Designated according to The Construction Products (Amendment etc.) (EU Exit) Regulations 2020

UK Technical Assessment	UKTA-0836-23/6695 of 22/06/2023
Technical Assessment Body issuing the UK Technical Assessment:	British Board of Agrément
Trade name of the construction product:	Hilti HIT-HY 170 with HAS-U
Product family to which the construction product belongs:	Bonded fastener for use in concrete
Manufacturer:	Hilti AG Feldkircherstraße 100 9494 Schaan FÜRSTENTUM LIECHTENSTEIN
Manufacturing plant(s):	Hilti plants
This UK Technical Assessment contains:	20 pages including 3 Annexes which form an integral part of this assessment.
This UK Technical Assessment is issued in accordance with The Construction Products (Amendment etc.) (EU Exit) Regulations 2020 on the basis of:	UKAD 330499-01-0601 Bonded fasteners for use in concrete

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1. Technical description of the product

The Injection system Hilti HIT-HY 170 is a bonded anchor consisting of a foil pack with injection mortar Hilti HIT-HY 170 and a steel element according to Annex A.

The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between metal part, injection mortar and concrete.

The product description is given in Annex A.

2. Specification of the intended use(s) in accordance with the applicable UK Assessment Document (hereinafter UKAD)

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this UK Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3. Performance of the product and references to the methods used for its assessment

3.1. Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for static and quasi-static tension load	See Annex C1
Characteristic resistance for static and quasi-static shear load	See Annex C2
Displacements for static and quasi-static loads	See Annex C2
Characteristic resistance for seismic performance category C1	No performance assessed
Characteristic resistance for seismic performance category C2	See Annex C3
Durability	See Annex B2

3.2. Safety in case of fire (BWR 2)

Not relevant.

3.3. Health, hygiene and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed

3.4. Safety and accessibility in use (BWR 4)

Not relevant.

3.5. Protection against noise (BWR 5)

Not relevant.

3.6. Energy economy and heat retention (BWR 6)

Not relevant.

3.7. Sustainable use of natural resources (BWR 7)

No performance assessed.

4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied.

4.1. System of assessment and verification of constancy of performance

According to UKAD No. 330499-01-0601 and Annex V of the Construction Products Regulation (Regulation (EU) 305/2011) as brought into UK law and amended, the system of assessment and verification of constancy of performance (AVCP) 1 applies.

5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable UKAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with the British Board of Agrément and made available to the UK Approved Bodies involved in the conformity attestation process.

5.1. UKCA marking for the product/ system must contain the following information:

- Identification number of the Approved Body
- Name/ registered address of the manufacturer of the product/ system
- Marking including date of Marking and the intended use as stated in the Designated technical specification
- Unique identification code of the product type
- The reference number of the Declaration of Performance
- The level or class of the performance declared
- The reference to the Designated technical specification applied
- UKTA number.

On behalf of the British Board of Agrément 	
Date of Issue: 22 June 2023	**Hardy Giesler** Chief Executive Officer

British Board of Agrément,
1st Floor Building 3,
Hatters Lane,
Croxley Park
Watford
WD18 8YG

ANNEX A1
Product description
Installed condition.

This annex applies to the product described in the main body of the UK Technical Assessment.

Installed condition

Figure A1:
HAS-U… and AM 8.8

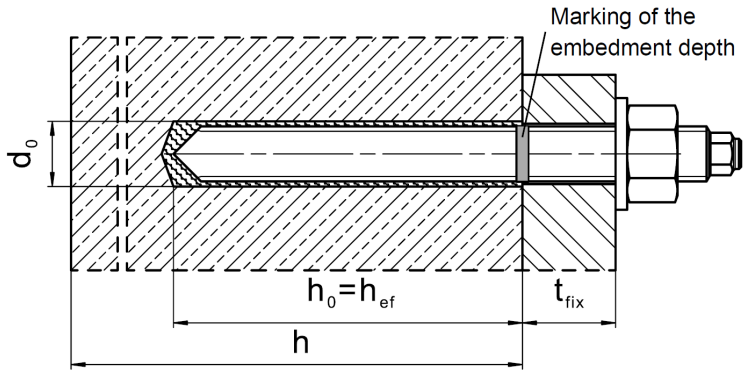
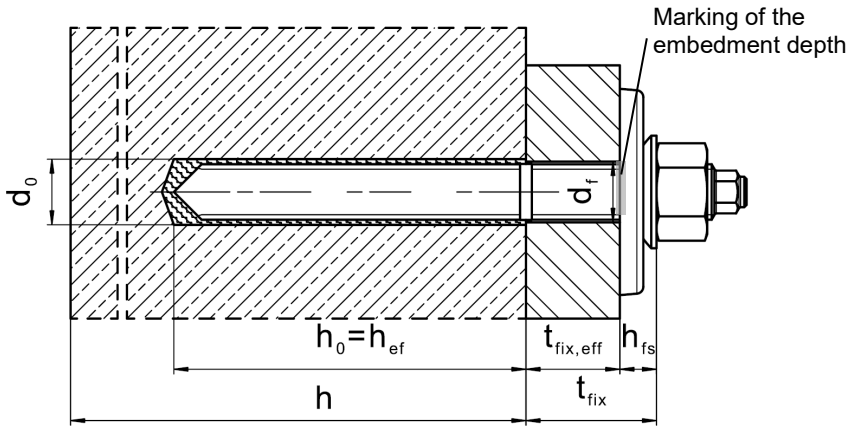


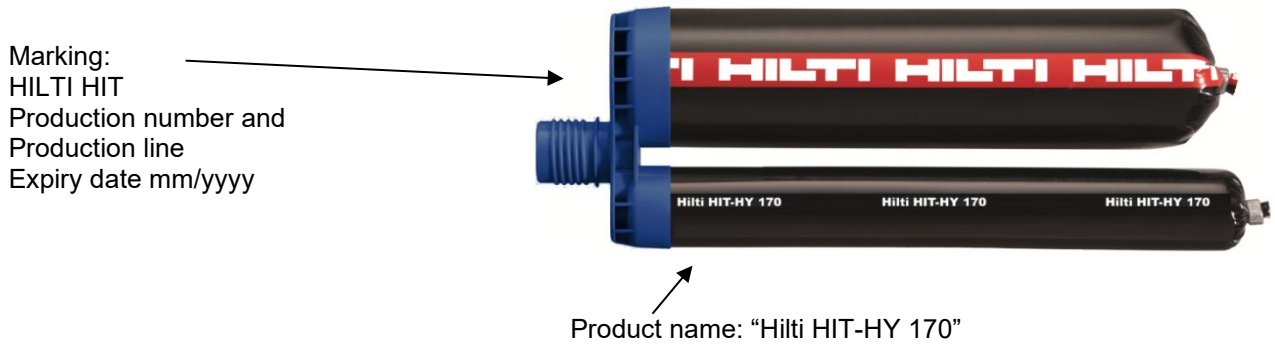
Figure A2:
HAS-U… and AM 8.8 with Hilti Filling Set



ANNEX A2
Product description
Injection mortar / Static mixer / Steel elements

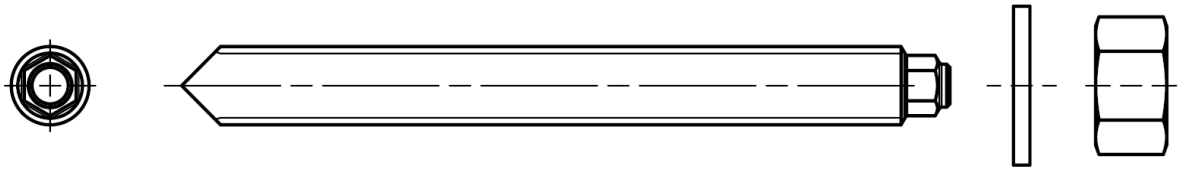
This annex applies to the product described in the main body of the UK Technical Assessment.

Product description: Injection mortar and steel elements
Injection mortar Hilti HIT-HY 170: Hybrid system with aggregate
330 ml and 500 ml

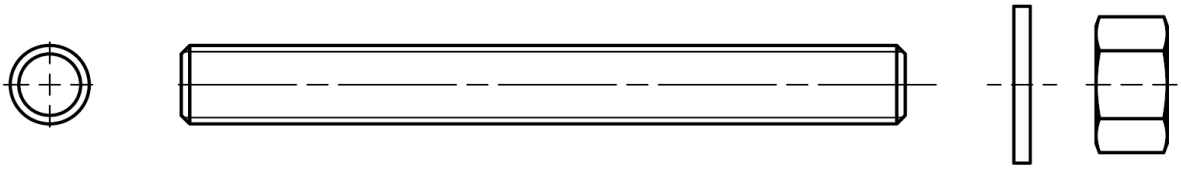


Static mixer Hilti HIT-RE-M

Steel elements



HAS-U…: M8 to M24



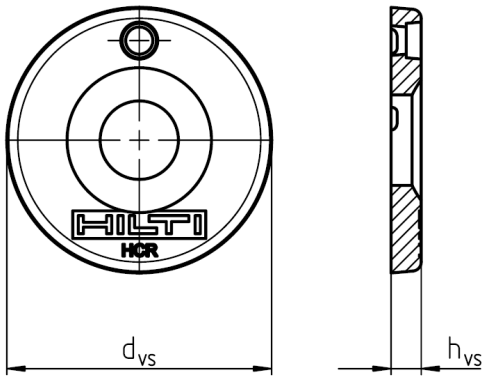
AM 8.8: M8 to M24

ANNEX A3
Product description
Steel elements

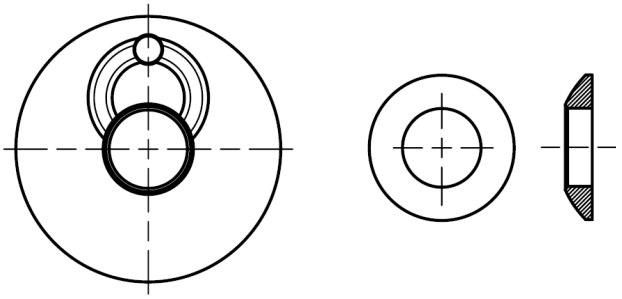
This annex applies to the product described in the main body of the UK Technical Assessment.

Hilti Filling Set to fill the annular gap between anchor and fixture

Sealing washer



Spherical washer



Hilti Filling Set			**M12**	**M16**
Diameter of sealing washer	d_{vs}	[mm]	44	56
Thickness of sealing washer	h_{vs}	[mm]	5	6
Thickness of Hilti Filling Set	h_{fs}	[mm]	10	11

ANNEX A4
Product description
Materials

This annex applies to the product described in the main body of the UK Technical Assessment.

Table A1: Materials

Designation	**Material**
Metal parts made of zinc coated steel	
HAS-U 5.8 (HDG)	Strength class 5.8, f_{uk} = 500 N·mm^{-2}; f_{yk} = 400 N·mm^{-2} Elongation at fracture (l_0=5d) > 8% ductile Electroplated zinc coated ≥ 5 μm, (HDG) Hot dip galvanized ≥ 45 μm
HAS-U 8.8 (HDG)	Strength class 8.8 , f_{uk} = 800 N·mm^{-2}, f_{yk} = 640 N·mm^{-2} Elongation at fracture (l_0=5d) > 12% ductile Electroplated zinc coated ≥ 5 μm, (HDG) Hot dip galvanized ≥ 45 μm
AM 8.8 (HDG)	Strength class 8.8, f_{uk} = 800 N·mm^{-2}, f_{yk} = 640 N·mm^{-2} Elongation at fracture (l_0 = 5d) > 12% ductile, Electroplated zinc coated ≥ 5 μm, (HDG) 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 ≥ 5 μm Hot dip galvanized ≥ 45 μm
Hilti Filling Set (F)	Filling washer: Electroplated zinc coated ≥ 5 μm, (F) hot dip galvanized ≥ 45 μm Spherical washer: Electroplated zinc coated ≥ 5 μm, (F) hot dip galvanized ≥ 45 μm Lock nut: Electroplated zinc coated ≥ 5 μm, (F) hot dip galvanized ≥ 45 μm
Metal parts made of stainless-steel corrosion resistance class III according to EN 1993-1-4:2006+A1:2015	
HAS-U A4	Strength class 70, f_{uk} = 700 N·mm^{-2}, f_{yk} = 450 N·mm^{-2} Elongation at fracture (l_0=5d) > 8% ductile
Washer	Stainless steel 1.4401, 1.4404, 1.4578, 1.4571, 1.4439, 1.4362 EN 10088-1:2014
Nut	Strength class 70, f_{uk} = 700 N·mm^{-2}, f_{yk} = 450 N·mm^{-2}; Stainless steel 1.4401, 1.4404, 1.4578, 1.4571, 1.4439, 1.4362 EN 10088-1:2014
Metal parts made of high corrosion resistant steel corrosion resistance class V according to EN 1993-1-4:2006+A1:2015	
HAS-U HCR	For ≤ M20: f_{uk} = 800 N·mm^{-2}, f_{yk} = 640 N·mm^{-2}, For > M20: f_{uk} = 700 N·mm^{-2}, f_{yk} = 400 N·mm^{-2}, Elongation at fracture (l_0=5d) > 8% ductile
Washer	High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014
Nut	For ≤ M20: f_{uk} = 800 N·mm^{-2}, f_{yk} = 640 N·mm^{-2}, For > M20: f_{uk} = 700 N·mm^{-2}, f_{yk} = 400 N·mm^{-2}, High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014

ANNEX B1
Intended Use
Specifications.

This annex applies to the product described in the main body of the UK Technical Assessment.

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loading: M8 to M24.
- Seismic performance category C2: M12 and M16.

Base material:

- Compacted reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013 + A1:2016.
- Strength classes C20/25 to C50/60 according to EN 206:2013 + A1:2016.
- Cracked and uncracked concrete.

Temperature in the base material:

- **At installation**
  0 °C to +40 °C for the standard variation of temperature after installation
- **In-service**
  Temperature range I: -40 °C to +40 °C
  (Maximum long term temperature +24 °C and maximum short term temperature +40 °C)
  Temperature range II: -40 °C to +80 °C
  (Maximum long term temperature +50 °C and maximum short term temperature +80 °C)

Table B1: Specifications of intended use

	HIT-HY 170 with …
Elements	HAS-U…, AM 8.8 
Hammer drilling with hollow drill bit TE-CD or TE-YD 	✓
Hammer drilling mode	✓
Static and quasi-static loading in uncracked concrete	M8 to M24
Static and quasi-static loading in cracked concrete	M10 to M16
Seismic performance category C2	M12 and M16

ANNEX B2
Intended Use
Specifications

This annex applies to the product described in the main body of the UK Technical Assessment.

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (all materials).
- For all other conditions according to EN 1993-1-4:2006+A1:2015-06 corresponding to corrosion resistance classes Table A1 Annex A4 (stainless steels).

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.).
- The anchorages are designed in accordance with:
  EN 1992-4:2018 and EOTA Technical Report TR 055.

Installation:

- Use category: dry or wet concrete (not in flooded holes) for all drilling techniques.
- Drilling technique:
  - Hammer drilling,
  - Hammer drilling with Hilti hollow drill bit TE-CD, TE-YD
- Installation direction D3: downward, horizontal and upward (e.g. overhead) installation admissible for all elements.

Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

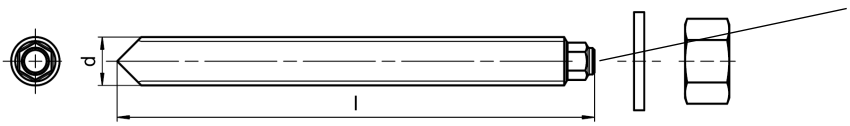
ANNEX B3
Intended Use
Installation parameters of HAS-U… and AM 8.8
Maximum working time and minimum curing time

This annex applies to the product described in the main body of the UK Technical Assessment.

Table B2: Installation parameters of HAS-U… and AM 8.8

HAS-U… and AM 8.8			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Diameter of element	d	[mm]	8	10	12	16	20	24
Nominal diameter of drill bit	d_0	[mm]	10	12	14	18	22	28
Range of effective embedment depth and depth of drilled hole	$h_{ef} = h_0$	[mm]	60 to 96	60 to 120	70 to 144	80 to 192	90 to 240	96 to 288
Maximum diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22	26
Thickness of Hilti Filling Set	h_{fs}	[mm]	-	-	10	11	-	-
Effective fixture thickness with Hilti Filling Set	$t_{fix,ef}$	[mm]	$t_{fix,ef} = t_{fix} - h_{fs}$					
Minimum thickness of concrete member	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			$h_{ef} + 2 \cdot d_0$		
Maximum torque moment	T_{max}	[Nm]	10	20	40	80	150	200
Minimum spacing	s_{min}	[mm]	40	50	60	75	90	115
Minimum edge distance	c_{min}	[mm]	40	45	45	50	55	60

HAS-U…



Marking:
Steel grade number and length identification letter: e.g. 8L

AM 8.8

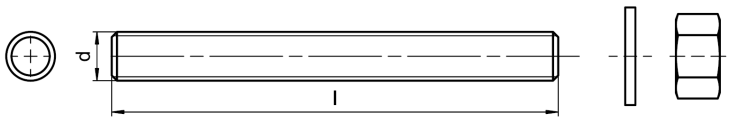


Table B3: Maximum working time and minimum curing time (1)

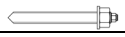
Temperature in the base material T (2)	**Maximum working time t_{work}**	**Minimum curing time t_{cure}**
0°C to 5°C	10 min	5 h
> 5°C to 10°C	8 min	2.5 h
> 10°C to 20°C	5 min	1.5 h
> 20°C to 30°C	3 min	45 min
> 30°C to 40°C	2 min	30 min

(1) The curing time data are valid for dry base material only. In wet base material the curing times must be doubled.
(2) The minimum temperature of the injection mortar Hilti HIT-HY 170 during installation is + 5°C

ANNEX B4
Intended Use
Cleaning and setting tools
Cleaning alternatives

This annex applies to the product described in the main body of the UK Technical Assessment.

Table B4: Parameters of cleaning and setting tools

Elements	Drill and clean			Installation
HAS-U…, AM 8.8	Hammer drilling	Hollow drill bit TE-CD, TE-YD	Brush	Piston plug
				
Size	d_0 [mm]	d_0 [mm]	HIT-RB	HIT-SZ
M8	10	-	10	-
M10	12	12 (1)	12	12
M12	14	14 (1)	14	14
M16	18	18	18	18
M20	22	22	22	22
M24	28	28	28	28

(1) To be used in combination with Hilti vacuum cleaner with suction volume ≥ 61 l/s (VC 20/40 –Y in corded mode only).

Cleaning alternatives

Manual Cleaning (MC):
Hilti hand pump for blowing out drill holes with diameters $d_0 \leq 18$ mm and drill hole depths $h_0 \leq 10 \cdot d$

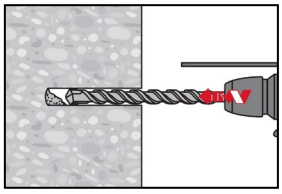
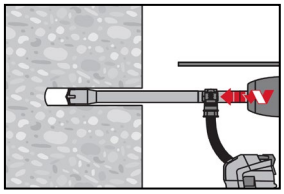
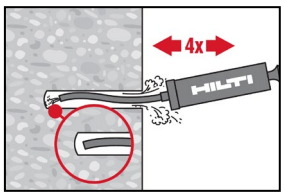
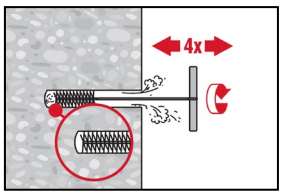
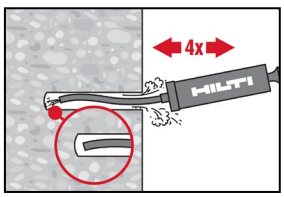
Compressed air cleaning (CAC):
Air nozzle with an orifice opening of minimum 3,5 mm in diameter.

Automatic Cleaning (AC):
Cleaning is performed during drilling with Hilti TE-CD and TE-YD drilling system including vacuum cleaner.

ANNEX B5
Intended Use
Installation instructions

This annex applies to the product described in the main body of the UK Technical Assessment.

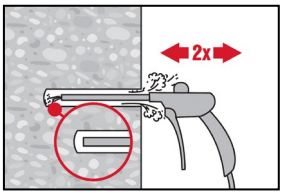
Installation

Hole drilling	
a) 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.
b) Hammer drilling with Hilti hollow drill bit	
	Drill hole to the required embedment depth with an appropriately sized Hilti TE-CD or TE-YD hollow drill bit attached to Hilti vacuum cleaner VC 20/40 (-Y) (suction volume ≥ 57 l/s) with automatic cleaning of the filter activated. This drilling system removes the dust and cleans the drill hole during drilling when used in accordance with the user's manual. When using TE-CD sizes 12 and 14 refer to Table B4. After drilling is completed, proceed to the "injection preparation" step in the installation instructions.
Drill hole cleaning	Just before setting an anchor, the drill hole must be free of dust and debris.
Manual Cleaning (MC)	Non-cracked concrete. For drill hole diameters $d_0 \leq 18$ mm and drill hole depths $h_0 \leq 10 \cdot d$
	The Hilti manual pump may be used for blowing out drill holes up to diameters $d_0 \leq 18$ mm and embedment depths up to $h_{ef} \leq 10 \cdot d$. Blow out at least four times from the back of the drill hole until return air stream is free of noticeable dust
	Brush four times with the specified brush (see Table B4) 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 drill hole (brush Ø ≥ drill hole Ø) - if not, the brush is too small and must be replaced with the proper brush diameter.
	Blow out again with manual pump at least four times until return air stream is free of noticeable dust.

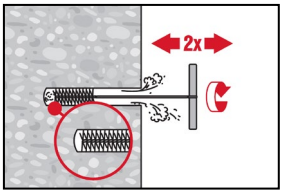
ANNEX B6
Intended Use
Installation instructions

This annex applies to the product described in the main body of the UK Technical Assessment.

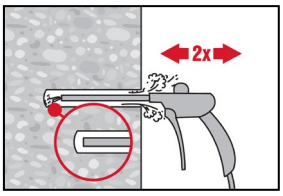
Compressed air cleaning (CAC) for all drill hole diameters d_0 and all drill hole depths h_0



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

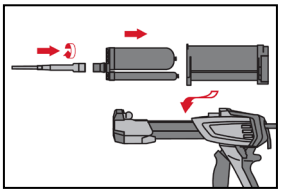


Brush two times with the specified brush (see Table B4) by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the drill hole (brush Ø ≥ drill hole Ø) - if not the brush is too small and must be replaced with the proper brush diameter.

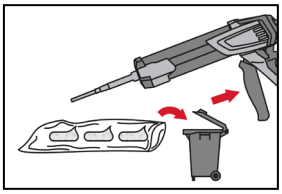


Blow again with compressed air two times until return air stream is free of noticeable dust.

Injection preparation



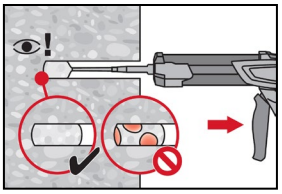
Tightly attach new Hilti mixing nozzle HIT-RE-M to foil pack manifold (snug fit). Do not modify the mixing nozzle.
Observe the instruction for use of the dispenser.
Check foil pack holder for proper function. Do not use damaged foil packs / holders.
Insert foil pack into foil pack holder and put holder into HIT-dispenser.



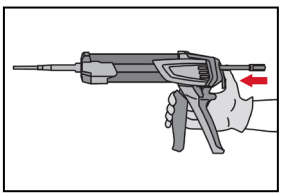
Discard initial adhesive. The foil pack opens automatically as dispensing is initiated.
Depending on the size of the foil pack an initial amount of adhesive has to be discarded.
Discarded quantities are

2 strokes	for 330 ml foil pack,
3 strokes	for 500 ml foil pack

Inject adhesive from the back of the drill hole without forming air voids.



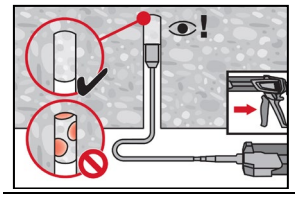
Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull.
Fill approximately 2/3 of the drill hole to ensure that the annular gap between the anchor and the concrete is completely filled with adhesive along the embedment length.
In water saturated concrete it is required to set the fastener immediately after cleaning the drillhole.



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

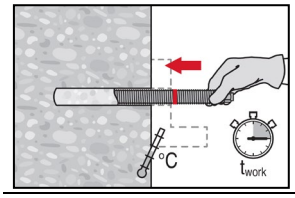
ANNEX B7
Intended Use
Installation instructions

This annex applies to the product described in the main body of the UK Technical Assessment.

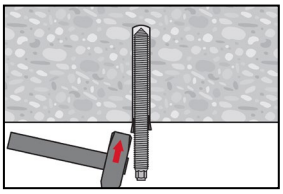


Overhead installation and/or installation with embedment depth h_{ef} > 250mm.
For overhead installation the injection is only possible with the aid of extensions and piston plugs. Assemble HIT-RE-M mixer, extension(s) and appropriately sized piston plug HIT-SZ (see Table B4). Insert piston plug to back of the hole and inject adhesive. During injection, the piston plug will be naturally extruded out of the drill hole by the adhesive pressure

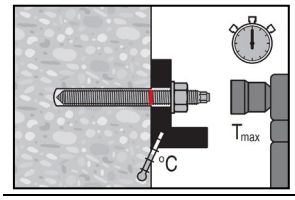
Setting the element



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} (see table B3) has elapsed.

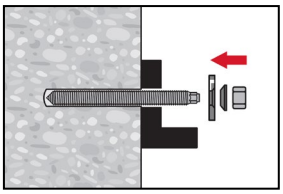


For overhead installation use piston plugs and fix embedded parts with e.g. wedges (HIT-OHW).

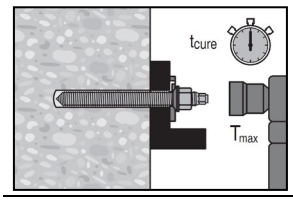


Loading the anchor: After required curing time t_{cure} (see Table B3) the anchor can be loaded.
The applied installation torque shall not exceed the values T_{max} given in Table B2.

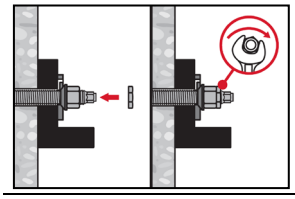
Installation of Hilti Filling Set



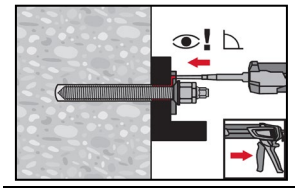
Use Hilti Filling Set with standard nut. Observe the correct orientation of filling washer and spherical washer.



The applied installation torque must not exceed the values T_{max} given in Table B2.



Optional:
Installation of lock nut. Tighten with a ¼ to ½ turn.

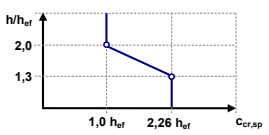


Fill the annular gap between the anchor rod and fixture with one to three strokes of Hilti injection mortar HIT-HY 170.
Follow the installation instructions supplied with the foil pack.
After required curing time t_{cure} the anchor can be loaded.

ANNEX C1
Performances
Essential characteristics under tension load in concrete

This annex applies to the product described in the main body of the UK Technical Assessment.

Table C1:Essential characteristics for HAS-U… and AM 8.8 under tension load in concrete

HAS-U… and AM 8.8				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Installation safety factor		γ_{inst}	[-]	1.0					
Steel failure									
Characteristic resistance		$N_{Rk,s}$	[kN]	$A_s \cdot f_{uk}$					
Partial factor grade 5.8		$\gamma_{Ms,N}$ [1)]	[-]	1.5					
Partial factor grade 8.8		$\gamma_{Ms,N}$ [1)]	[-]	1.5					
Partial factor HAS-U A4		$\gamma_{Ms,N}$ [1)]	[-]	1.86					
Partial factor HAS-U HCR		$\gamma_{Ms,N}$ [1)]	[-]	1.5					2.1
Combined pullout and concrete cone failure									
Characteristic bond resistance in uncracked concrete C20/25									
Temperature range I:	24 °C/40 °C	$\tau_{Rk,ucr}$	[N·mm^{-2}]	10.0					
Temperature range II:	50 °C/80 °C	$\tau_{Rk,ucr}$	[N·mm^{-2}]	7.5					
Characteristic bond resistance in cracked concrete C20/25									
Temperature range I:	24 °C/40 °C	$\tau_{Rk,cr}$	[N·mm^{-2}]	-		5,5		-	
Temperature range II:	50 °C/80 °C	$\tau_{Rk,cr}$	[N·mm^{-2}]	-		4,0		-	
Influence factors ψ on bond resistance τ_{Rk}									
Cracked and uncracked concrete: Factor for concrete strength		ψ_c	C30/37	1.04					
			C40/50	1.07					
			C50/60	1.09					
Cracked and uncracked concrete: Sustained load factor		ψ^0_{sus}	24 °C / 40 °C	0.95					
			50 °C / 80 °C	0.79					
Concrete cone failure									
Factor for uncracked concrete		$k_{ucr,N}$	[-]	11.0					
Factor for cracked concrete		$k_{cr,N}$	[-]	7.7					
Edge distance		$c_{cr,N}$	[mm]	$1.5 \cdot h_{ef}$					
Spacing		$s_{cr,N}$	[mm]	$3.0 \cdot h_{ef}$					
Splitting failure									
Edge distance $c_{cr,sp}$ [mm] for	$h / h_{ef} \geq 2.0$			$1.0 \cdot h_{ef}$					
	$2.0 > h / h_{ef} > 1.3$			$4.6\ h_{ef} - 1.8\ h$					
	$h / h_{ef} \leq 1.3$			$2.26\ h_{ef}$					
Spacing		$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$					

[1)] In absence of national regulations.

ANNEX C2
Performances
Essential characteristics under shear load in concrete
Displacements

This annex applies to the product described in the main body of the UK Technical Assessment.

Table C2: Essential characteristics for HAS-U… and AM 8.8 under shear load in concrete

HAS-U… and AM 8.8			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel failure without lever arm								
Characteristic resistance	$V_{Rk,s}$	[kN]	$0.5 \cdot A_s \cdot f_{uk}$					
Partial factor grade 5.8	$\gamma_{Ms,V}$ (1)	[-]	1.25					
Partial factor grade 8.8	$\gamma_{Ms,V}$ (1)	[-]	1.25					
Partial factor HAS-U A4	$\gamma_{Ms,V}$ (1)	[-]	1.56					
Partial factor HAS-U HCR	$\gamma_{Ms,V}$ (1)	[-]	1.25					1.75
Ductility factor	k_7	[-]	1.0					
Steel failure with lever arm								
Bending moment	$M^0_{Rk,s}$	[Nm]	$1.2 \cdot W_{el} \cdot f_{uk}$					
Ductility factor	k_7	[-]	1.0					
Concrete pry-out failure								
Pry-out factor	k_8	[-]	2.0					
Concrete edge failure								
Effective length of fastener	l_f	[mm]	$\min(h_{ef}; 12 \cdot d_{nom})$					
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16	20	24

(1) In absence of national regulations.

Table C3: Displacement under tension load

HAS-U… and AM 8.8			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Non-cracked concrete								
Displacement	δ_{N0}	[mm·(N·mm^{-2})]	0.07	0.07	0.07	0.08	0.08	0.09
Displacement	$\delta_{N\infty}$	[mm·(N·mm^{-2})]	0.07	0.07	0.07	0.08	0.08	0.09
Cracked concrete								
Displacement	δ_{N0}	[mm·(N·mm^{-2})]	-	0.07	0.07	0.06	-	-
Displacement	$\delta_{N\infty}$	[mm·(N·mm^{-2})]	-	0.11	0.11	0.11	-	-

Table C4: Displacement under shear load

HAS-U… and AM 8.8			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Displacement	δ_{V0}	[mm·(N·mm^{-2})]	0.06	0.06	0.05	0.04	0.04	0.03
Displacement	$\delta_{V\infty}$	[mm·(N·mm^{-2})]	0.09	0.08	0.08	0.06	0.06	0.05

ANNEX C3
Performances
Essential characteristics for seismic performance category C2 and displacements.

This annex applies to the product described in the main body of the UK Technical Assessment.

Table C5: Essential characteristics for HAS-U… under tension loads for seismic performance category C2

HAS-U… and AM 8.8			**M12**	**M16**
Steel failure				
HAS-U 8.8 (HDG), AM 8.8 (HDG)	$N_{Rk,s,seis}$	[kN]	67	126
Combined pull-out and concrete cone failure				
Temperature range I: 24 °C/40 °C	$\tau_{Rk,seis}$	[N·mm^{-2}]	2.0	1.9
Temperature range II: 50 °C/80 °C	$\tau_{Rk,seis}$	[N·mm^{-2}]	1.4	1.3

Table C6: Essential characteristics for HAS-U… under shear loads for seismic performance category C2

HAS-U… and AM 8.8			**M12**	**M16**
Steel failure without lever arm with Hilti Filling Set				
HAS-U 8.8, AM 8.8	$V_{Rk,s,seis}$	[kN]	28	46
Steel failure without lever arm without Hilti Filling Set				
HAS-U 8.8, AM 8.8	$V_{Rk,s,seis}$	[kN]	24	40
HAS-U 8.8 HDG, AM 8.8 HDG	$V_{Rk,s,seis}$	[kN]	18	30

Table C7: Displacements under tension load for seismic performance category C2

HAS-U… and AM 8.8			**M12**	**M16**
Displacement DLS	$\delta_{N,seis(DLS)}$	[mm]	0.2	0.2
Displacement ULS	$\delta_{N,seis(ULS)}$	[mm]	0.6	0.4

Table C8: Displacements under shear load for seismic performance category C2

HAS-U… and AM 8.8			**M12**	**M16**
Installation with Hilti Filling Set				
Displacement DLS	$\delta_{V,seis(DLS)}$	[mm]	1.6	1.2
Displacement ULS	$\delta_{V,seis(ULS)}$	[mm]	4.5	3.2
Installation without Hilti Filling Set				
Displacement DLS HAS-U 8.8, AM 8.8	$\delta_{V,seis(DLS)}$	[mm]	2.9	3.2
Displacement DLS HAS-U 8.8 HDG, AM 8.8 HDG	$\delta_{V,seis(DLS)}$	[mm]	2.2	2.3
Displacement ULS HAS-U 8.8, AM 8.8	$\delta_{V,seis(ULS)}$	[mm]	5.4	9.2
Displacement ULS HAS-U 8.8 HDG, AM 8.8 HDG	$\delta_{V,seis(ULS)}$	[mm]	4.1	4.3

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