HILTI HIT-HY 200-R V3 INJECTION MORTAR

ETA-19/0665 (16.11.2020)

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European Technical Assessment ETA 19/0665 of 16/11/2020

GENERAL PART

Trade name of the construction product	**Hilti HIT-HY 200-R V3**
Product family to which the construction product belongs	**PAC 33: FIXINGS** **Post-Installed Reinforcing Bar (Rebar) Connections with Improved Bond-Splitting Behaviour Under Static Loading**
Manufacturer	**Hilti Corporation** **Feldkircherstrasse 100** **9494 Schaan | Liechtenstein**
Manufacturing plant	**Hilti Corporation**
This European Technical Assessment contains:	**18 pages, including 10 annexes which form an integral part of this assessment**
This European Technical Assessment is issued in accordance with Regulation (EU) n° 305/2011, on the basis of	**EAD 332402-00-0601-v01 – Post-Installed Reinforcing Bar (Rebar) Connections with Improved Bond-Splitting Behaviour Under Static Loading: 100 years working life**
This version replaces	**ETA 19/0665 (version 03) of 22/01/2020**

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SPECIFIC PARTS

1. TECHNICAL DESCRIPTION OF THE PRODUCT

The injection system Hilti HIT-HY 200-R V3 is a post-installed rebar system consisting of a foil pack with injection mortar Hilti HIT-HY 200-R V3 and a reinforcing bar.
The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between steel element, injection mortar and concrete.

The product description, with reference to its components, is given in Annex A.

2. SPECIFICATION OF THE INTENDED USE IN ACCORDANCE WITH EUROPEAN ASSESSMENT DOCUMENT N° 332402-00-0601-v01 (hereinafter EAD)

The Hilti HIT-HY 200-R V3 is intended to be used in reinforced or unreinforced normal weight, non-carbonated concrete without fibres C20/25 to C50/60 according to EN 206:2013+A1:2016 for applications which are allowed with straight deformed post-installed reinforcing bars (rebars) according to EOTA TR 069.

Concerning product packaging, transport and storage it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport and storage, as he considers necessary in order to reach the declared performances.
The information about installation is provided with the technical documentation from the Manufacturer and it is assumed that the product will be installed according to it or (in absence of such instructions) according to the usual practice of the building professionals.

The specifications and conditions given by the manufacturer are summarized in Annex B.

The performances assessed in this European Technical Assessment, according to the applicable EAD, are based on an assumed intended working life of 50 years and 100 years, provided that the conditions for the installation, packaging, transport, storage, installation as well as appropriate use, maintenance and repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, 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

The tests for performance assessment of Hilti HIT-HY 200-R V3 were carried out in compliance with EAD 332402-00-0601-v01 according to the test methods reported herein, as well for what concerns sampling, conditioning and testing provisions.

3.1 MECHANICAL RESISTANCE AND STABILITY (BWR 1)

#	Essential characteristic	Performance
1	Resistance to combined pull-out and concrete failure in uncracked concrete	See Annex C1
2	Resistance to concrete cone failure	See Annex C1
3	Robustness	See Annex C1
4	Resistance to bond-splitting failure	See Annex C1
5	Influence of cracked concrete on resistance to combined pull-out and concrete failure	See Annex C1

4. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (AVCP) SYSTEM APPLIED, WITH REFERENCE TO ITS LEGAL BASE

In accordance with the European Assessment Document EAD No. 332402-00-0601-v01 the applicable European legal act is: **Decision 1996/582/EC**.
The AVCP system to be applied is: **1**

5. TECHNICAL DETAILS NECESSARY FOR THE IMPLEMENTATION OF THE AVCP SYSTEM, AS PROVIDED FOR IN EAD 332402-00-0601-v01

Technical details necessary for the implementation of the AVCP system are laid down in the Control Plan deposited at ITC-CNR.

Issued in San Giuliano Milanese, Italy on 16/11/2020
by ITC – CNR

Professor Antonio Occhiuzzi
Director of ITC-CNR

Product description: Injection mortar and steel elements

Injection mortar Hilti HIT-HY 200-R V3: hybrid system with aggregate

330 ml and 500 ml

Marking:
HILTI HIT
Production number and
production line
Expiry date mm/yyyy

Product name: “Hilti HIT-HY 200-R V3”

Static mixer Hilti HIT-RE-M

Steel elements

Reinforcing bar (rebar): ϕ 8 to ϕ 32

- Materials and mechanical properties according to Table A1.
- Minimum value of related rib area f_R according to EN 1992-1-1:2004/AC:2010.
- Rib height of the bar h_{rib} shall be in the range:
  $0{,}05 \cdot \phi \le h_{rib} \le 0{,}07 \cdot \phi$
- The maximum outer rebar diameter over the ribs shall be:
  $\phi + 2 \cdot 0{,}07 \cdot \phi = 1{,}14 \cdot \phi$

(ϕ: Nominal diameter of the bar; h_{rib}: Rib height of the bar)

Table A1: Materials

Designation	**Material**
Reinforcing bars (rebars)	
Rebar EN 1992-1-1:2004/AC:2010	Bars and de-coiled rods class B or C with f_{yk} and k according to NDP or NCL of EN 1992-1-1 $f_{uk} = f_{tk} = k \cdot f_{yk}$

Hilti HIT-HY 200-R V3	**Annex A1** **of ETA N° 19/0665**
Product description Injection mortar / Static mixer / Steel elements / Material	

SPECIFICATION OF INTENDED USE

Anchorages subject to:

- Static and quasi-static loading: rebar size ϕ 8 to ϕ 32 mm.

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.
- Maximum chloride content of 0,40 % (CL 0.40) related to the cement content according to EN 206:2013+A1:2016.
- Non-carbonated concrete.
  Note: In case of a carbonated surface of the existing concrete structure the carbonated layer shall be removed in the area of the post-installed rebar connection with a diameter of ϕ + 60 mm prior to the installation of the new rebar. The depth of concrete to be removed shall correspond at least to the minimum concrete cover in accordance with EN 1992-1-1. The foregoing may be neglected if building components are new and not carbonated and if building components are in dry conditions.

Temperature in the base material

- At installation:
  -10 °C to +40 °C
- In service
  Temperature range I: -40 °C to +40 °C
  (max. long term temperature +24 °C and max. short term temperature +40 °C)
  Temperature range II: -40 °C to +80 °C
  (max. long term temperature +50 °C and max. short term temperature +80 °C)
  Temperature range III: -40 °C to +120 °C
  (max. long term temperature +72 °C and max. short term temperature +120 °C)

Design

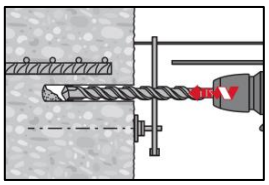
- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the forces to be transmitted.
- Design under static or quasi-static loading in accordance with EOTA TR 069.
- The actual position of the reinforcement in the existing structure shall be determined on the basis of the construction documentation and taken into account when designing.

Installation

- Use category: dry or wet concrete (not in flooded holes).
- Drilling technique: hammer drilling (HD), hammer drilling with Hilti hollow drill bit TE-CD, TE-YD (HDB), or diamond coring with roughening with Hilti roughening tool TE-YRT (RT).
- Overhead installation is admissible.
- Rebar installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
  Check the position of the existing rebars (if the position of existing rebars is not known, it shall be determined using a rebar detector suitable for this purpose as well as on the basis of the construction documentation and then marked on the building component).

Hilti HIT-HY 200-R V3	**Annex B1** **of ETA N° 19/0665**
Intended Use Specifications	

Table B1: Minimum concrete cover c_{min} of post-installed rebar depending on drilling method and drilling tolerance

Drilling method	Bar diameter [mm]	Minimum concrete cover c_{min} [mm]		
		Without drilling aid	With drilling aid	
Hammer drilling **(HD)** and **(HDB)**[1)]	$\phi < 25$	$30 + 0{,}06 \cdot l_b \geq 2 \cdot \phi$	$30 + 0{,}02 \cdot l_b \geq 2 \cdot \phi$	
	$\phi \geq 25$	$40 + 0{,}06 \cdot l_b \geq 2 \cdot \phi$	$40 + 0{,}02 \cdot l_b \geq 2 \cdot \phi$	
Diamond coring with roughening with Hilti Roughening Tool TE-YRT **(RT)**	$\phi < 25$	$30 + 0{,}06 \cdot l_b \geq 2 \cdot \phi$	$30 + 0{,}02 \cdot l_b \geq 2 \cdot \phi$	
	$\phi \geq 25$	$40 + 0{,}06 \cdot l_b \geq 2 \cdot \phi$	$40 + 0{,}02 \cdot l_b \geq 2 \cdot \phi$	

[1)] HDB = Hollow Drill Bit Hilti TE-CD and TE-YD

Comments: The minimum concrete cover acc. EN 1992-1-1 must be observed.
The minimum clear spacing is a = max(40 mm ; 4ϕ).

Table B2: Maximum embedment depth $l_{b,max}$ depending on bar diameter and dispenser

Element	Dispensers	
Rebar	HDM 330, HDM 500	HDE 500
	Concrete temperature ≥ -10 °C	Concrete temperature ≥ 0 °C
Size	$l_{b,max}$ [mm]	$l_{b,max}$ [mm]
ϕ 8 - ϕ 32	700	1000

Table B3: Maximum working time and minimum curing time

Temperature in the base material T [1)]	Maximum working time t_{work}	Minimum curing time t_{cure}
-10 °C to -5 °C	3 hours	20 hours
-4 °C to 0 °C	1,5 hours	8 hours
1 °C to 5 °C	45 min	4 hours
6 °C to 10 °C	30 min	2,5 hours
11 °C to 20 °C	15 min	1,5 hours
21 °C to 30 °C	9 min	1 hour
31 °C to 40 °C	6 min	1 hour

[1)] Minimum foil pack temperature 0°C

Hilti HIT-HY 200-R V3

Intended Use
Minimum concrete cover / Maximum embedment depth
Maximum working time and minimum curing time

Annex B2
of ETA N° 19/0665

Table B4: Parameters for use of the Hilti Roughening tool TE-YRT

Associated components			
Diamond coring		Roughening tool TE-YRT	Wear gauge RTG
			
d_0 [mm]		d_0 [mm]	Size
Nominal	Measured		
18	17,9 to 18,2	18	18
20	19,9 to 20,2	20	20
22	21,9 to 22,2	22	22
25	24,9 to 25,2	25	25
28	27,9 to 28,2	28	28
30	29,9 to 30,2	30	30
32	31,9 to 32,2	32	32
35	34,9 to 35,2	35	35

Table B5: Installation parameters for use of the Hilti Roughening tool TE-YRT

l_b [mm]	**Roughening time** $t_{roughen}$ **[s]**	**Minimum blowing time** $t_{blowing}$ **[s]**
0 to 100	10	30
101 to 200	20	40
201 to 300	30	50
301 to 400	40	60
401 to 500	50	70
501 to 600	60	80
> 600	l_b [mm] / 10	$t_{roughen}$ [s] + 20

Hilti roughening tool TE-YRT and wear gauge RTG

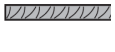
Hilti roughening tool TE-YRT	
Wear gauge RTG	

Hilti HIT-HY 200-R V3

Intended Use
Parameters for use of the Hilti Roughening tool TE-YRT

Annex B3
of ETA N° 19/0665

Table B6: Parameters of drilling, cleaning and setting tools for hammer drilling (HD)

Element	Drill and clean				Installation		
Rebar	Hammer drilling (HD)	Brush HIT-RB	Air nozzle HIT-DL	Extension for air nozzle	Piston plug HIT-SZ	Extension for piston plug	Maximum embedment length
						 [1)]	-
Size	d_0 [mm]	Size	Size	[-]	Size	[-]	$l_{b,max}$ [mm]
ϕ 8	10	10	10	HIT-DL 10/0,8 or HIT-DL V10/1	-	HIT-VL 9/1,0	250
	12	12	12		12		1000
ϕ 10	12	12	12		12		250
	14	14	14		14	HIT-VL 11/1,0	1000
ϕ 12	14	14	14		14		250
	16	16	16		16		1000
	-	18	16		18		
ϕ 14	18	18	18		18		1000
	-	18	18		18		
ϕ 16	20	20	20	HIT-DL 16/0,8 or HIT-DL B and/or HIT-VL 16/0,7 and/or HIT-VL 16	20	HIT-VL 16/0,7 and/or HIT-VL 16	1000
	-	22	20		22		
ϕ 18	22	22	22		22		1000
ϕ 20	25	25	25		25		1000
	-	28	25		28		
ϕ 22	28	28	28		28		1000
ϕ 24	32	32	32		32		1000
ϕ 25	32	32			32		1000
ϕ 26	35	35			35		1000
ϕ 28	35	35			35		1000
ϕ 30	-	35			35		1000
	37	37			37		
ϕ 32	40	40			40		1000

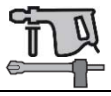
[1)] Assemble extension HIT-VL 16/0,7 with coupler HIT-VL K for deeper drill holes.

Hilti HIT-HY 200-R V3

Intended Use
Parameters of drilling, cleaning and setting tools for hammer drilling

Annex B4
of ETA N° 19/0665

Table B7: Parameters of drilling and setting tools for hammer drilling with Hilti hollow drill bit (HDB)

Element	**Drill** (no cleaning required)				**Installation**		
Rebar	Hammer drilling, hollow drill bit[1] (HDB)	Brush HIT-RB	Air nozzle HIT-DL	Extension for air nozzle	Piston plug HIT-SZ	Extension for piston plug	Maximum embedment depth
						 [2]	-
Size	d_0 [mm]	Size	Size	[-]	Size	[-]	$l_{b,max}$ [mm]
ϕ 8	12	No cleaning required			12	HIT-VL 9/1,0	400
ϕ 10	12				12		400
	14				14	HIT-VL 11/1.0	400
ϕ 12	14				14		400
	16				16		1000
ϕ 14	18				18		1000
ϕ 16	20				20	HIT-VL 16/0,7 and/or HIT-VL 16	1000
ϕ 18	22				22		1000
ϕ 20	25				25		1000
ϕ 22	28				28		1000
ϕ 24	32				32		1000
ϕ 25	32				32		1000

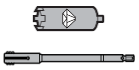
[1] To be used in combination with Hilti vacuum cleaner with suction volume ≥ 57 l/s.
[2] Assemble extension HIT-VL 16/0,7 with coupler HIT-VL K for deeper drill holes.

Hilti HIT-HY 200-R V3

Intended Use
Parameters of drilling and setting tools for hammer drilling with hollow drill bit

Annex B5
of ETA N° 19/0665

Table B8: Parameters of drilling, cleaning and setting tools for diamond coring and roughening with Hilti roughening tool TE-YRT (RT)

Element	**Drill and clean**				**Installation**		
Rebar	Diamond coring with roughening (RT)	Brush HIT-RB	Air nozzle HIT-DL	Extension for air nozzle	Piston plug HIT-SZ	Extension for piston plug	Maximum embedment depth
						 [1)]	-
Size	d_0 [mm]	Size	Size	[-]	Size	[-]	$l_{b,max}$ [mm]
ϕ 14	18	18	18	HIT-DL V10/1	18	HIT-VL 11/1,0	1000
ϕ 16	20	20	20	HIT-DL 16/0,8 or HIT-DL B and/or HIT-VL 16/0,7 and/or HIT-VL 16	20	HIT-VL 16/0,7 and/or HIT-VL 16	1000
ϕ 18	22	22	22		22		1000
ϕ 20	25	25	25		25		1000
ϕ 22	28	28	28		28		1000
ϕ 24	32	32	32		32		1000
ϕ 25	32	32			32		1000
ϕ 26	35	35			35		1000
ϕ 28	35	35			35		1000

[1)] Assemble extension HIT-VL 16/0,7 with coupler HIT-VL K for deeper drill holes.

Hilti HIT-HY 200-R V3

Intended Use
Parameters of drilling, cleaning and setting tools for diamond coring with roughening tool

Annex B6
of ETA N° 19/0665

Cleaning alternatives

Manual Cleaning (MC):

Hilti hand pump for blowing out drill holes with diameters $d_0 \leq 20$ mm and drill hole depths $l_b \leq 10 \cdot \phi$.

+ brush HIT-RB

Compressed Air Cleaning (CAC):

air nozzle with an orifice opening of minimum 3,5 mm in diameter.

+ brush HIT-RB

Automatic Cleaning (AC):

Cleaning is performed during drilling with Hilti TE-CD and TE-YD drilling system including vacuum cleaner.

Hilti HIT-HY 200-R V3	**Annex B7** **of ETA N° 19/0665**
Intended Use Cleaning alternatives	

Installation Instructions

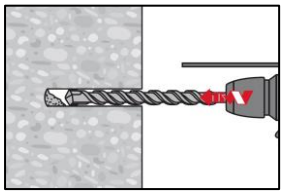
Safety Regulations:

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 200-R V3.
Important: Observe the installation instruction provided with each foil pack.

Hole drilling

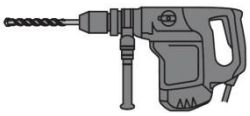
Before drilling remove carbonized concrete and clean contact areas (see Annex B1).
In case of aborted drill hole the drill hole shall be filled with mortar.

a) Hammer drilling (HD)

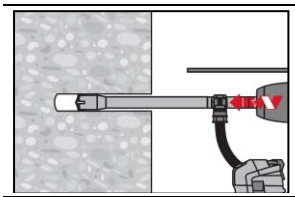


Drill hole to the required embedment depth with a hammer drill set in rotation-hammer mode using an appropriately sized carbide drill bit.

Hammer drill (HD)

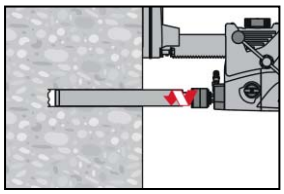


b) Hammer drilling with Hilti hollow drill bit TE-CD, TE-YD (HDB)



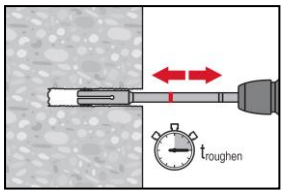
Drill hole to the required embedment depth with an appropriately sized Hilti TE-CD or TE-YD hollow drill bit attached to Hilti vacuum cleaner VC 20/40 (-Y) (suction volume ≥ 57 l/s) with automatic cleaning of the filter activated. This drilling system removes the dust and cleans the drill hole during drilling when used in accordance with the user's manual.
After drilling is completed, proceed to the "injection preparation" step in the installation instruction.

c) Diamond coring with roughening with Hilti roughening tool TE-YRT (RT)



Diamond coring is permissible when suitable diamond core drilling machines and the corresponding core bits are used.

For the use in combination with Hilti roughening tool TE-YRT see parameters Table B4 and Table B5.



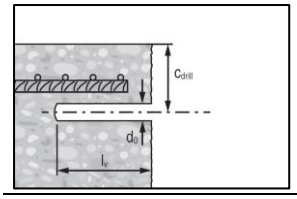
Before roughening water needs to be removed from the drill hole.
Check usability of the roughening tool with the wear gauge RTG.
Roughen the drill hole over the whole length to the required l_b.

Hilti HIT-HY 200-R V3

Intended Use
Installation instructions

Annex B8/1
of ETA N° 19/0665

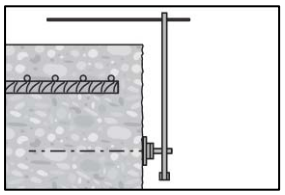
Splicing applications



- Measure and control concrete cover c.
- $c_{drill} = c + d_0/2$.
- Drill parallel to edge and to existing rebar.
- Where applicable use Hilti drilling aid HIT-BH.

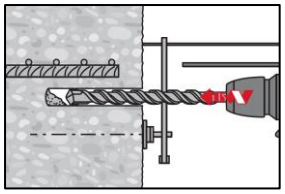
Drilling aid

For holes l_b > 20 cm use drilling aid.



Ensure that the drill hole is parallel to the existing rebar.
Three different options can be considered:

- Hilti drilling aid HIT-BH
- Lath or spirit level
- Visual check



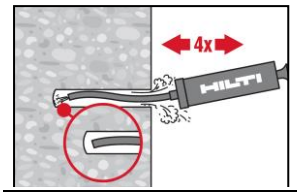
Hole drilling with Hilti drilling aid HIT-BH.

Drill hole cleaning

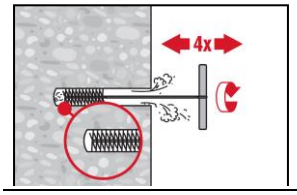
Just before setting the bar the drill hole must be free of dust and debris.
Inadequate hole cleaning = poor load values.

Manual Cleaning (MC)

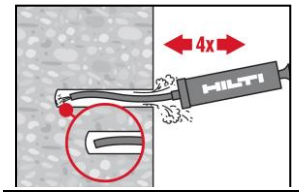
For drill hole diameters $d_0 \leq 20$ mm and drill hole depths $l_b \leq 10\ \phi$.



The Hilti hand pump may be used for blowing out drill holes up to diameters $d_0 \leq 20$ mm and embedment depths up to $l_b \leq 10\ \phi$.
Blow out at least 4 times from the back of the drill hole until return air stream is free of noticeable dust.



Brush 4 times with the specified brush (see Table B6) 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 the Hilti hand pump at least 4 times until return air stream is free of noticeable dust.

Hilti HIT-HY 200-R V3

Intended Use
Installation instructions

Annex B8/2
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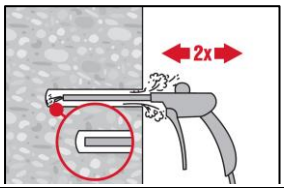
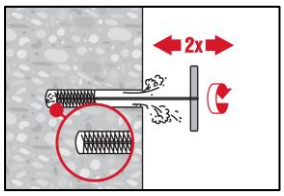
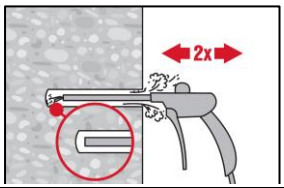
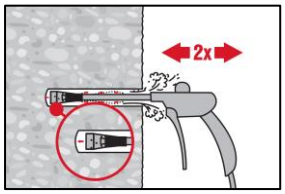
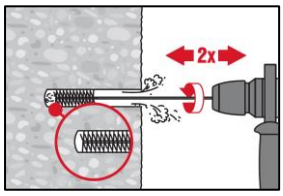
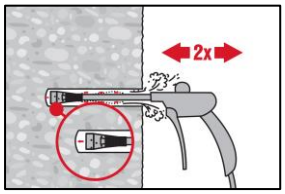
Compressed Air Cleaning (CAC)	For all drill hole diameters d_0 and all drill hole depths $l_b \leq 20\ \phi$.
	Blow 2 times from the back of the hole (if needed with nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust. Safety tip: Do not inhale concrete dust. Use of the dust collector Hilti HIT-DRS is recommended.
	Brush 2 times with the specified brush (see Table B6) 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 2 times until return air stream is free of noticeable dust.
Compressed Air Cleaning (CAC)	For ϕ 8 to ϕ 12 and drill holes depths $l_b > 250$ mm or ϕ > 12 mm and drill hole depths $l_b > 20\ \phi$
	Use the appropriate air nozzle Hilti HIT-DL (see Table B6). Blow 2 times from the back of the hole over the whole length with oil-free compressed air until return air stream is free of noticeable dust. For drill hole diameters ≥ 32 mm the compressor has to supply a minimum air flow of 140 m³/h. Safety tip: Do not inhale concrete dust. Use of the dust collector Hilti HIT-DRS is recommended.
	Screw the round steel brush HIT-RB in one end of the brush extension(s) HIT-RBS, so that the overall length of the brush is sufficient to reach the base of the drill hole. Attach the other end of the extension to the TE-C/TE-Y chuck. Brush 2 times with the specified brush (see Table B6) by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) and removing it. Safety tip: Start machine brushing operation slowly. Start brushing operation once the brush is inserted in the drill hole.
	Use the appropriate air nozzle Hilti HIT-DL (see Table B6). Blow 2 times from the back of the hole over the whole length with oil-free compressed air until return air stream is free of noticeable dust.

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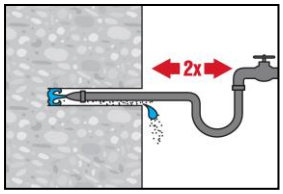
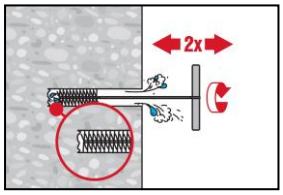
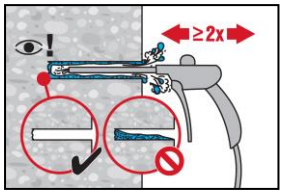
Cleaning of diamond cored holes with roughening with Hilti roughening tool TE-YRT (RT):
For all drill hole diameters d_0 and all drill hole depths l_b.



Flush 2 times by inserting a water hose (water-line pressure) to the back of the hole until water runs clear.

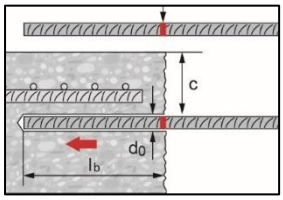


Brush 2 times with the specified brush (see Table B8) by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the drill hole (brush Ø ≥ drill hole Ø) - if not the brush is too small and must be replaced with the proper brush diameter.



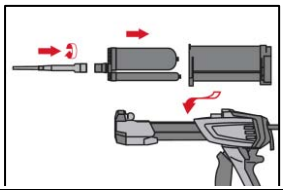
Blow 2 times from the back of the hole (if needed with nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust and water. Remove all water from the drill hole until it is completely dried before mortar injection. Blow time see Table B5.
For drill hole diameters ≥ 32 mm the compressor has to supply a minimum air flow of 140 m³/h.

Rebar preparation

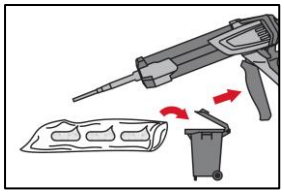


Before use, make sure the rebar is dry and free of oil or another residue.
Mark the embedment depth on the rebar (e.g. with tape) → l_b.
Insert rebar in drill hole to verify hole and setting depth l_b.

Injection preparation



Tightly attach Hilti mixing nozzle HIT-RE-M to foil pack manifold. Do not modify the mixing nozzle.
Observe the instruction for use of the dispenser.
Check foil pack holder for proper function. Insert foil pack into foil pack holder and put holder into dispenser.



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,
4 strokes for 500 ml foil pack < 5°C.
The minimum foil pack temperature is 0°C.

Hilti HIT-HY 200-R V3	**Annex B8/4** **of ETA N° 19/0665**
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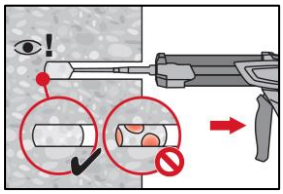
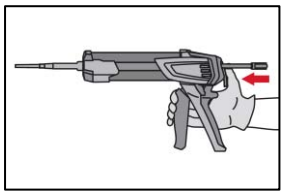
Inject adhesive from the back of the drill hole without forming air voids.

Injection method for drill hole depth ≤ 250 mm (without overhead applications)

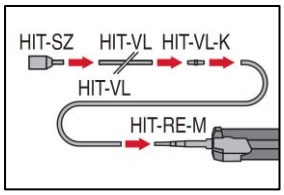


Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull.
Fill approximately 2/3 of the drill hole to ensure that the annular gap between the rebar and the concrete is completely filled with adhesive along the embedment length.

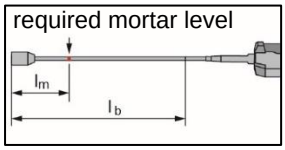


After injection is completed, depressurize the dispenser by pressing the release trigger. This will prevent further adhesive discharge from the mixer.

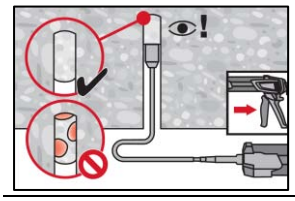
Injection method for drill hole depth > 250 mm or overhead applications



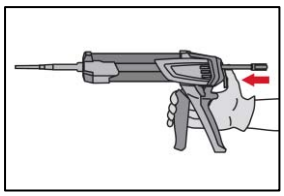
Assemble mixing nozzle HIT-RE-M, extension(s) and piston plug HIT-SZ (see Table B6, Table B7 and Table B8).
For combinations of several injection extensions use coupler HIT-VL-K.
A substitution of the injection extension for a plastic hose or a combination of both is permitted.
The combination of HIT-SZ piston plug with HIT-VL 16 pipe and HIT-VL 16 tube supports proper injection.



Mark the required mortar level l_m and embedment depth l_b with tape or marker on the injection extension.
Estimation:
$l_m = 1/3 \cdot l_b$
Precise formula for optimum mortar volume:
$l_m = l_b \cdot (1{,}2 \cdot (\phi^2 / d_0^2) - 0{,}2)$



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 (see Table B6,Table B7 and Table B8). 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.



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

Hilti HIT-HY 200-R V3

Intended Use
Installation instructions

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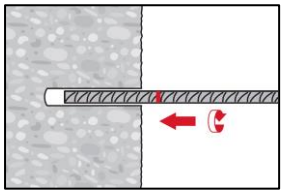
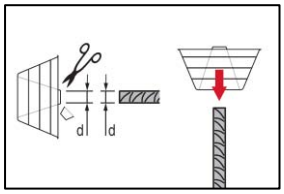
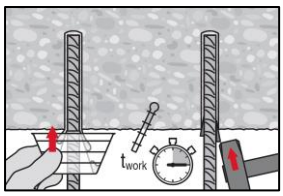
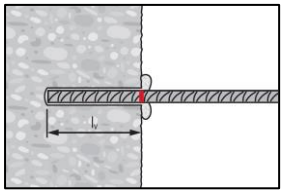
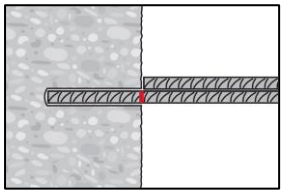
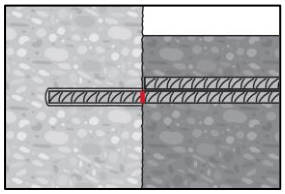
Setting the element	Before use, verify that the element is dry and free of oil and other contaminants**.**
	For easy installation insert the rebar into the drill hole while slowly twisting until the embedment mark is at the concrete surface level.
	For overhead application: During insertion of the rebar mortar might flow out of the drill hole. For collection of the flowing mortar HIT-OHC may be used.
	Support the rebar and secure it from falling until mortar has started to harden, e.g. using wedges HIT-OHW.
	After installing the rebar the annular gap must be completely filled with mortar. Proper installation: • desired anchoring embedment l_b is reached: embedment mark at concrete surface. • excess mortar flows out of the drill hole after the rebar has been fully inserted until the embedment mark.
	Observe the working time t_{work} (see Table B3), which varies according to temperature of base material. Minor adjustments to the rebar position may be performed during the working time.
	Full load may be applied only after the curing time t_{cure} has elapsed (see Table B3).

Hilti HIT-HY 200-R V3	**Annex B8/6** **of ETA N° 19/0665**
Intended Use Installation instructions	

Table C1: Essential characteristics for rebar under tension load in concrete – 50 and 100 years working life

Rebar			**ϕ 8**	**ϕ 10**	**ϕ 12**	**ϕ 14**	**ϕ 16**	**ϕ 20**	**ϕ 25**	**ϕ 26**	**ϕ 28**	**ϕ 30**	**ϕ 32**
Diameter of rebar	ϕ	[mm]	8	10	12	14	16	20	25	26	28	30	32
Pull-out resistance													
Characteristic bond resistance in uncracked concrete C20/25 - 50 years working life													
Temperature range I: 40°C/24°C	$\tau_{Rk,ucr,50}$	[N/mm²]	12										
Temperature range II: 80°C/50°C	$\tau_{Rk,ucr,50}$	[N/mm²]	10										
Temperature range III: 120°C/72°C	$\tau_{Rk,ucr,50}$	[N/mm²]	8,5										
Characteristic bond resistance in uncracked concrete C20/25 – 100 years working life													
Temperature range I: 40°C/24°C	$\tau_{Rk,ucr,100}$	[N/mm²]	11										
Temperature range II: 80°C/50°C	$\tau_{Rk,ucr,100}$	[N/mm²]	9,5										
Temperature range III: 120°C/72°C	$\tau_{Rk,ucr,100}$	[N/mm²]	8										
Influence of cracked concrete	Ω_{cr}	[-]	0,53		0,58			0,61	0,64				0,73
Installation safety factor													
Hammer drilling	γ_{inst}	[-]	1,0										
Hammer drilling with Hilti hollow drill bit TE-CD or TE-YD	γ_{inst}	[-]	1,0							–			
Diamond coring with roughening with Hilti roughening tool TE-YRT	γ_{inst}	[-]	-			1,0						–	
Bond-splitting resistance													
Product basic factor	A_k	[-]	4,1										
Exponent for influence of concrete compressive strength	sp1	[-]	0,31										
Exponent for influence of rebar diameter ϕ	sp2	[-]	0,32										
Exponent for influence of concrete cover c_d	sp3	[-]	0,67										
Exponent for influence of side concrete cover (c_{max} / c_d)	sp4	[-]	0,25										
Exponent for influence of anchorage length l_b	lb1	[-]	0,45										
Influence factors ψ on bond resistance τ_{Rk}													
Cracked and uncracked concrete: Factor for concrete strength	ψc	C30/37	1,04										
		C40/45	1,07										
		C50/60	1,10										
Cracked and uncracked concrete: Sustained load factor - 50 years	$\psi^0_{sus,50}$	40°C/24°C	0,74										
		80°C/50°C	0,89										
		120°C/72°C	0,72										
Cracked and uncracked concrete: Sustained load factor - 100 years	$\psi^0_{sus,100}$	40°C/24°C	No Performance Assessed										
		80°C/50°C	No Performance Assessed										
		120°C/72°C	No Performance Assessed										
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]	$1,5 \cdot l_b$										
Spacing	$s_{cr,N}$	[mm]	$3,0 \cdot l_b$										

Hilti HIT-HY 200-R V3

Performances
Essential characteristics under tension load in concrete for bond-splitting and concrete cone resistances – 50 and 100 years working life

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of ETA N° 19/0665