
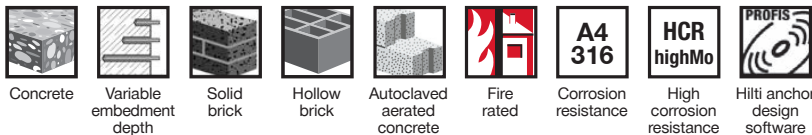


HIT-HY 70 injection mortar for masonry

Injection Mortar System	Benefits
 <p>Hilti HIT-HY 70 330 ml foil pack (also available as 500 ml and 1400 ml foil pack)</p>	<ul style="list-style-type: none"> ■ chemical injection fastening for all type of base materials: <ul style="list-style-type: none"> - hollow and solid - clay bricks, sand-lime bricks, normal and light weight concrete blocks, aerated light weight concrete, natural stones
 <p>Mixer</p>	<ul style="list-style-type: none"> ■ two-component hybrid mortar ■ rapid curing
 <p>HIT-V (Zinc) HIT-V-F (Gal) HIT-V-R (A4-70)</p>	<ul style="list-style-type: none"> ■ versatile and convenient handling ■ flexible setting depth and fastening thickness
 <p>HAS-E (Zinc) HAS-E-F (Gal) HAS-E-R (A4-70)</p>	<ul style="list-style-type: none"> ■ small edge distance and anchor spacing ■ mortar filling control with HIT-SC sleeves
 <p>HIT-AC, HIT-ACR rod</p>	<ul style="list-style-type: none"> ■ suitable for overhead fastenings ■ in-service temperatures: <ul style="list-style-type: none"> short time: max.120°C long term: max 72°C
 <p>HIT-IC internal threaded sleeve</p>	
 <p>HIS-RN sleeve</p>	
 <p>HIT-SC composite sleeve</p>	



Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
Allgemeine bauaufsichtliche Zulassung (national German approval)	DIBt, Berlin	Z-21.3-1830 / 2009-01-20
Fiche technique SOCOTEC	SOCOTEC, Paris	YX 0047 08.2006
Fire test report	MFPA, Leipzig	PB III/B-07-157 / 2007-06-04
Assessment report (fire)	warringtonfire	WF 166402 / 2007-10-26




Basic loading data for single anchor in masonry units

All data in this section applies to

- Load values valid for holes drilled with TE rotary hammers in hammering mode
- Correct anchor setting (see instruction for use, setting details)
- Steel quality of fastening elements: see data below
- Steel quality for screws for HIT-IG, 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 5.8 can be used
- Base material temperature during installation and curing must be between -5°C through +40°C

Recommended loads ^{a)} F_{rec} for brick breakout and pull out in [kN]

Hollow masonry: HIT-HY 70 with HIT-SC and HIT-AC / HIT-V, HAS, HAS-E and HIT-IG / HIT-IC

Anchor size			HIT-AC, HIT-V, HAS, HAS-E					HIT-IG / HIT-IC			
			M6	M8	M10	M12		M8	M10		M12
Base material	Setting depth [mm]		HIT-SC	HIT-SC	HIT-SC	HIT-SC	HIT-SC	HIT-SC	HIT-SC	HIT-SC	HIT-SC
			12x...	16x...	16x...	18x...	22x...	16x...	18x... ^{c)}	22x...	22x...
Fire light brick Scoria Blend $f_{uc}^{b)} \geq 4 \text{ N/mm}^2$ L x H x B [mm] 230 x 110 x 119  (Shell thickness 19 mm) Australia	50	N _{rec} [kN]	0.5	0.5	0.5	0.8	0.8	-	-	-	-
		V _{rec} [kN]	1.0	1.5	1.5	1.5	2.0	-	-	-	-
	80	N _{rec} [kN]	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
		V _{rec} [kN]	Towards free edge c _{min} = 200	1.25	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		No free edges	1.25	2.5	2.8	3.0	3.0	2.5	2.8	2.8	3.0
Hollow Block $f_{uc}^{b)} \geq 10 \text{ N/mm}^2$ L x H x B [mm] 390 x 190 x 190  (Shell thickness 30 mm) Australia	50	N _{rec} [kN]	0.6	0.6	0.6	0.6	0.6	-	-	-	-
		V _{rec} [kN]	1.0	1.5	1.5	1.5	2.0	-	-	-	-
	80	N _{rec} [kN]	0.6	0.9	0.9	1.7	1.7	0.9	1.7	1.7	1.7
		V _{rec} [kN]	Towards free edge c _{min} = 200	1.25	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		No free edges	1.25	2.5	2.8	3.0	3.0	2.5	2.8	2.8	3.0
Clay common (Standard) $f_{uc}^{b)} \geq 20 \text{ N/mm}^2$ L x H x B [mm] 230 x 110 x 76  (Shell thickness 20 mm) Australia	50	N _{rec} [kN]	1.5	1.5	1.5	1.5	1.5	-	-	-	-
		V _{rec} [kN]	2.0	2.0	2.0	2.0	2.0	-	-	-	-
	80	N _{rec} [kN]	2.0	3.0	3.0	3.0	4.0	3.0	4.0	4.0	4.0
		V _{rec} [kN]	Towards free edge c _{min} = 200	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		No free edges	2.0	3.5	5.5	7.5	7.5	3.5	5.5	5.5	7.5


a) Recommended load values with consideration of a global safety factor $\gamma_{global} = 3.0$: $F_{rec} = F_{Rk} / \gamma_{global}$

b) f_{uc} = unconfined compressive strength

c) HIT-SC 18x ... with HIT-IC M10 only! HIT-IG M10 elements do not fit.

Recommended loads ^{a)} F_{rec} for brick breakout and pull out in [kN]

Solid masonry: HIT-HY 70 with HIT-AC / HIT-V, HAS, HAS-E and HIT-IG / HIT-IC

Anchor size			HIT-AC, HIT-V, HAS, HAS-E				HIT-IG / HIT-IC		
Base material	Setting depth [mm]		M6	M8	M10	M12	M8	M10	M12
Clay common (Dry pressed) $f_{uc}^{b)} \geq 14 \text{ N/mm}^2$ L x H x B [mm] 230 x 110 x 76  Australia	80	N_{rec} [kN]	-	2.5	3.0	4.0	2.5	3.0	4.0
	V_{rec} [kN]	Towards free edge $c_{min} = 200$	-	2.0	2.0	2.0	2.0	2.0	2.0
		No free edges	-	3.5	5.5	7.5	3.5	5.5	7.5

a) Recommended load values with consideration of a global safety factor $\gamma_{global} = 3.0$: $F_{rec} = F_{Rk} / \gamma_{global}$

b) f_{uc} = unconfined compressive strength

Design

Influence of joints:

If the joints of the masonry are not visible the recommended load N_{rec} has to be reduced with the factor $\alpha_j = 0.75$.

If the joints of the masonry are visible (e.g. unplastered wall) following has to be taken into account:

- The recommended load N_{rec} may be used only, if the wall is designed such that the joints are to be filled with mortar.
- If the wall is designed such that the joints are not to be filled with mortar then the recommended load N_{rec} may be used only, if the minimum edge distance c_{min} to the vertical joints is observed. If this minimum edge distance c_{min} can not be observed then the recommended load N_{rec} has to be reduced with the factor $\alpha_j = 0.75$.

The decisive resistance to tension loads is the lower value of N_{rec} (brick breakout, pull out) and $N_{max,pb}$ (pull out of one brick).

Pull out of one brick:

The allowable load of an anchor or a group of anchors in case of pull out of one brick, $N_{max,pb}$ [kN], is given in the following tables:

Clay bricks:

$N_{max,pb}$ [kN]		brick breadth b_{brick} [mm]					
		80	120	200	240	300	360
brick length l_{brick} [mm]	240	1.1	1.6	2.7	3.3	4.1	4.9
	300	1.4	2.1	3.4	4.1	5.1	6.2
	500	2.3	3.4	5.7	6.9	8.6	10.3

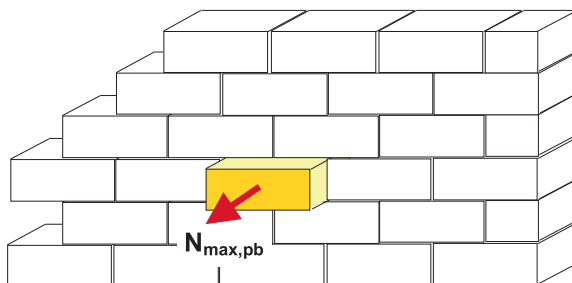
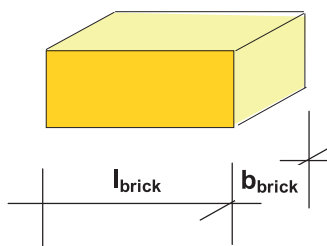
All other brick types:

$N_{max,pb}$ [kN]		brick breadth b_{brick} [mm]					
		80	120	200	240	300	360
brick length l_{brick} [mm]	240	0.8	1.2	2.1	2.5	3.1	3.7
	300	1.0	1.5	2.6	3.1	3.9	4.6
	500	1.7	2.6	4.3	5.1	6.4	7.7

$N_{max,pb}$ = resistance for pull out of one brick

l_{brick} = length of the brick

b_{brick} = breadth of the brick



For all applications outside of the above mentioned base materials and / or setting conditions site tests have to be made for the determination of load values.

Materials

Material quality HAS

Part	Material
Threaded rod HAS-(E), HAS-(E)-(F)	Strength class 5.8, EN ISO 898-1, A5 > 8% ductile steel galvanized $\geq 5 \mu\text{m}$, EN ISO 4042 (F) hot dipped galvanized $\geq 45 \mu\text{m}$, EN ISO 10684
Threaded rod HAS-(E)R	Stainless steel grade A4, A5 > 8% ductile strength class 70, EN ISO 3506-1, EN 10088: 1.4401
Washer ISO 7089	Steel galvanized, EN ISO 4042;
	Stainless steel, EN 10088: 1.4401
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: 1.4401
	Strength class 70, EN ISO 3506-2, high corrosion resistant steel, EN 10088: 1.4529; 1.4565

Material quality HIT-A

Part	Material
HIT-AC rod	Carbon steel grade 5.8; galvanized to min. $5 \mu\text{m}$
HIT-ACR rod	Stainless steel, grade A4-70; 1.4401
HIT-AN rod	Carbon steel grade 3.6; galvanized to min. $5 \mu\text{m}$

Material quality sleeves

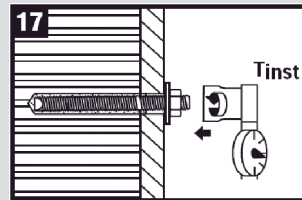
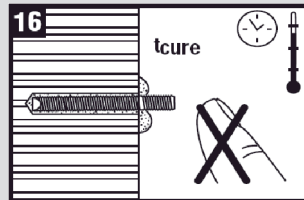
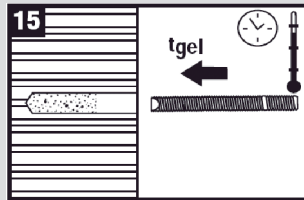
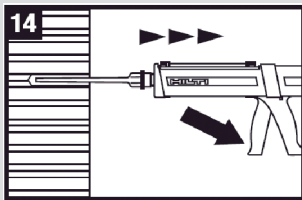
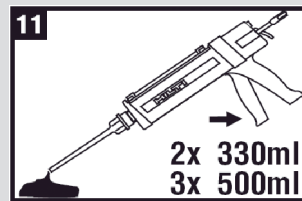
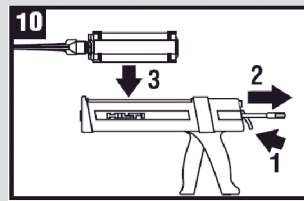
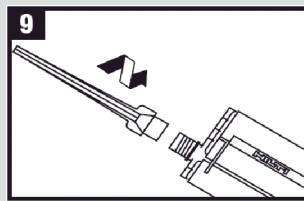
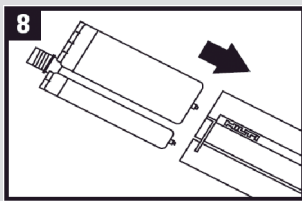
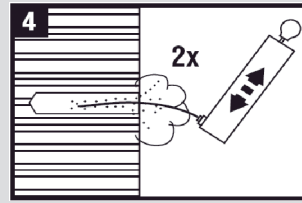
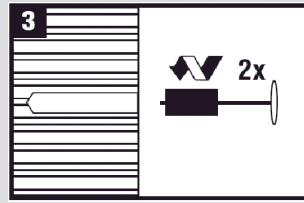
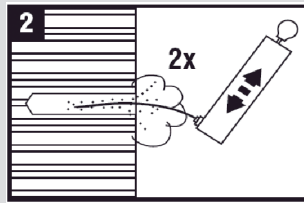
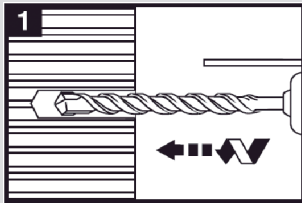
Part	Material
HIT-IG sleeve	Carbon steel 1.0718; galvanized to min. $5 \mu\text{m}$
HIT-IC sleeve	Carbon steel; galvanized to min. $5 \mu\text{m}$
HIT-SC sleeve	PA/PP

Setting

Installation equipment

Anchor size	M6	M8	M10	M12
Rotary hammer	TE2 - TE16			
Other tools	blow out pump, set of cleaning brushes, dispenser			

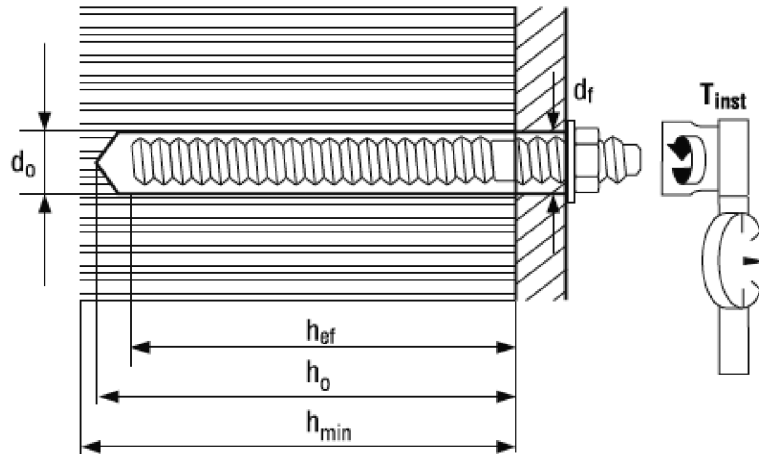
Setting instructions in solid base materials



15	°F	°C	t _{gel}
	23	-5	10 min
	32	0	10 min
	41	5	10 min
	50	10	7 min
	68	20	4 min
	86	30	2 min
104	40	1 min	

16	°F	°C	t _{cure}
	23	-5	6 h
	32	0	4 h
	41	5	2.5 h
	50	10	1.5 h
	68	20	45 min
	86	30	30 min
104	40	20 min	

Setting details: hole depth h_0 and effective anchorage depth in solid base materials



Setting details HIT-AC, HIT-V, HAS-E, HAS-E-F, HAS-E-R

Anchor size		HIT-AC, HIT-V			HIT-V, HAS-E, HAS-E-F, HAS-E-R ^{c)}			
		M8	M10	M12	M8	M10	M12	M16
Nominal diameter of drill bit	d_0 [mm]	10	12	14	10	12	14	18
Effective anchorage 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]	110	110	110	110	120	140	170
Diameter of clearance hole in the fixture	d_f [mm]	9	12	14	9	12	14	18
Minimum spacing ^{a), b)}	s_{min} [mm]	100	100	100	100	100	100	100
Minimum edge distance ^{a)}	c_{min} [mm]	100	100	100	100	100	100	100
Torque moment	T_{inst} [Nm]	5	8	10	5	8	10	10
Filling volume	[ml]	4	5	7	4	6	10	15

a) In case of **shear loads towards a free edge: $c_{min} = 200$ mm**

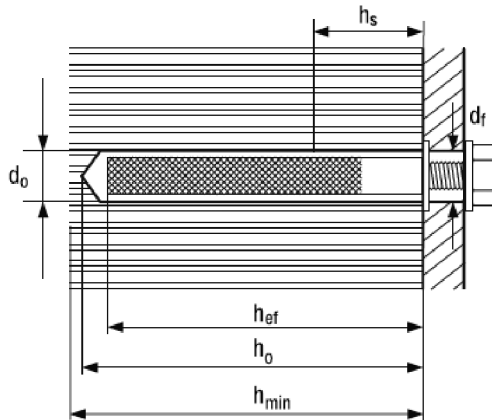
A distance from the edge of a broken brick of $c_{min} = 200$ mm is recommended, e.g. around window or door frames.

b) Recommend to place one anchor per brick, in the middle of the brick face.

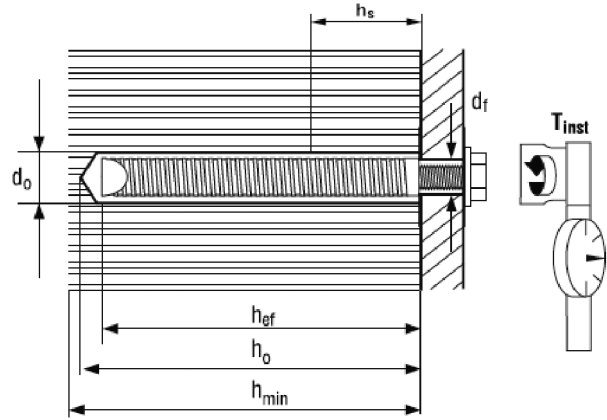
c) Refer the Recommended loads table for the required setting depth.



HIT-IG, HIT-IC



HIS-N/RN



Setting details HIT-IG, HIT-IC

Anchor size		HIT-IG			HIT-IC			HIS-N/RN ^{c)}		
		M8	M10	M12	M8	M10	M12	M8	M10	M12
Nominal diameter of drill bit	d _o [mm]	14	18	18	14	16	18	14	18	22
Effective anchorage depth	h _{ef} [mm]	80	80	80	80	80	80	90	110	125
Hole depth	h _o [mm]	85	85	85	85	85	85	95	115	130
Minimum base material thickness	h _{min} [mm]	110	110	110	110	110	110	120	150	170
Diameter of clearance hole in the fixture	d _f [mm]	9	12	14	9	12	14	9	12	14
Length of bolt engagement	h _s [mm]	min. 10 – max. 75			min. 10 – max. 75			min. 8 max.20	min. 10 max.25	min. 12 max.30
Minimum spacing ^{a), b)}	s _{min} [mm]	100	100	100	100	100	100	100	100	100
Minimum edge distance ^{a)}	c _{min} [mm]	100	100	100	100	100	100	100	100	100
Torque moment	T _{inst} [Nm]	5	8	10	5	8	10	5	8	10
Filling volume	[ml]	6	6	6	6	6	6	6	10	16

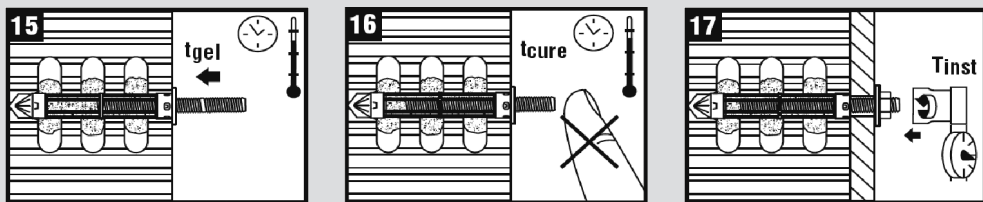
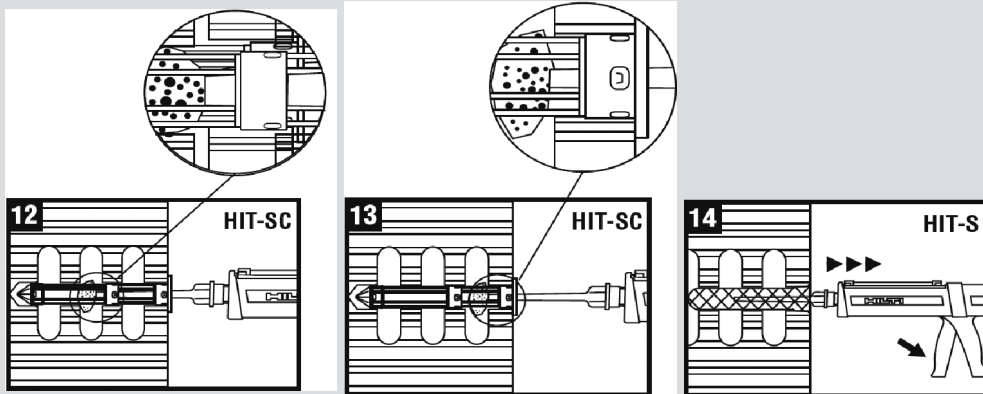
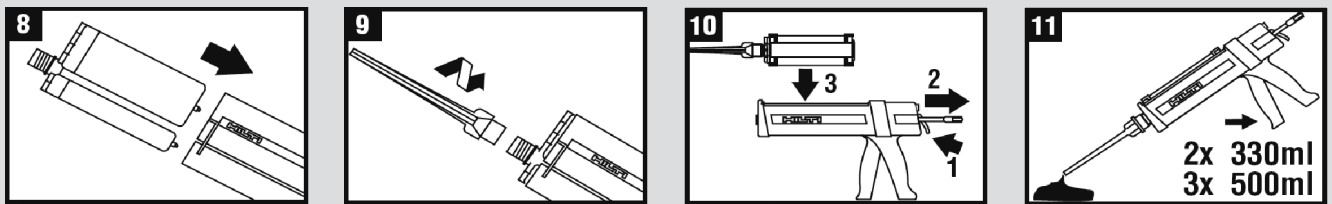
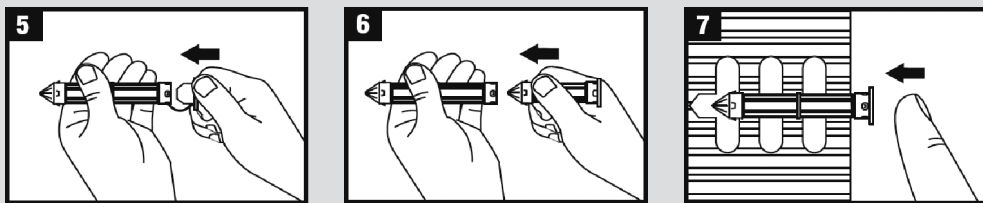
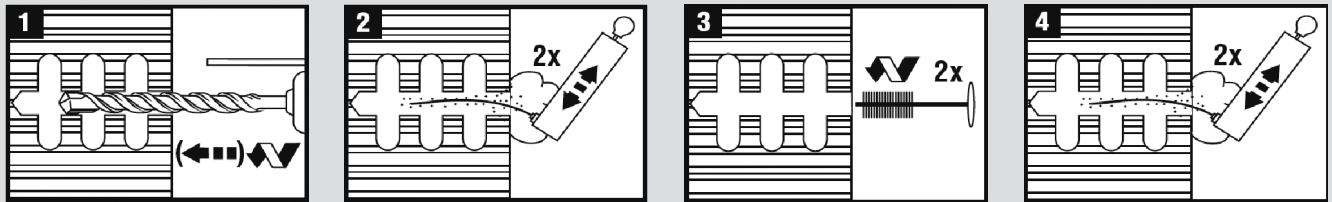
a) In case of **shear loads towards a free edge: c_{min} = 200 mm**

A distance from the edge of a broken brick of c_{min} = 200 mm is recommended, e.g. around window or door frames.

b) Recommend to place one anchor per brick, in the middle of the brick face.

c) Refer the Recommended loads table for the required setting depth.

Setting instruction in hollow base material – using 330 ml foil pack



15	°F	°C	t _{gel}
	23	-5	10 min
	32	0	10 min
	41	5	10 min
	50	10	7 min
	68	20	4 min
	86	30	2 min
	104	40	1 min

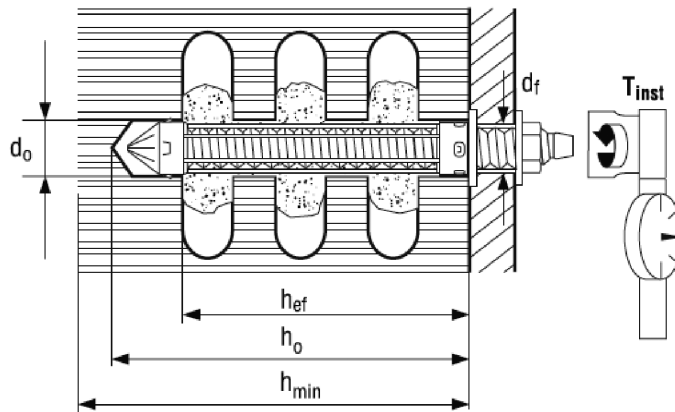
16	°F	°C	t _{cure}
	23	-5	6 h
	32	0	4 h
	41	5	2.5 h
	50	10	1.5 h
	68	20	45 min
	86	30	30 min
	104	40	20 min

Setting details: hole depth h_0 and effective anchorage depth in hollow base materials

HAS-E / HIT-AC with HIT-SC



HIT-AC, HIT-V, HAS-E



Setting details HIT-V / HAS-E / HIT-A...with sieve sleeve

Anchor size		M6		M8		M10		M12			
Sieve sleeve HIT SC		12x50	12x85	16x50	16x85	16x50	16x85	18x50	18x85	22x50	22x85
Nominal diameter of drill bit	d_0 [mm]	12	12	16	16	16	16	18	18	22	22
Effective anchorage depth	h_{ef} [mm]	50	80	50	80	50	80	50	80	50	80
Hole depth	h_0 [mm]	60	95	60	95	60	95	60	95	60	95
Minimum base material thickness	h_{min} [mm]	80	110	80	110	80	110	80	110	80	110
Diameter of clearance hole in the fixture	d_f [mm]	7	7	9	9	12	12	14	14	14	14
Minimum spacing ^{a), b)}	s_{min} [mm]	100	100	100	100	100	100	100	100	100	100
Minimum edge distance ^{a)}	c_{min} [mm]	100	100	100	100	100	100	100	100	100	100
Torque moment	T_{inst} [Nm]	3	3	3	3	4	4	6	6	6	6
Filling volume	[ml]	12	24	18	30	18	30	18	36	30	55

a) In case of **shear loads towards a free edge**: $c_{min} = 200$ mm

A distance from the edge of a broken brick of $c_{min} = 200$ mm is recommended, e.g. around window or door frames.

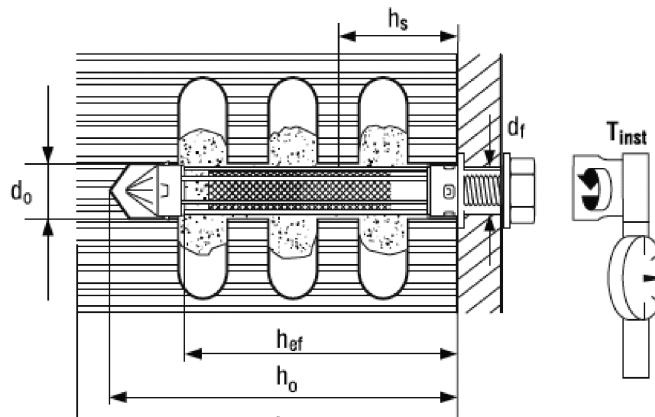
b) Recommended one anchor per brick in the middle of the brick face. In the case of hollow concrete blocks one anchor per cavity in the middle of each cavity face.

Setting details: hole depth h_0 and effective anchorage depth in hollow base materials

HIT-IG / HIT-IC with HIT-SC



HIT-IG / HIT-IC



Setting details HIT-IG / HIT-IC with sieve sleeve

Anchor size		HIT-IG			HIT-IC		
		M8	M10	M12	M8	M10	M12
Sieve sleeve HIT SC		16x85	22x85	22x85	16x85	18x85	22x85
Nominal diameter of drill bit	d_0 [mm]	16	22	22	16	18	22
Effective anchorage depth	h_{ef} [mm]	80	80	80	80	80	80
Hole depth	h_0 [mm]	95	95	95	95	95	95
Minimum base material thickness	h_{min} [mm]	110	110	110	110	110	110
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. 10 – max. 75		
Minimum spacing ^{a), b)}	s_{min} [mm]	100	100	100	100	100	100
Minimum edge distance ^{a)}	c_{min} [mm]	100	100	100	100	100	100
Torque moment	T_{inst} [Nm]	3	4	6	3	4	6
Filling volume	[ml]	30	45	45	30	36	45

a) In case of **shear loads towards a free edge**: $c_{min} = 200$ mm

A distance from the edge of a broken brick of $c_{min} = 200$ mm is recommended, e.g. around window or door frames.

b) Recommended one anchor per brick in the middle of the brick face. In the case of hollow concrete blocks one anchor per cavity in the middle of each cavity face.