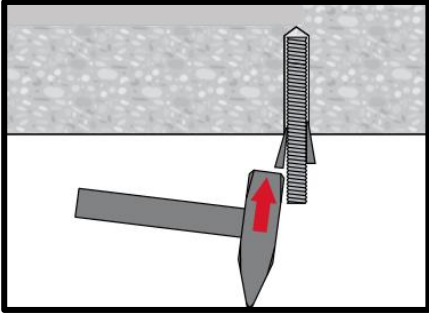
Setting the element



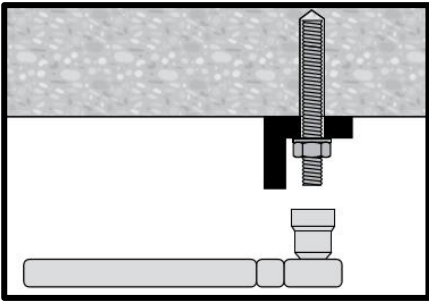
Setting element, observe working time " t_{work} ",



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



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







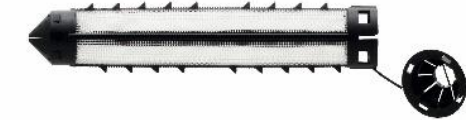


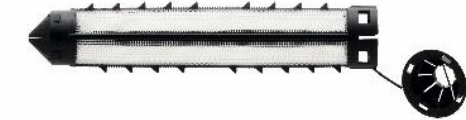


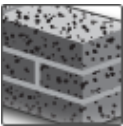
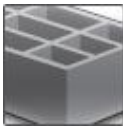
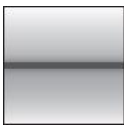

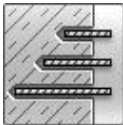

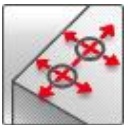
Loading the anchor after required curing time t_{cure} the anchor can be loaded. The applied installation torque shall not exceed T_{max} .



HIT-MM Plus injection mortar

Anchor design (ETAG 029) / Rods&Sleeves / Masonry

Injection mortar system	Benefits
	<ul style="list-style-type: none"> - Chemical injection fastening for all type of base materials: - Hollos and solid clay bricks, sand-lime bricks, normal and light weight concrete blocks, aereated light weight concrete, natural stones - Two component hybrid mortar - Rapid curing - Flexible setting depth and fastening thickness - Suitable for overhead fastenings - Versatile and conventional handling - Clean and simple in use - Small edge distance and anchor spacing - Always correct mixing ratio
	
	
	
	
	
	
	
	
	

Base material	Load conditions	
 <p>Solid brick</p>	 <p>Hollow brick</p>	
 <p>Static/ quasi-static</p>		
Installation conditions	Other information	
 <p>Hammer / rotary drilling</p>	<div style="border: 2px solid black; padding: 5px; display: inline-block;"> A4 316 </div> <p>Corrosion resistance</p>	
 <p>Variable embedment depth</p>		 <p>European Technical Approval</p>
 <p>Small edge distance and spacing</p>		

Approvals / certificates		
Description	Authority / Laboratory	No. / date of issue
European Technical Assessment ^{a)}	DIBt, Berlin	ETA-16/0239 / 2016-04-21



c) All data given in this section according to ETA-16/0239 (issued 2016-04-21).

Static and quasi-static loading (for a single anchor)

All data in this section applies to:

- Load values valid for holes drilled with TE rotary hammers in hammering (solid bricks) / rotary (hollow bricks) mode.
- Correct anchor setting (see instruction for use, setting details)
- Steel quality of fastening elements: see data below
- Steel quality for screws for HIT-IC and HIS-N: min. grade 5.8 / HIS-RN: A4-70
- Threaded rods of appropriate size (diameter and length) and a minimum steel quality of 5.6 can be used

Recommended loads $F_{rec}^{b)}$ for pull-out failure in [kN]

Anchor size		HAS / HAS-E / HIT-V				HIT-IC		
		M8	M10	M12	M8	M10	M12	
Solid Masonry								
Solid clay brick Mz12/2,0 DIN 105/ EN 771-1 $f_{b\ a)} \geq 12\ \text{N/mm}^2$ 	Setting depth [mm]	80	80	80	80	80	80	80
	F_{rec} [kN]	0,9	1,5	1,5	0,9	1,5	1,5	
Hollow Masonry								
Hlz 12 DIN 105/ EN 771-1 $f_{b\ a)} \geq 12\ \text{N/mm}^2$ 	Sieve Sleeve HIT-	16x...	16x...	18x...	22x...	16x...	16x...	16x...
	Setting depth [mm]	80	80	80	80	80	80	80
	F_{rec} [kN]	0,8	0,8	0,8	0,8	0,8	0,8	0,8

a) f_b = brick strength

b) The data provided in the table is intended for product comparison only and not suitable for the complete design of an anchorage

Due to the wide variety of bricks site tests have to be performed for determination of load values for all applications outside of the above mentioned base materials and / or setting conditions.

Materials

Material quality

Part	Material
Threaded rod HIT-V, HAS-(E)	Strength class 5.8, EN ISO 898-1, A5 > 8% ductile Steel galvanized $\geq 5\ \mu\text{m}$, EN ISO 4042
Threaded rod HIT-V-R / HAS-(E)R	Stainless steel grade A4, strength class 70; A5 > 8% Ductile Stainless steel 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088
HIT-IC sleeve	Carbon steel; galvanized to min. $5\ \mu\text{m}$
HIS-N	C-steel 1.0718, EN 10277-3, Steel galvanized $\geq 5\ \mu\text{m}$ EN ISO 4042
HIS-RN	Stainless steel 1.4401 and 1.4571 EN 10088
Washer ISO 7089	Steel galvanized EN ISO 4042 Stainless steel, EN 10088: 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362
Nut EN ISO 4032	Strength class 8 ISO 898-2 Steel galvanized $\geq 5\ \mu\text{m}$ EN ISO 4042 Strength class 70 EN ISO 3506-2, stainless steel grade A4, EN 10088: Stainless steel 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362
HIT-SC sleeve	PA/PP

Setting information

Installation temperature range:

Solid masonry: 5°C to +40°C

Hollow masonry: -5°C to +40°C

In service temperature range

Hilti HIT-HY MM+ injection mortar with anchor rods may be applied in the temperature ranges given below. An elevated base material temperature leads 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 + 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.

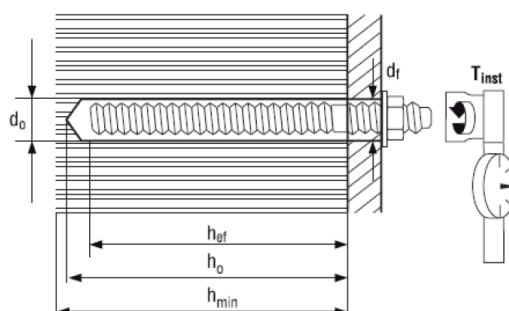
Working time and curing time

Temperature of the base material	Maximum working time t_{work}	Minimum curing time t_{cure}
0 °C < T_{BM} ≤ 5 °C ^{a)}	10 min ^{a)}	6 h ^{a)}
5 °C < T_{BM} ≤ 10 °C	8 min	3 h
10 °C < T_{BM} ≤ 20 °C	5 min	2 h
20 °C < T_{BM} ≤ 30 °C	3 min	60 min
30 °C < T_{BM} ≤ 40 °C	2 min	45 min

a) For hollow bricks only.

Setting details for solid bricks

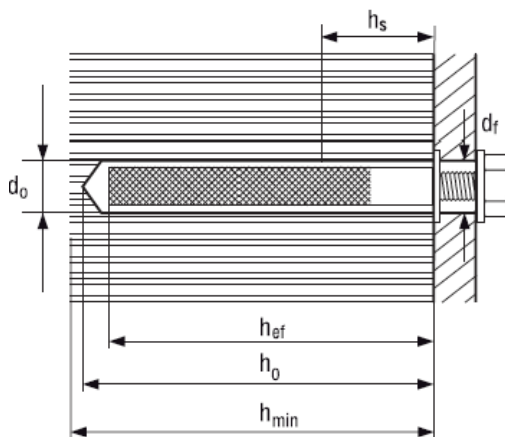
Anchor size	HIT-V			HAS / HAS-E / HAS-R				
	M8	M10	M12	M8	M10	M12	M16	
Sieve sleeve	HIT-SC							-
Nominal diameter of drill bit	d_0 [mm]	10	12	14	10	12	14	18
Effective anchorage and drill hole depth	h_{ef} [mm]	80	80	80	80	90	110	125
Hole depth	h_0 [mm]	85	85	85	85	95	115	130
Minimum base material thickness	h_{min} [mm]	115	115	115	110	120	140	170
Diameter of clearance hole in the fixture	d_f [mm]	9	12	14	9	12	14	18
Min. spacing	s_{min} [mm]	100	100	100	100	100	100	100
Min. edge distance	c_{min} [mm]	100	100	100	100	100	100	100
Torque moment	T_{max} [Nm]	5	8	10	5	8	10	10
Filing volume	[ml]	4	5	7	4	6	10	15



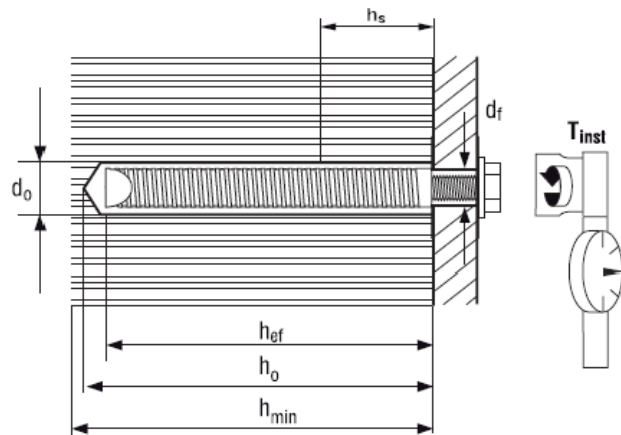
Setting details for solid bricks

Anchor size	HIT-IC			HIS-(R)N			
	M8	M10	M12	M8	M10	M12	
Sieve sleeve	HIT-SC						-
Nominal diameter of drill bit	d_o [mm]	14	16	18	14	18	22
Effective anchorage and drill hole depth	h_{ef} [mm]	80	80	80	90	110	125
Hole depth	h_o [mm]	85	85	85	95	115	130
Minimum base material thickness	h_{min} [mm]	115	115	115	120	150	170
Diameter of clearance hole in the fixture	d_f [mm]	9	12	14	9	12	14
Length of bolt engagement	h_s [mm]	min. 10 – max. 75			min. 8 max. 20	min. 10 max. 25	min. 12 max. 30
Min. spacing ^{a)}	s_{min} [mm]	100	100	100	100	100	100
Min. edge distance ^{a)}	c_{min} [mm]	100	100	100	100	100	100
Torque moment	T_{max} [Nm]	5	8	10	5	8	10
Filing volume	[ml]	6	6	6	6	10	16

HIT-IC

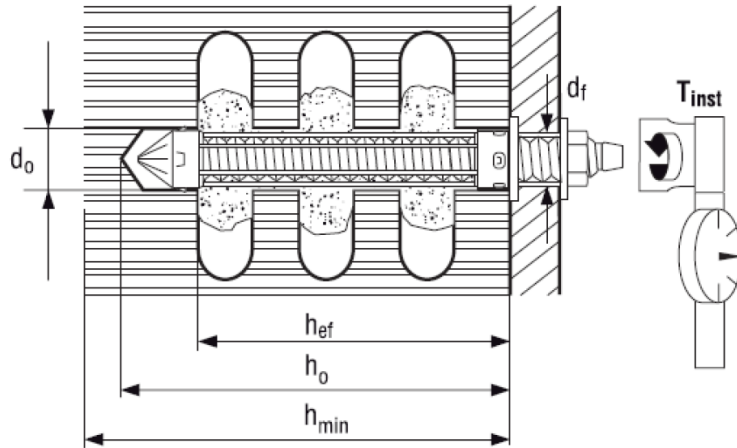


HIS-N/RN



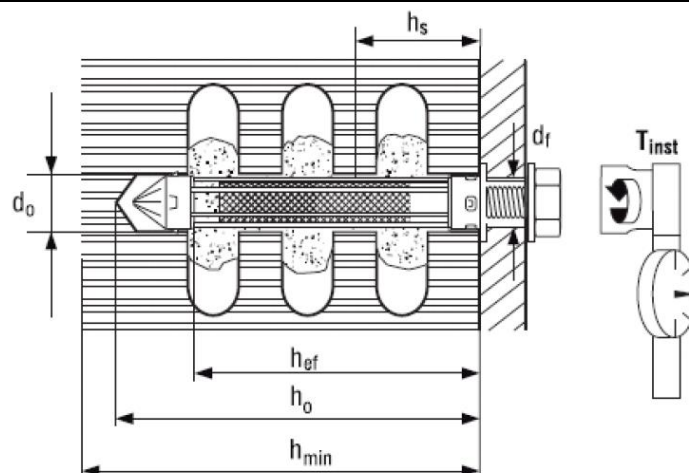
Setting details for hollow bricks

Anchor size	HAS / HIT-V										
	M6		M8		M10		M12				
Sieve sleeve	HIT-SC										
Nominal diameter of drill bit	d_o [mm]	12	12	16	16	16	16	18	18	22	22
Effective anchorage and drill hole depth	h_{ef} [mm]	50	80	50	80	50	80	50	80	50	80
Hole depth	h_o [mm]	60	95	60	95	60	95	60	95	60	95
Minimum base material thickness	h_{min} [mm]	80	115	80	115	80	115	80	115	80	115
Diameter of clearance hole in the fixture	d_f [mm]	7	7	9	9	12	12	14	14	14	14
Min. spacing ^{a)}	s_{min} [mm]	100	100	100	100	100	100	100	100	100	100
Min. edge distance ^{a)}	c_{min} [mm]	100	100	100	100	100	100	100	100	100	100
Torque moment	T_{max} [Nm]	3	3	3	3	4	4	6	6	6	6
Filing volume	[ml]	12	24	18	30	18	30	18	36	30	55



Setting details for hollow bricks

Anchor size		HIT-IC		
		M8	M10	M12
Sieve sleeve	HIT-SC	16x85	18x85	22x85
Nominal diameter of drill bit	d_o [mm]	16	18	22
Effective anchorage and drill hole depth	h_{ef} [mm]	80	80	80
Hole depth	h_o [mm]	95	95	95
Minimum base material thickness	h_{min} [mm]	115	115	115
Diameter of clearance hole in the fixture	d_f [mm]	9	12	14
Length of bolt engagement	h_s [mm]	min. 10 – max. 75		
Min. spacing ^{a)}	s_{min} [mm]	100	100	100
Min. edge distance ^{a)}	c_{min} [mm]	100	100	100
Torque moment	T_{max} [Nm]	3	4	6
Filing volume	[ml]	30	36	45



Drilling and cleaning parameters for solid bricks

HIT-V HAS	HIT-IC	HIS-N	Hammer drill	Brush HIT-RB	Piston plug HIT-SZ
			d_0 [mm]	size [mm]	
M8	-	-	10	10	-
M10	-	-	12	12	12
M12	M8	M8	14	14	14
-	M10	-	16	16	16
M16 ^{a)}	M12	M10	18	18	18
-	-	M12	22	22	22

a) Only for HAS (-E) threaded rods.

Drilling and cleaning parameters for hollow bricks

HIT-V (-R) HAS (-E) + sieve sleeve	HIT-IC + sieve sleeve	Hammer drill	Brush HIT-RB	Piston plug HIT-SZ
		d_0 [mm]	size [mm]	
M6	-	12	12	12
M8	-	16	16	16
M10	M8	16	16	16
M12	M10	18	18	18
M12 ^{a)}	M12	22	22	22

b) M12 with sieve sleeve SC22x50

Setting instructions

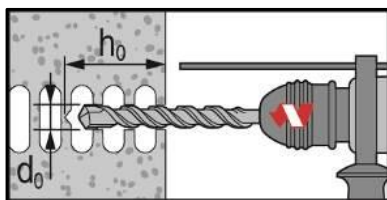
*For detailed information on installation see instruction for use given with the package of the product.



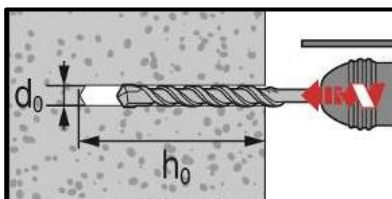
Safety regulations.

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-HY MM+.

Drilling

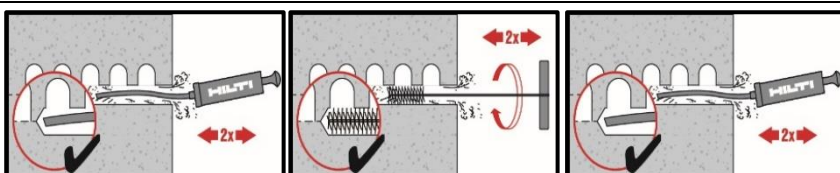


In hollow bricks: rotary mode



In solid bricks: hammer mode

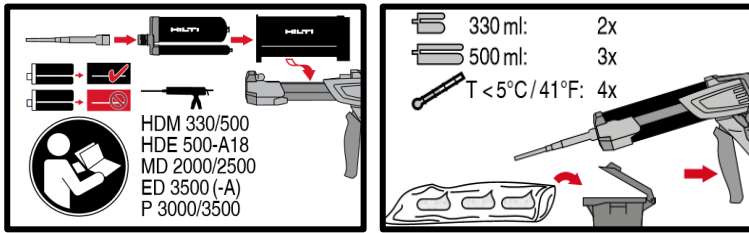
Cleaning



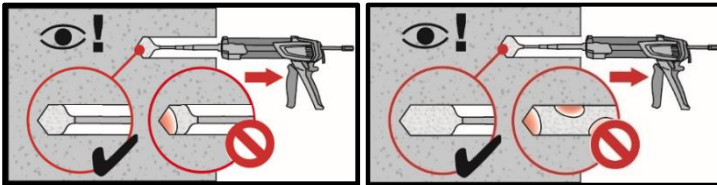
Manual cleaning (MC)

Instructions for solid bricks without sieve sleeve

Injection system

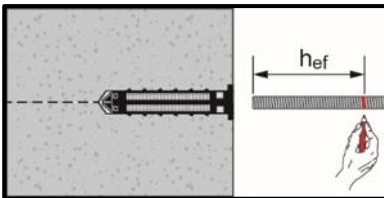


Injection system preparation.

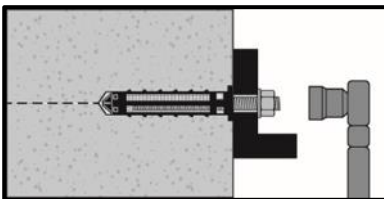


Injection method for drill hole

Setting the element



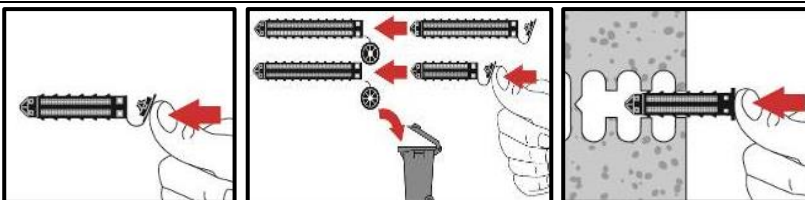
Presetting element, observe working time "t_{work}",



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

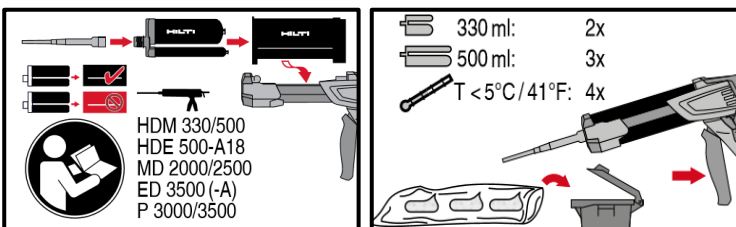
Instructions for hollow and solid bricks with sieve sleeve

Preparation of the sieve sleeve



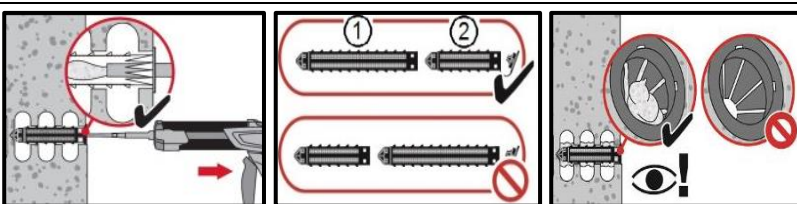
Close lid and insert sieve sleeve manually

Injection system



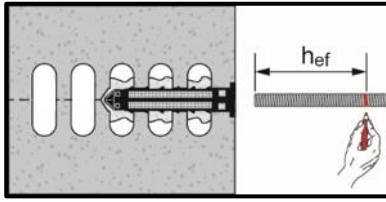
Injection system preparation.

Injection system: hollow bricks

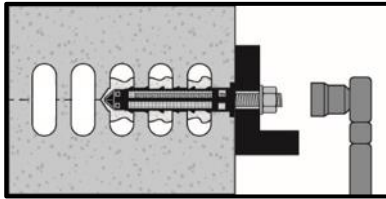


Installation with sieve sleeve HIT-SC

Setting the element



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



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