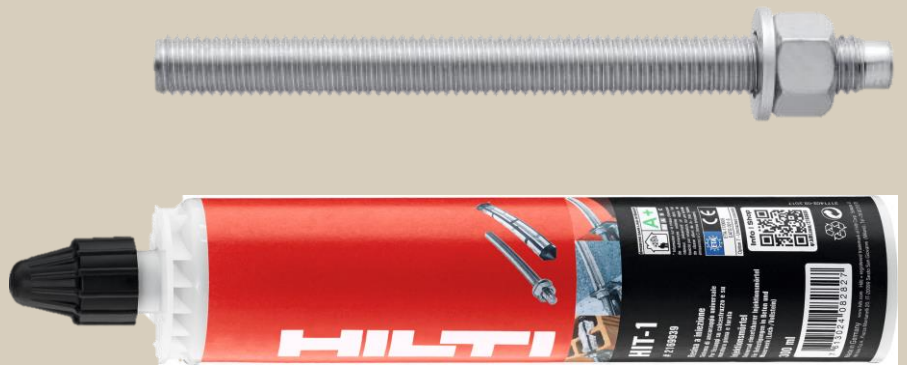




HIT-1 INJECTION MORTAR

Technical Datasheet

Update: Dec-17





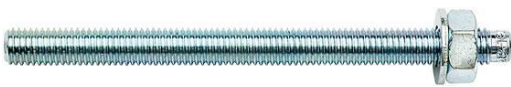
HIT-1 / HIT-1 CE injection mortar

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

Injection mortar system



Hilti HIT-1 / HIT-1 CE
300 ml tube cartridge



Anchor rods:
HIT-V(F)
HIT-V-R
HIT-V-HCR
(M8-M16)

Benefits

- Chemical injection fastening
- Two-component hybrid mortar
- Rapid curing
- Suitable for overhead fastenings
- Versatile and convenient handling
- Clean and simple in use
- Small edge distance and anchor spacing
- Always correct mixing ratio

Base material



Concrete
(non-cracked)

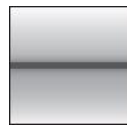


Dry concrete



Wet concrete

Load conditions

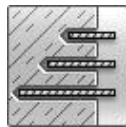


Static/
quasi-static

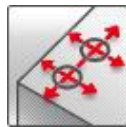
Installation conditions



Hammer
drilling



Variable
embedment
depth



Small edge
distance and
spacing

Other information



European
Technical
Assessment



CE
conformity

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European Technical Assessment ^{a)}	TTIC, Prague	ETA-17/0005 / 2017-02-20

a) All data given in this section according to ETA-17/0005, issue 2017-02-20.

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

All data in this section applies to

- Non-cracked concrete C 20/25, $f_{ck,cube} = 25 \text{ N/mm}^2$
- Load values valid for holes drilled with TE rotary hammers in hammering mode
- Diamond coring is not permitted
- Correct anchor setting (see instruction for use, setting details)
- No edge distance and spacing influence
- Embedment depth, base material thickness, as specified in the tables
- Base material temperature during installation and curing must be between 0°C through $+40^\circ\text{C}$
- Temperature range I and II, as specified in the tables
- *Steel* failure

Recommended loads for tension loading

Threaded rod HIT-V 5.8		M8	M10	M12	M16
Temperature range I (24/40°C)					
Embedment depth	$h_{ef,min}$ [mm]	60	60	70	80
Base material thickness	h [mm]	100	100	100	116
Tensile load	N_{rec} [kN]	4,2	5,2	7,3	9,6
Temperature range II (50/80°C)					
Embedment depth	$h_{ef,10d}$ [mm]	80	100	120	160
Base material thickness	h [mm]	110	130	150	196
Tensile load	N_{rec} [kN]	5,6	8,7	12,6	19,2
Temperature range I (24/40°C)					
Embedment depth	$h_{ef,20d}$ [mm]	160	200	240	320
Base material thickness	h [mm]	190	210	270	356
Tensile load	N_{rec} [kN]	8,7	13,8	20,1	37,4
Temperature range II (50/80°C)					
Embedment depth	$h_{ef,min}$ [mm]	60	60	70	80
Base material thickness	h [mm]	100	100	100	116
Tensile load	N_{rec} [kN]	3,0	3,7	5,2	7,2
Temperature range II (50/80°C)					
Embedment depth	$h_{ef,10d}$ [mm]	80	100	120	160
Base material thickness	h [mm]	110	130	150	196
Tensile load	N_{rec} [kN]	4,0	6,2	9,0	14,4
Temperature range II (50/80°C)					
Embedment depth	$h_{ef,20d}$ [mm]	160	200	240	320
Base material thickness	h [mm]	190	210	270	356
Tensile load	N_{rec} [kN]	8,0	12,5	18,0	28,7

Recommended loads for shear loading

Threaded rod HIT-V 5.8		M8	M10	M12	M16
Shear load	V_{rec} [kN]	5,1	8,6	12,0	22,3

Materials

Mechanical properties

Anchor size		M8	M10	M12	M16
Nominal tensile strength f_{uk}	HIT-V 5.8	500	500	500	500
	HIT-V 8.8	800	800	800	800
	HIT-V-R	700	700	700	700
	HIT-V-HCR	800	800	800	800
Yield strength f_{yk}	HIT-V 5.8	400	400	400	400
	HIT-V 8.8	640	640	640	640
	HIT-V-R	450	450	450	450
	HIT-V-HCR	640	640	640	640
Stressed cross-section A_s	HIT-V	36,6	58,0	84,3	157
Moment of resistance W	HIT-V	31,2	62,3	109	277

Material quality for HIT-V

Part	Material
Zinc coated steel	
Threaded rod, HIT-V 5.8 (F)	Strength class 5.8; Elongation at fracture $A_5 > 8\%$ 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)	Strength class 8.8; Elongation at fracture $A_5 > 12\%$ 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 $\leq M24$ and strength class 50 for $> M24$; Elongation at fracture $A_5 > 8\%$ 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	Strength class 80 for $\leq M20$ and class 70 for $> M20$, Elongation at fracture $A_5 > 8\%$ 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:

0°C to +40°C

Service temperature range

Hilti HIT-1 / HIT-1 CE 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 +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 T_{BM}	Maximum working time t_{work}	Minimum curing time t_{cure}
$-5^{\circ}\text{C} \leq T_{BM} < 0^{\circ}\text{C}$	1,5 h	6 h
$0^{\circ}\text{C} \leq T_{BM} < 5^{\circ}\text{C}$	45 min	3 h
$5^{\circ}\text{C} \leq T_{BM} < 10^{\circ}\text{C}$	25 min	2 h
$10^{\circ}\text{C} \leq T_{BM} < 15^{\circ}\text{C}$	20 min	100 min
$15^{\circ}\text{C} \leq T_{BM} < 20^{\circ}\text{C}$	15 min	80 min
$20^{\circ}\text{C} \leq T_{BM} < 30^{\circ}\text{C}$	6 min	45 min
$30^{\circ}\text{C} \leq T_{BM} < 35^{\circ}\text{C}$	4 min	25 min
$30^{\circ}\text{C} \leq T_{BM} < 40^{\circ}\text{C}$	2 min	25 min

Setting details

Threaded rod – size		M8	M10	M12	M16
Nominal diameter of drill bit	d_0 [mm]	10	12	14	18
Nominal diameter of element	d [mm]	8	10	12	16
Maximum diameter of clearance hole in the fixture	d_f [mm]	9	12	14	18
Diameter of steel brush	d_0 [mm]	10	12	14	16
Minimum base material thickness	h_{min} [mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{ef} + 2d_0$
Effective anchorage depth (= drill hole depth) $h_{ef} = h_0$	$h_{ef,min}$ [mm]	60	60	70	80
	$h_{ef,max}$ [mm]	160	200	240	320
Minimum spacing	s_{min} [mm]	40	50	60	80
Minimum edge distance	c_{min} [mm]	40	50	60	80

Installation equipment

Anchor – size	M8	M10	M12	M16
Rotary hammer	TE2(-A) – TE30(-A)			
Other tools	Blow out pump ($h_{ef} \leq 10 \cdot d$) Compressed air gun ^{b)} Set of cleaning brushes ^{c)} , dispenser, piston plug			

- a) Compressed air gun with extension hose for all drill holes deeper than 250 mm (for M8 to M12) 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 M8 to M12) or deeper than $20 \cdot \phi$ (for $\phi > 12$ mm)

Parameters of cleaning and setting tools

HIT-V	Drill and clean [mm]		Installation
	Hammer drilling	Brush HIT-RB	Piston plug HIT-SZ
M8	10	10	10
M10	12	12	12
M12	14	14	14
M16	18	18	18

Setting instructions

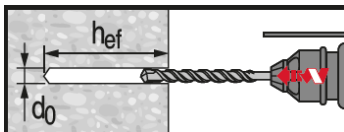
*For detailed information on installation see instruction for use given with the package of the product.



Safety regulations.

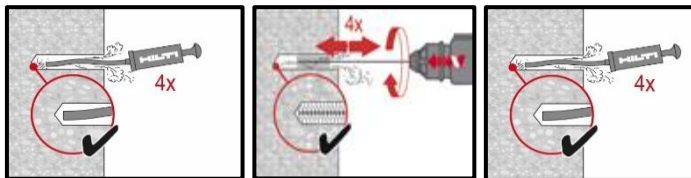
Review the Material Safety Data Sheet (MSDS) before use for proper and safe handling! Wear well-fitting protective goggles and protective gloves when working with Hilti HIT-1 / HIT-1 CE.

Drilling



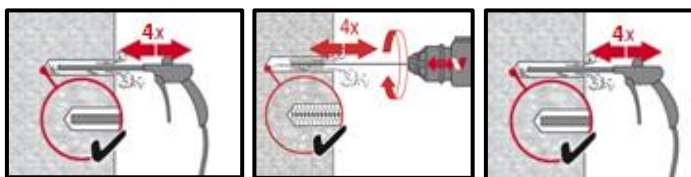
Hammer drilled hole (HD)
For dry and wet concrete only

Cleaning



Manual cleaning with machine brushing (MCMC)

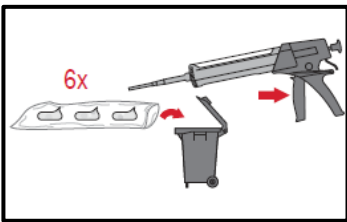
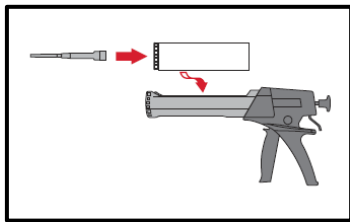
For drill diameters $d_0 \leq 20$ mm and drill hole depth $h_0 \leq 10 \cdot d$.



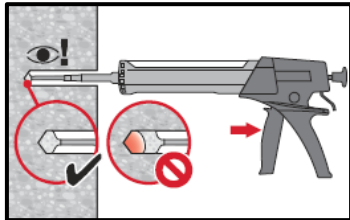
Compressed air cleaning with machine brushing (CACMB)

For drill diameters d_0 and all drill hole depth h_0 .

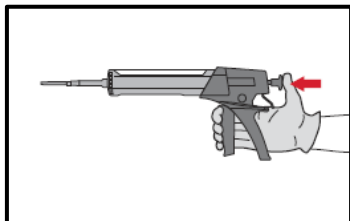
Injection system



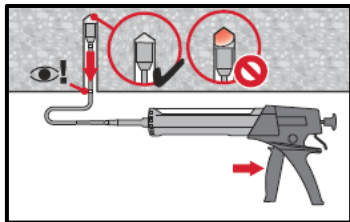
Injection system preparation



Injection method for drill hole depth
(approx. 2/3 full)

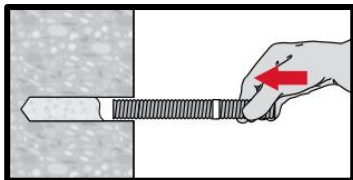


Depressurization of the dispenser.

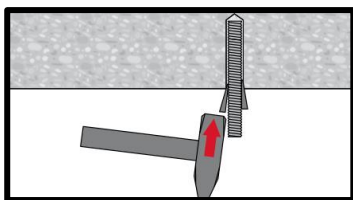


Injection method for overhead application and/or installation with embedment depth $h_{ef} > 250$ mm.

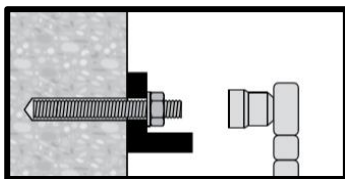
Setting the element



Setting the 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-1 / HIT-1 CE injection mortar

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

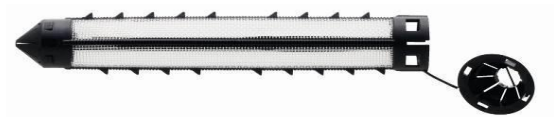
Injection mortar system



Hilti HIT-1 / HIT-1 CE
300 ml tube cartridge



Anchor rod:
HIT-V
HIT-V-F
HIT-V-R
HIT-V-HCR rods
(M8-M12)

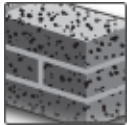


Sieve sleeve:
HIT-SC
(16)

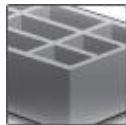
Benefits

- Hollow and solid masonry: clay bricks
- Two-component hybrid mortar
- Rapid curing
- Suitable for overhead fastenings
- Versatile and convenient handling
- Flexible setting depth and fastening thickness
- Small edge distance and anchor spacing
- Mortar filling control with HIT-SC sleeves

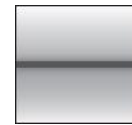
Base material



Solid bricks



Hollow bricks



Static/
quasi-static

Load conditions

Installation conditions



Hammer/rotary
drilling

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
Hilti Technical Data ^{a)}	Hilti	2017-11-28

b) All data given in this section according to Hilti Technical Data.

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 hammer mode for solid bricks
- Load values valid for holes drilled with TE rotary hammers in rotary mode for hollow bricks
- Correct anchor setting (see instruction for use, setting details)
- Steel quality of fastening elements: see data below
- Threaded rods of appropriate size (diameter and length) and a minimum steel quality of 5.6 can be used
- Base material temperature during installation and curing must be between 0°C through +40°C

Recommended loads for solid bricks

Anchor size		M8		M10		M12		
Sieve sleeve	HIT-SC	-	16x85	-	16x85	-	16x85	
Compressive strength	f_b [N/mm ²]	28	28	28	28	28	28	
Effective anchorage depth	h_{ef} [mm]	80	80	90	80	100	80	
Tensile load	40°C/24°C	N_{rec} [kN]	0,7	0,9	0,7	0,9	0,7	0,9
	80°C/50°C		0,4	0,6	0,4	0,6	0,4	0,6
Shear load	V_{rec} [kN]	1,3	1,3	1,7	1,6	2,5	1,7	

Recommended loads for hollow bricks

Anchor size		M8		M10		M12		
Hollow bricks type		HZL 12	Doppio Uni	HZL 12	Doppio Uni	HZL 12	Doppio Uni	
Sieve sleeve	HIT-SC	16x85		16x85		16x85		
Compressive strength	f_b [N/mm ²]	12	28	12	28	12	28	
Effective anchorage depth	h_{ef} [mm]	80	80	80	80	80	80	
Tensile load	40°C/24°C	N_{rec} [kN]	0,35	0,25	0,35	0,25	0,45	0,35
	80°C/50°C		0,20	0,15	0,20	0,20	0,25	0,20
Shear load	V_{rec} [kN]	1,40	0,85	1,40	0,85	1,40	0,85	

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 5,8 (F)	Strength class 5,8, 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)	Strength class 8,8, A5 > 12% ductile Electroplated zinc coated $\geq 5\mu\text{m}$ (F) Hot dip galvanized $\geq 45\mu\text{m}$
Threaded rod HIT-V-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	Strength class 70 for $\leq M24$ and class 50 for $> M24$, A5 > 8% ductile High corrosion resistance steel 1,4528; 1,4565;
Washer	Electroplated zinc coated $\geq 5\mu\text{m}$, hot dip galvanized $\geq 45\mu\text{m}$
	Stainless steel 1,4401, 1,4404, 1,4578, 1,4571, 1,4439, 1,4362 EN 10088-1:2014
	High corrosion resistant steel 1,4529, 1,4565 EN 10088-1:2014
Nut	Strength class of nut adapted to strength class of threaded rod, Electroplated zinc coated $\geq 5\mu\text{m}$, hot dip galvanized $\geq 45\mu\text{m}$
	Strength class of nut adapted to strength class of threaded rod, Stainless steel 1,4401, 1,4404, 1,4578, 1,4571, 1,4439, 1,4362 EN 10088-1:2014
	Strength class of nut adapted to strength class of threaded rod, High corrosion resistant steel 1,4529, 1,4565 EN 10088-1:2014
HIT-SC sleeve	Frame: FPP 20T, Sieve: PA6,6 N500/200

Setting information

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

Service temperature range

Hilti HIT-1 / HIT-1 CE 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,

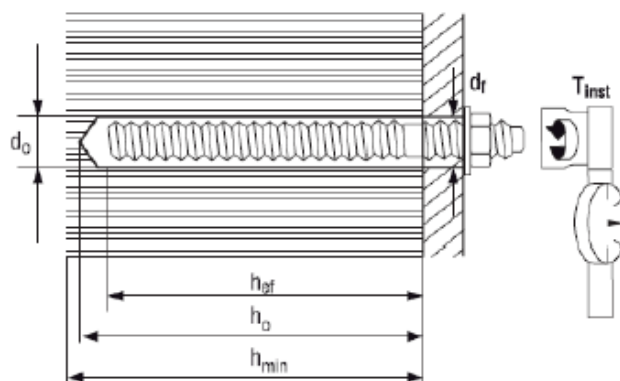
Temperature range	Base material temperature	Maximum long term base material temperature	Maximum short term base material temperature
Temperature range I	-40 °C to +40 °C	+24 °C	+40 °C
Temperature range II	-40 °C to +80 °C	+50 °C	+80 °C

Working time and curing time:

Temperature of the base material	Maximum working time t_{work}	Minimum curing time t_{cure}
$0^{\circ}\text{C} \leq T_{BM} < 5^{\circ}\text{C}$	45 min	3 h
$5^{\circ}\text{C} \leq T_{BM} < 10^{\circ}\text{C}$	25 min	2 h
$10^{\circ}\text{C} \leq T_{BM} < 20^{\circ}\text{C}$	15 min	100 min
$20^{\circ}\text{C} \leq T_{BM} < 30^{\circ}\text{C}$	6 min	45 min
$30^{\circ}\text{C} \leq T_{BM} < 40^{\circ}\text{C}$	2 min	25 min

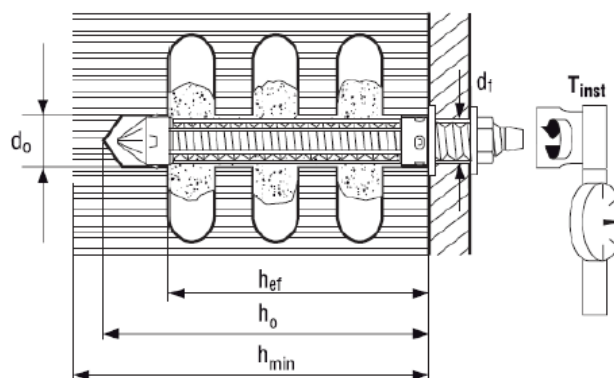
Setting details for solid bricks

Anchor size	HIT-SC		M8		M10		M12	
			-	16x85	-	16x85	-	16x85
Sieve sleeve			-	16x85	-	16x85	-	16x85
Nominal diameter of drill bit	d_0	[mm]	10	16	12	16	14	18
Max, diameter of clearance hole in the fixture	d_f	[mm]	9	9	12	12	14	14
Effective anchorage depth	h_{ef}	[mm]	80	80	90	80	100	80
Hole depth	h_0	[mm]	80	95	90	95	100	95
Minimum base material thickness	h_{min}	[mm]	115	115	115	115	115	115
Torque moment	T_{max}	[Nm]	6	6	10	8	10	8



Setting details for hollow bricks

Anchor Size	M8		M10		M12	
	HLZ2	Doppio Uni	HLZ2	Doppio Uni	HLZ2	Doppio Uni
Sieve sleeve	HIT-SC		16x85		16x85	
Nominal diameter of drill bit	d_o	[mm]	16	16	18	
Max, diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	
Effective anchorage 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	
Torque moment	T_{max}	[Nm]	4	4	4	



Installation equipment

Anchor – size	M8	M10	M12
Rotary hammer	TE2(-A) – TE30(-A)		
Other tools	Blow out pump Set of cleaning brushes, dispenser		

Cleaning and setting parameters for solid and hollow bricks

HIT-V	Sieve sleeve HIT-SC	Drill and clean [mm]	
		Hammer drilling	Brush HIT-RB
M8 ^{a)}	-	10	10
M10 ^{a)}	-	12	12
M12 ^{a)}	-	14	14
M8	HIT-SC 16x85	16	16
M10	HIT-SC 16x85	16	16
M12	HIT-SC 18x85	18	18

a) Installation without the sieve sleeve HIT-SC can be used only in case of solid bricks.

Setting instructions

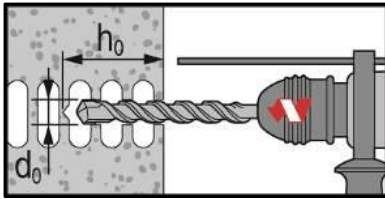
*For detailed information on installation see instruction for use given with the package of the product.



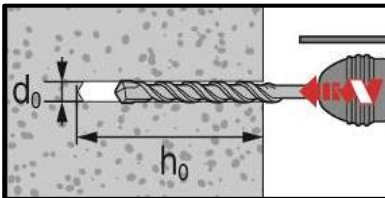
Safety regulations.

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-1 / HIT-1 CE.

Drilling

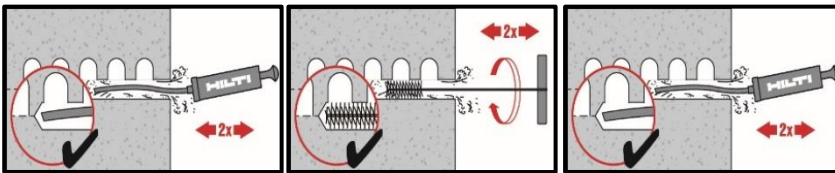


In hollow bricks: rotary mode



In solid bricks: hammer mode

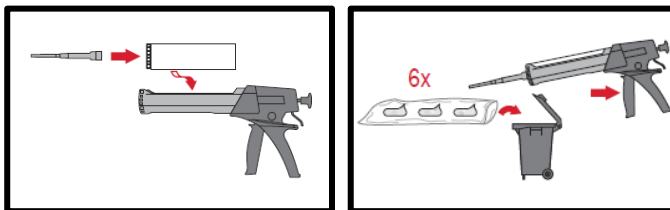
Cleaning



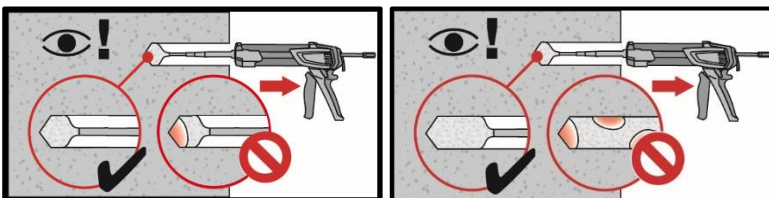
Manual cleaning (MC)

Instructions for solid bricks without sieve sleeve

Injection system

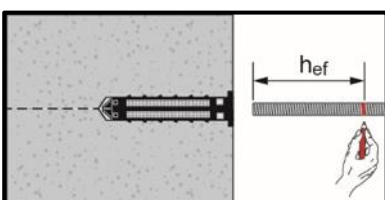


Injection system preparation.

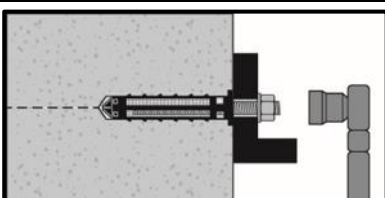


Injection method for drill hole

Setting the element



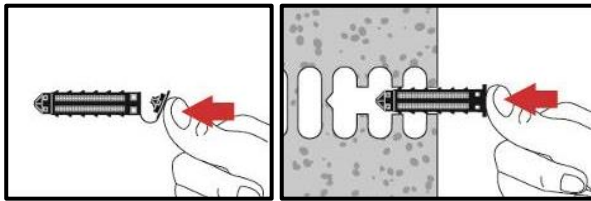
Presetting element, observe working time " t_{work} ",



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

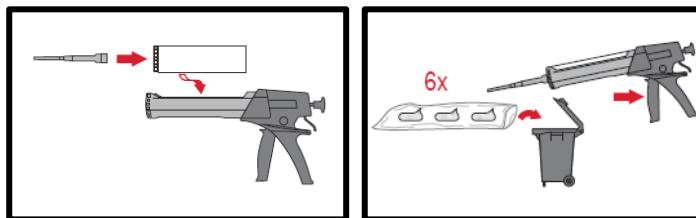
Instructions for hollow and solid bricks with sieve sleeve

Preparation of the sieve sleeve



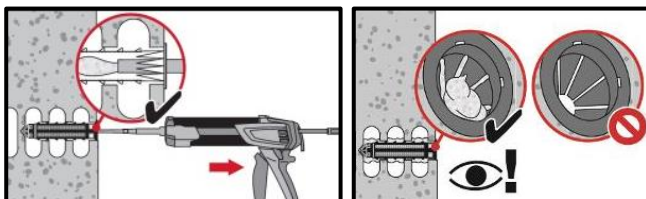
Close lid and insert sieve sleeve manually

Injection system



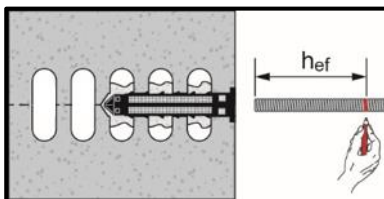
Injection system preparation.

Injection system: hollow bricks

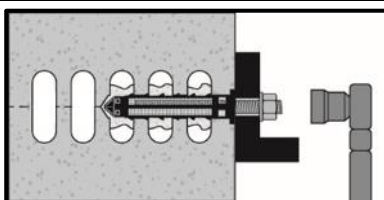


Installation with sieve sleeve HIT-SC

Setting the element



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



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