Hilti HIT-HY 200 Injectable Mortar

(Post Installed Rebar) Submission Folder

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Injectable mortar HIT-HY 200-R





BASE MATERIALS

- Concrete (cracked)
- Concrete (uncracked)



APPLICATIONS

- Anchoring secondary steel structures (e.g. racking, guard rails, sound barriers)
- Anchoring structural steel connections (e.g. steel columns, beams)
- Seismic strengthening / retrofitting and bracing of reinforced concrete buildings
- Substitution of misplaced / missing rebars
- Anchoring safety barriers, balustrades, fire staircases
- Structural splices / straight connections with post-installed rebars

ADVANTAGES

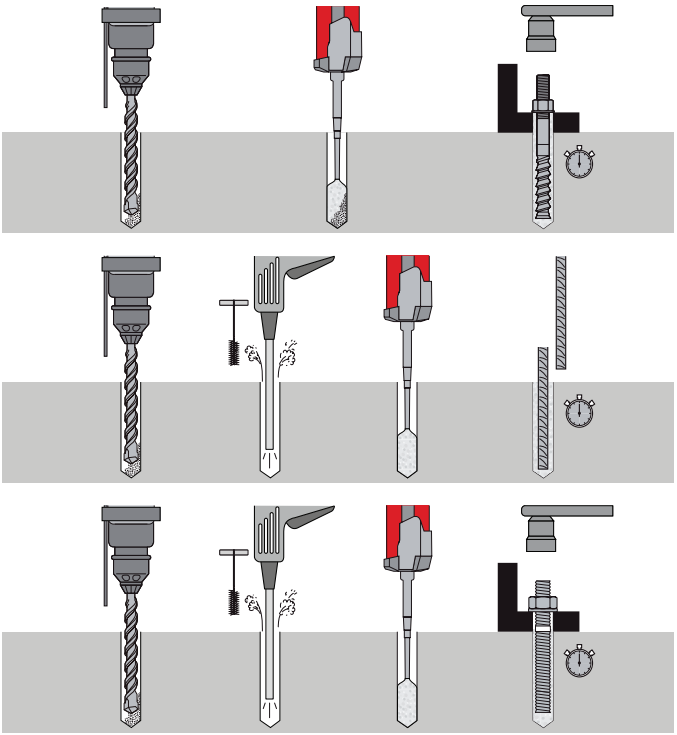
- No hole cleaning required with the revolutionary new Hilti HIT-Z anchor rod
- Automatic hole cleaning with TE-CD and TE-YD drill bits in combination with Hilti vacuum cleaners
- Fulfills the requirements of the most demanding ICC-ES and ETA C2 approvals for seismic applications
- Post-installed rebars perform like cast-in connections

Technical data	
Material composition	Hybrid urethane methacrylate adhesive
Base material condition	Dry, wet
Tested/approved for diamond drilling	Yes (for HIT-Z), No (for HIT-V & Rebar)
Seismic	Yes
Compatible cartridge holder	CR (Red)
Additional product information	Always wear eye protection and gloves while handling

Curing time

Temperature in the base material T [°C]	Maximum working time twork [min]	Minimum curing time tcure [h]
5	60	4
6 to 10	40	2.5
11 to 20	15	1.5
21 to 30	9	1
31 to 40	6	1

[1] The curing time data are vaild for dry base material only. In wet base material the curing times must be doubled.



These are abbreviated instructions which may vary according to the application.

Order Now Watch Video

Technical data

Recommended load (kN), non-cracked concrete at 25N/mm², safety factor (γ) =3

Model	Size	M8	M10	M12	M16	M20
HIT-HY 200 R + HIT-Z	Tensile Load, Nrec	8.0	12.7	18.1	32.0	44.3
	Shear Load, Vrec	4.0	6.3	9.0	16.0	24.3

Recommended load (kN), cracked concrete at 25N/mm², safety factor (γ) =3

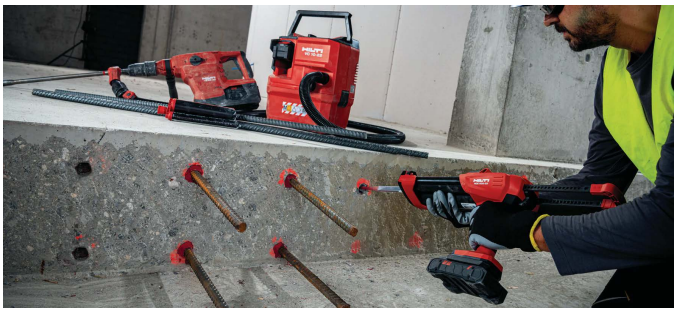
Model	Size	M8	M10	M12	M16	M20
HIT-HY 200 R + HIT-Z	Tensile Load, Nrec	7.5	11.0	14.8	22.4	31.0
	Shear Load, Vrec	4.0	6.3	9.0	16.0	24.3

Remarks:
1) All the data applies to no edge distance, spacing and other influences 2) For detail design method please refer to Fastening Technology Manual *) HY 200 with the use of HIT-Z/HIT-Z-R has shock approved

Ordering designation	Package contents	Sales pack quantity	Item number
HIT-HY 200-R 330/2/EE	1x Foil pack, 2x Mixer, 1x Mixer extension	1 pc	**2045036**
HIT-HY 200-R 500/2/EE	1x Foil pack, 2x Mixer, 1x Mixer extension	1 pc	**2045032**
HY 200-R 500/2/EE + HDE A22 Dispenser	80x foil pack, 1x Dispenser HDE 500-A22, 1x Cartridge Holder	1 pc	**3733215**

Please visit Hilti website for the latest item numbers and related products

Dispenser HDE 500-22





APPLICATIONS

- Injecting Hilti HIT epoxy or adhesive mortar for fastening anchor rods and rebar in concrete and masonry
- Dispensing Hilti firestop foams (only when packaged in compatible soft foil packs)

ADVANTAGES

- Faster anchoring
- Significantly reduce mortar wastage
- Improve fastener safety and reliability
- Repeat and resume functions
- On the Nuron battery platform

Technical data	
Power source type	Compact B22-55 or B22-85 battery pack
Dispenser type	Battery
Performance (at 20˚C)	55 sec (RE100 500 ml)
B22-55 Battery capacity	100 cartridges (500 ml)
Dimension (L x W x H)	440mm x 120mm x 230 mm
Modes available	Off / continuous / smart discard / measured volume dispensing with ml
Dispensing volume per trigger	1 ml

Order Now

Ordering designation	Content per can/cartridge	Sales pack quantity	Item number
HDE 500-22 + CB (Ultimate) 110V	1x Cordl. dispenser HDE 500-22, 1x Cartridge holder HIT-CB, 1x Battery pack B 22-55, 1x Battery charger C 4-22 110V	1 pc	**3880132**
HDE 500-22 + CR (Ultimate) 110V	1x Cordl. dispenser HDE 500-22, 1x Cartridge holder HIT-CR, 1x Battery pack B 22-55, 1x Battery charger C 4-22 110V	1 pc	**3880183**
HDE 500-22 + CB (Ultimate) 230V	1x Cordl. dispenser HDE 500-22, 1x Cartridge holder HIT-CB, 1x Battery pack B 22-55, 1x Battery charger C 4-22 230V	1 pc	**3880184**
HDE 500-22 + CR (Ultimate) 230V	1x Cordl. dispenser HDE 500-22, 1x Cartridge holder HIT-CR, 1x Battery pack B 22-55, 1x Battery charger C 4-22 230V	1 pc	**3880186**
Battery pack B 22-85 Li-ion	-	1 pc	**2251351**
Battery charger C 4-22 110V	-	1 pc	**2372874**
Battery charger C 4-22 230V	-	1 pc	**2372873**

Please visit Hilti website for the latest item numbers and related products

Safety glasses



Technical data	
Lens	PC material
Thickness	2.1 mm
Coating	Optidur NCH coating
Filter	2C-1.2
Impact energy	45 m/s

Order Now

Ordering designation	Sales pack quantity	Item number
Safety glasses PP EY-CA NCH clear	1 pc	**2065449**

Please visit Hilti website for the latest item numbers and related products

Accessories for blowing out



APPLICATIONS

- For fast and efficient removal of dust and debris from drilled holes of varying diameters and depths to allow correct installation of anchors and rebar

Technical data	
Dispenser, setting tool, accessory, tester type	Cleaning accessories

Order Now

Ordering designation	Sales pack quantity	Item number
Blow-out pump	1 pc	**60579**
Extension tube HIT-VL 16/0.7	10 pc	**336646**[1)]

Please visit Hilti website for the latest item numbers and related products

Accessories for blowing out (Air nozzle)



APPLICATIONS

- Clearing dust and debris from drilled holes under various conditions including where adhesive anchors are set at great depth

Technical data	
Dispenser, setting tool, accessory, tester type	Cleaning accessories

ADVANTAGES

- Fast, effective cleaning of drilled holes

Order Now

Ordering designation	Drill hole diameter	Sales pack quantity	Item number
Air nozzle HIT-DL 20	20 mm	1 pc	**371719**[1)]
Air nozzle HIT-DL 25	25 mm	1 pc	**371720**[1)]
Air nozzle HIT-DL 32	32 mm	1 pc	**371721**[1)]

[1)] This is a non-stock item. For detailed lead time information please contact your Hilti representative.

Please visit Hilti website for the latest item numbers and related products

Accessories for brushing



HIT-RBH

Round steel brush HIT-RB

APPLICATIONS

- For the proper brushing of drilled holes of varying diameters and embedment depths

Technical data	
Dispenser, setting tool, accessory, tester type	Cleaning accessories

Order Now

Ordering designation	Package contents	Sales pack quantity	Item number
Brush extension HIT-RBH	30 cm extension with handle for manual cleaning fitting to all RB diameter.	1 pc	**229138**
Brush extension HIT-RBV	30 cm extention used between RBH (handle) and all RB diameter.	1 pc	**238727**[1)]
Brush extension HIT-RBS-10/0.35	35 cm extension for machine cleaning fitting to all RB diameter.	1 pc	**371722**[1)]
Holder TE-C	Connection end for C and SDS end. Works with RBS.	1 pc	**263437**[1)]
Holder TE-Y	Connection end for Y end. Works with RBS.	1 pc	**263439**[1)]
Round steel brush HIT-RB 12	Brush diameter - 12 mm. Use with HIT-RBH/RBV	1 pc	**336548**
Round steel brush HIT-RB 16	Brush diameter - 16 mm. Use with HIT-RBH/RBV	1 pc	**336550**[1)]
Round steel brush HIT-RB 20	Brush diameter - 20 mm. Use with HIT-RBH/RBV	1 pc	**336550**
Round steel brush HIT-RB 25	Brush diameter - 25 mm. Use with HIT-RBH/RBV	1 pc	**336553**[1)]
Round steel brush HIT-RB 32	Brush diameter - 32 mm. Use with HIT-RBH/RBV	1 pc	**336554**
Round steel brush HIT-RB 40	Brush diameter - 40 mm. Use with HIT-RBH/RBV	1 pc	**382260**[1)]
Round steel brush HIT-RB 52	Brush diameter - 52 mm. Use with HIT-RBH/RBV	1 pc	**382265**

[1)] This is a non-stock item. For detailed lead time information please contact your Hilti representative. **382265**[1)]

Please visit Hilti website for the latest item numbers and related products

Accessories for injection in deep / overhead holes application



APPLICATIONS

- For injection of Hilti HIT adhesive mortars in a variety of situations including deep holes, overhead holes and in underwater applications

ADVANTAGES

- Injection pistons and flexible extension hoses help ensure consistent injection of the adhesive into the hole without formation of air voids

Technical data	
Dispenser, setting tool, accessory, tester type	Cleaning accessories

Order Now

Ordering designation	Drill hole diameter	Sales pack quantity	Item number
Hose HIT-VL 11/1.0 (Plastic tube)	-	10 pc	**2042533**[1]
Coupler VL-K (connect HIT-VL)	-	10 pc	**335021**[1]
Piston plug HIT-SZ 20	20 mm	10 pc	**2039312**
Piston plug HIT-SZ 25	25 mm	10 pc	**2039315**
Piston plug HIT-SZ 30	30 mm	10 pc	**2039317**
Piston plug HIT-SZ 40	40 mm	10 pc	**2039325**[1]
Piston plug HIT-SZ 47	47 mm	10 pc	**2039332**[1]

[1] This is a non-stock item. For detailed lead time information please contact your Hilti representative.

Please visit Hilti website for the latest item numbers and related products

Accessories for overhead applications



Technical data	
Dispenser, setting tool, accessory, tester type	Mixing nozzles and injection accessories

Order Now

Ordering designation	Sales pack quantity	Item number
Drip guard HIT-OHC1 (for fastener Ø10-20 mm)	10 pc	**387551**
Drip guard HIT-OHC2 (for fastener Ø22-32 mm)	10 pc	**387552**
Wedge HIT-OHW	100 pc	**387550**

Please visit Hilti website for the latest item numbers and related products

Mixers for Hilti injectable (RE&HY)



Technical data	
Dispenser, setting tool, accessory, tester type	Mixing nozzles and injection accessories

Order Now

Ordering designation	Sales pack quantity	Item number
Mixers HIT-RE-M (for RE&HY)	1 pc	**337111**

Please visit Hilti website for the latest item numbers and related products

HILTI SAFE-SET TECHNOLOGY

A small step for engineers.
And a giant leap forward for your next design.

Now you can design anchor rod and post-installed rebar connections with more confidence. Inadequately cleaning holes during installation can reduce the performance of conventional chemical anchor systems significantly. Hilti SAFE-SET Technology eliminates this factor almost entirely – in both cracked or uncracked concrete and with anchor rods or post-installed rebar.



HIT-RE 500 V3

APPLICATIONS

- Post-installed rebar connections forconcrete slab, column or wall extensions
- Heavy-duty anchoring in cracked or uncracked concrete, e.g. for steel beams, colum



HIT-HY 200- R

WHAT IS SAFE-SET

Hilti SAFE-SET Technology eliminates the most load-affecting and time-consuming step in the installation process: cleaning the hole before injection of the adhesive. As a consequence, engineers can now have peace of mind because the specified application will perform on the jobsite as it has been designed in the plan.



HIT-RE 100

SAFE-SET Application Ranges

Thread rod size / Drill hole dia.	M8 (10mm)	M10 (12mm)	M12 (14mm)	M16 (18mm)	M20 (22mm)	M24 (28mm)	M27 (30mm)	M30 (35mm)
Anchoring								
HIT-HY 200-R, standard drill bit and HIT-Z Rod (zero cleaning)			SAFE-SET					
HIT-HY 200-R, HIT-RE100, HIT-RE 500 V3, Hollow Drill Bits and HAS-E Rod, HAS-U Rod or HIT-V Rod (auto-cleaning)		SAFE-SET						
Rebar								
HIT-HY 200-R, HIT-RE100 , HIT-RE 500 V3, Hollow Drill Bits and rebar (auto-cleaning)			SAFE-SET					

Rebar size / Drill hole dia.	Y8 (12mm)	Y10 (14mm)	Y12 (16mm)	Y16 (20mm)	Y20 (25mm)	Y25 (32mm)	Y32 (40mm)

INTRODUCING HILTI SAFESET TECHNOLOGY

Once in a blue moon, something comes along with the power to accelerate the way you work.

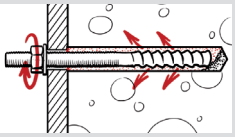
SAFESET

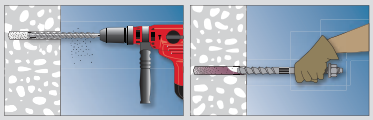
SAFEset is a registered trade mark of Hilti.

1 ZERO CLEANING SOLUTION.
HIT-Z anchor rods + HIT-HY 200-R

The new Hilti HIT-Z anchor rod works as a torque-contolled bonded anchor. Because of their unique shape, HIT-Z anchor rods, used in hammer-drilled holes in dry or water-saturated concrete above 5°C, are not affected by uncleaned holes. The benefits are clear: fewer steps and more productivity in anchoring applications.







Hilti SAFESET Technology
Up to 60% faster!





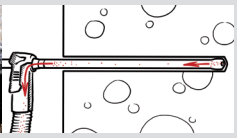
Anchor diameter range	M8 to M20
Material	Carbon or stainless steel (A4)
Embedment depth	Up to 12 times rod diameter
Concrete compressive strengths	C20/25 to C50/60
Installation temperature range	5°C to 40°C

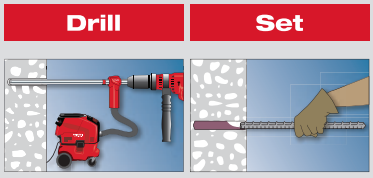


2 AUTO-CLEANING SOLUTION.
Hollow drill bits + HIT-HY 200-R / HIT-RE 100 / HIT-RE 500 V3

Hilti TE-CD and TE-YD hollow drill bits, in conjunction with HIT-HY 200-R, HIT-RE 100 or HIT-RE 500 V3, make subsequent hole cleaning completely unnecessary. Dust is removed by the Hilti vacuum system while drilling is in progress for faster drilling and a virtually dustless working environment.







Hilti SAFESET Technology
Up to 60% faster!





Rebar diameter range	Y8 to Y25
Threaded rod diameters	M10 to M30
Embedment depth	Up to 1000 mm
Concrete compressive strengths	C20/25 to C50/60
Installation temperature range	-10°C to 40°C

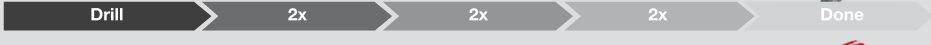


3 CONVENTIONAL SOLUTION.
Brush and blow

Another option is to continue using the traditional hole cleaning method with any Hilti HIT system for superior performance.



*Cleaning Sequence when using manual dust pump are : blow twice , brush twice , blow twice.





Rebar diameter range	Y8 to Y40
Threaded rod diameters	M8 to M39
Embedment depth	Up to 20 times element diameter
Concrete compressive strengths	C20/25 to C50/60
Installation temperature range	-10°C to 40°C



SUMMARY TABLE FOR CHEMICAL ANCHORS

	HIT-HY 200-R	HIT-RE 500 V3	HIT-RE 100	HIT-HY 270
HIT-Z 	■			
HAS-U 	■	■	■	■
HIS-N 	■	■	■	■
Setting tool TE-C 				
Setting tool HIS-S 				
Mixer HIT-RE-M	■	■	■	■
Profi accessories for HIT 	■	■	■	■
HIT-SC 				■
CR Cartridge holder 	■			
CB Cartridge holder 		■	■	■
HDE Dispenser 	■	■	■	■
TE-CD/YD Hollow drill bit 	■	■	■	
VC 20/40 Vacuum cleaner 	■	■	■	
Setting tool TE-C-E/ TE-Y-E 				
Blow-out pump 	■	■	■	■
Steel brush 	■	■	■	■

HIT-HY 200-R Injection Adhesive with Rebar

Features:	base material: concrete
	Injection system with high loading capacity
	Two-component hybrid mortar
	Suitable for dry and water saturated concrete
	Fast curing system
	SAFEset system with hollow drill bit TE-CD & TE-YD
	Non corrosive to rebar elements
Material:	Hybrid adhesive
Cartridge:	Foil pack: 500ml
	Foil pack: 330ml (special request)
Dispenser:	HDE 500-A22 and HDM 500 Cartridge holder, HIT-CR 500



HIT HY 200 foil pack, mixer



Cartridge holder, HIT-CR 500

Installation Details

	Y10	Y12	Y16	Y20	Y25	Y32
Rebar diameter (mm) [Ød]	10	12	16	20	25	32
Hole diameter (mm) [d0]	12	16	20	25	32	40
Min. Embedment Depth (mm) [h1]	Min. embedment depth should be according to EN1992-1-1 (clause 8.6)					
Installation system (Hammer Drilling)						
Hollow Drill bit	TE-CD12	TE-CD16	TE-YD20	TE-YD25	TE-YD30	n/a
Drill bit	TE-CX12	TE-CX16	TE-CX20	TE-CX25	TE-YX30	TE-YX40
Drilling system	TE2 / TE7 / TE30 / TE40				TE 50 / TE60 / TE70	

Remarks:

1. Actual embedment depth should be subjected to design stress.
2. All the spacing and edge distance requirement should be reference to European Technical Approval (ETA-12/0083);
3. **If there is a fire resistance concern, the loading should be referred to the local fire assessment FAHY200C-2016-S**

Basic Testing & loading data

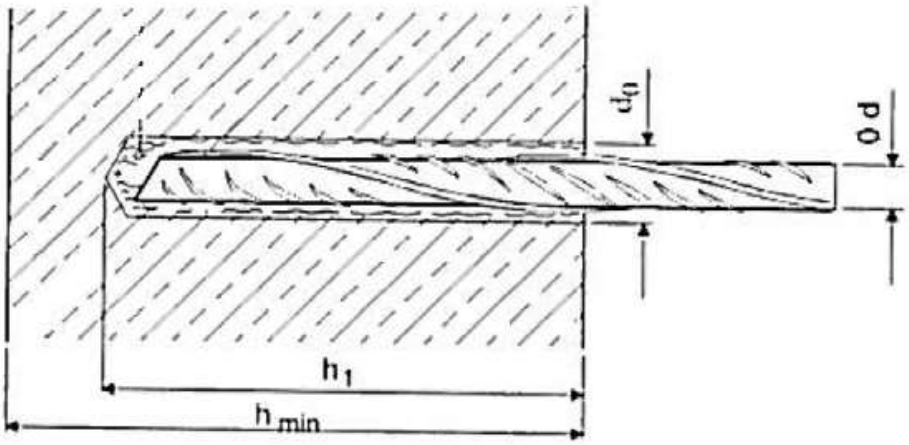
	Y10	Y12	Y16	Y20	Y25	Y32
Ultimate mean pull-out load as per BS5080 Part 1 (kN) Test Report ***See Remark 1**	***42.7***	***65.1***	***132.9***	***180.2***	***255.7***	***413.4***
Yield load of rebar (kN)	39.3	56.6	100.6	157.1	245.5	402.1
Max. Testing Load (0.87 x Yield Load)	**34.1**	**49.2**	**87.5**	**136.7**	**213.5**	**349.8**

Remarks:

1. It is based on BS5080 test for non-cracked concrete with strength 30N/mm2;
2. Yield strength of rebar fyk is 500N/mm2;
3. **Design embedment depth and loading should be subjected to design stress or designer's decision.;**
4. **Onsite pullout test can be carried out to verify the workmanship of the installation but should not be served as verification of the ultimate loading. The testing load shall be subjected to the designer's decision and onsite condition. It should not exceed the 0.87 x yield load of rebar to avoid permanent damage to the rebar.**

Setting Details

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



Mechanical Properties

Property	Standard	Value
Density Cured Mortar	EN ISO 1183-1	1.83g/cm3
Compressive Strength modulus	EN ISO 604 / HN569	1900 N/mm2
Compressive Strength	EN ISO 604 / HN569	7days - 110 N/mm2

5.6 Mortar consumption estimation for post installed rebars

Rebar Ø d_s [mm]	10	12	16	20	25	32	40
Drill bit Ø d_0 [mm]	14	16	20	25	32	40	55
Hole depth [mm]							
100	10.3	13.4	20.9	32.7	53.6	83.8	158.4
120	12.3	16.1	25.1	39.3	64.3	100.5	190.1
140	14.4	18.8	29.3	45.8	75.1	117.3	221.7
160	16.4	21.4	33.5	52.4	85.8	134.0	253.4
180	18.5	24.1	37.7	58.9	96.5	150.8	285.1
200	20.5	26.8	41.9	65.5	107.2	167.6	316.8
220	22.6	29.5	46.1	72.0	118.0	184.3	348.5
240	24.6	32.2	50.3	78.5	128.7	201.1	380.1
260	26.7	34.9	54.5	85.1	139.4	217.8	411.8
280	28.7	37.5	58.6	91.6	150.1	234.6	443.5
300	30.8	40.2	62.8	98.2	160.8	251.3	475.2
320	32.8	42.9	67.0	104.7	171.6	268.1	506.8
340	34.9	45.6	71.2	111.3	182.3	284.8	538.5
360	36.9	48.3	75.4	117.8	193.0	301.6	570.2
380	39.0	50.9	79.6	124.4	203.7	318.3	601.9
400	41.1	53.6	83.8	130.9	214.5	335.1	633.6
450	46.2	60.3	94.2	147.3	241.3	377.0	712.8
500	51.3	67.0	104.7	163.6	268.1	418.9	791.9
550	56.4	73.7	115.2	180.0	294.9	460.8	871.1
600	61.6	80.4	125.7	196.4	321.7	502.7	950.3
650	66.7	87.1	136.1	212.7	348.5	544.5	1029.5
700	71.8	93.8	146.6	229.1	375.3	586.4	1108.7
750	77.0	100.5	157.1	245.4	402.1	628.3	1187.9
800	82.1	107.2	167.6	261.8	428.9	670.2	1267.1
850	87.2	113.9	178.0	278.2	455.7	712.1	1346.3
900	92.4	120.6	188.5	294.5	482.5	754.0	1425.5
950	97.5	127.3	199.0	310.9	509.4	795.9	1504.7
1000	102.6	134.0	209.4	327.3	536.2	837.8	1583.9
1200	123.2	160.8	251.3	392.7	643.4	1005.3	1900.7
1400	143.7	187.7	293.2	458.2	750.6	1172.9	2217.4
1600	164.2	214.5	335.1	523.6	857.9	1340.4	2534.2
1800	184.7	241.3	377.0	589.1	965.1	1508.0	2851.0
2000	205.3	268.1	418.9	654.5	1072.3	1675.5	3167.8
2500	256.6	335.1	523.6	818.1	1340.4	2094.4	3959.7
3000	307.9	402.1	628.3	981.8	1608.5	2513.3	4751.7
3200	328.4	428.9	670.2	1047.2	1715.7	2680.8	5068.4

1. In the above table please find the quantity of mortar required for one fastening point, in ml. In this estimation, we consider 80% of the mortar is used for fastening, the rest being used for the first pull outs and waste.
2. The greyed area should not be used since it is not in accordance with the design codes requiring a depth of at least 10 drilling diameters.
3. The filled volume showed in the table did not include any wastage during the installation.
4. 1 trigger pull of dispenser HDE is approx. 6 ml of HY200.
   To dispense 1 cartridge of 500ml HY 200 needs approx. 80 triggers.

Installation instruction

Safety Regulations:

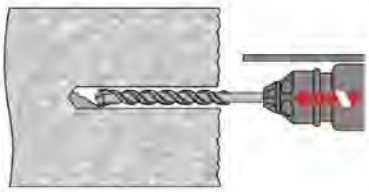


Review the Material Safety Data Sheet (MSDS) before use for proper and safe handling!
Wear well-fitting protective goggles and protective gloves when working with Hilti HIT-HY 200-R.
Important: Observe the installation instruction provided with each foil pack.

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

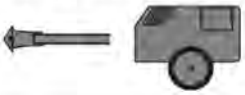


Drill hole to the required embedment depth with a hammer drill set in rotation-hammer mode or a compressed air drill using an appropriately sized carbide drill bit.

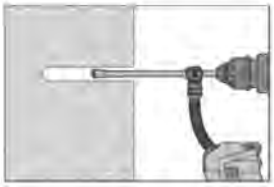
Hammer drill (HD)



Compressed air drill (CA)

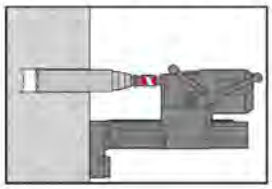


b) Hammer drilling with Hilti hollow drill bit TE-CD, TE-YD



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



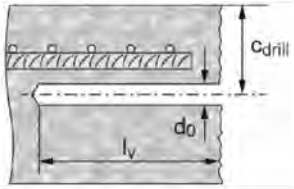


Diamond coring is permissible when suitable diamond core drilling machines and the corresponding core bits are used.

For the use in combination with Hilti roughening tool TE-YRT see parameters in Table B6 and B7.
Before roughening water needs to be removed from the borehole. Check usability of the roughening tool with the wear gauge RTG.
Roughen the borehole over the whole length to the required l_v.

Injection system Hilti HIT-HY 200-R for rebar connections	
Intended Use Installation instructions	**Annex B11**

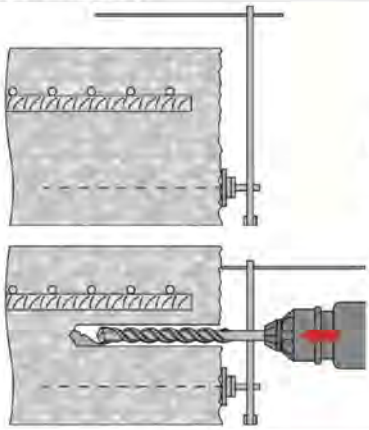
Splicing applications



- 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 $l_v > 20$ cm use drilling aid.



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

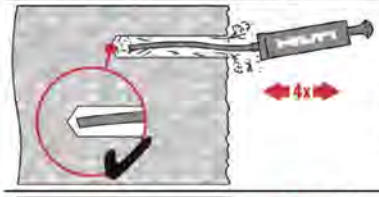
- Hilti drilling aid HIT-BH
- Lath or spirit level
- Visual check

Drill hole cleaning

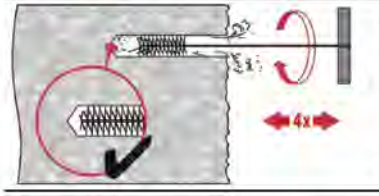
Just before setting the bar the drill hole must be free of dust and debris.
Inadequate hole cleaning = poor load values.

Manual Cleaning (MC)

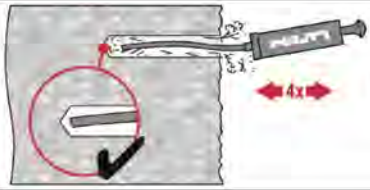
For drill hole diameters $d_0 \leq 20$ mm and drill hole depths $h_0 \leq 10 \cdot \phi$.



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 $h_{ef} \leq 10 \cdot \phi$.
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 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.

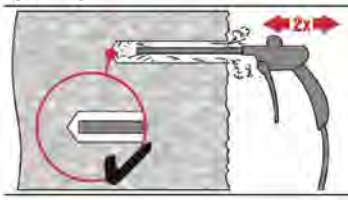
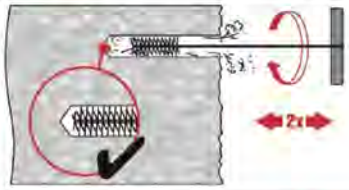
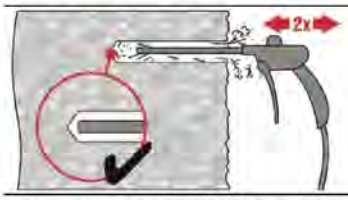
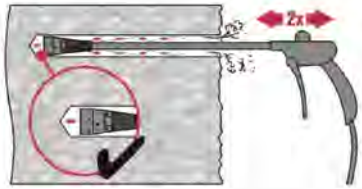
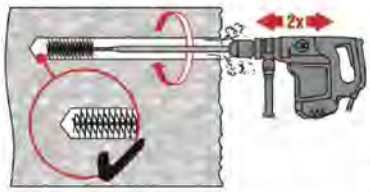
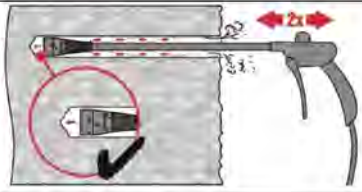


Blow out again with the Hilti hand pump at least 4 times until return air stream is free of noticeable dust.

Injection system Hilti HIT-HY 200-R for rebar connections

Intended Use
Installation instructions

Annex B12

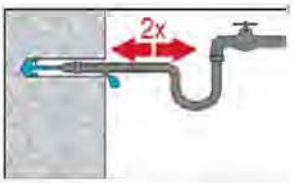
Compressed Air Cleaning (CAC)	For all drill hole diameters d_0 and all drill hole depths $h_0 \leq 20 \cdot \phi$.
	Blow 2 times from the back of the hole (if needed with nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust. Safety tip: Do not inhale concrete dust.
	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 again with compressed air 2 times until return air stream is free of noticeable dust.
Compressed Air Cleaning (CAC)	For drill holes deeper than 250 mm (for ϕ 8 to ϕ 12) or deeper than 20 · ϕ (for ϕ > 12 mm)
	Use the appropriate air nozzle Hilti HIT-DL (see Table B8). 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 B8) 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 drillhole.
	Use the appropriate air nozzle Hilti HIT-DL (see Table B8). 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.

Injection system Hilti HIT-HY 200-R for rebar connections

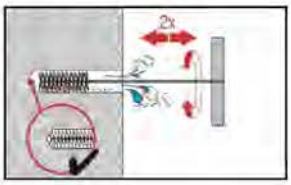
Intended Use
Installation instructions

Annex B13

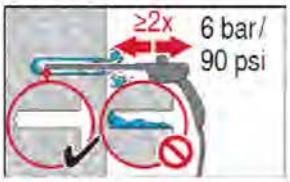
Cleaning of diamond cored holes with roughening with Hilti roughening tool TE-YRT:
For all drill hole diameters d_0 and all drill hole depths h_0.



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

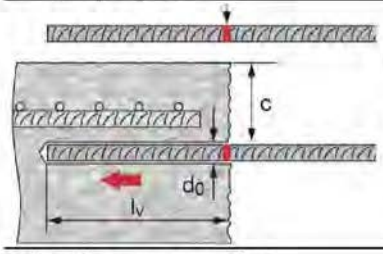


Brush 2 times with the specified brush (see Table 10) by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the drill hole (brush Ø ≥ drill hole Ø) - if not the brush is 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. Blow time see Table B7.
For drill hole diameters ≥ 32 mm the compressor has to supply a minimum air flow of 140 m³/h.

Rebar preparation

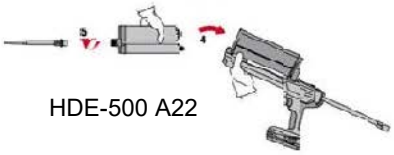


Before use, make sure the rebar is dry and free of oil or another residue.

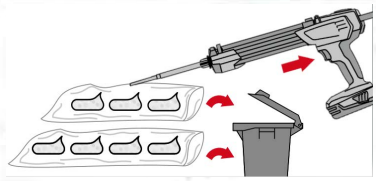
Mark the embedment depth on the rebar (e.g. with tape) → l_v.

Insert Rebar in drill hole to verify hole and setting depth l_v.

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.

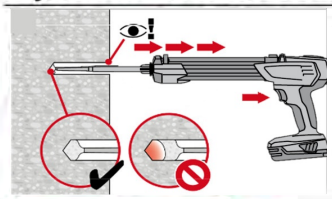


The foil pack opens automatically as dispensing is initiated. Depending on the size of the foil pack an initial amount of adhesive has to be discarded.
Discarded quantities are:
2 strokes for 330 ml foil pack,
3 strokes for 500 ml foil pack,
4 strokes for 500 ml foil pack < 5°C.

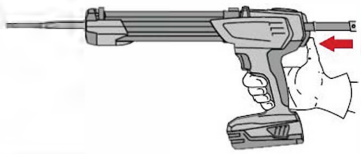
Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B14**
Intended Use Installation instructions	

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

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

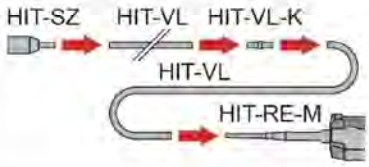


Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull.
Fill approximately 2/3 of the drill hole to ensure that the annular gap between the anchor and the concrete is completely filled with adhesive along the embedment length.

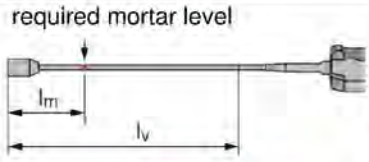


After injection is completed, depressurize the dispenser by pressing the release trigger. This will prevent further adhesive discharge from the mixer.

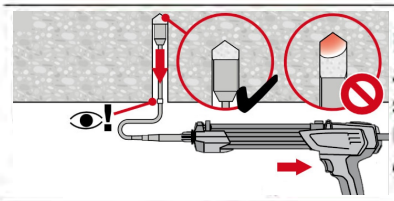
Injection method for drill hole depth > 250 mm or overhead applications



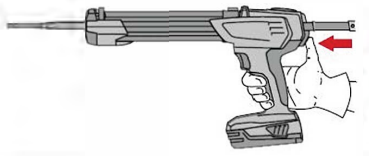
Assemble mixing nozzle HIT-RE-M, extension(s) and piston plug HIT-SZ (see Table B8 and Table B9).
For combinations of several injection extensions use coupler HIT-VL-K.
A substitution of the injection extension for a plastic hose or a combination of both is permitted.
The combination of HIT-SZ piston 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_v with tape or marker on the injection extension.
Estimation:
$l_m = 1/3 \cdot l_v$
Precise formula for optimum mortar volume:
$l_m = l_v \cdot (1{,}2 \cdot (\phi^2 / d_0^2) - 0{,}2)$

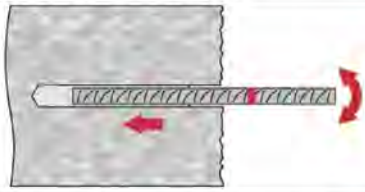
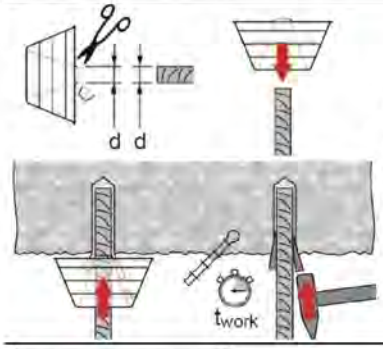
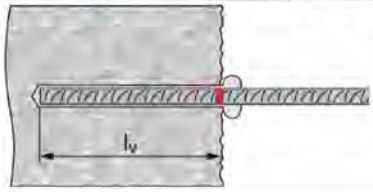
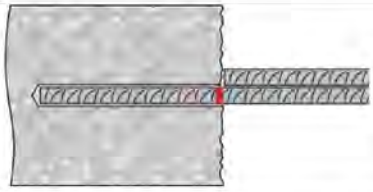
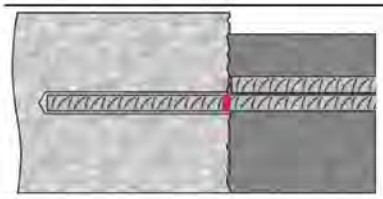


For overhead installation the injection is only possible with the aid of extensions and piston plugs. Assemble HIT-RE-M mixer, extension(s) and appropriately sized piston plug (see Table B8 and Table B9). Insert piston plug to back of the hole and inject adhesive. During injection the piston plug will 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.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B15**
Intended Use Installation instructions	

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_v is reached: embedment mark at concrete surface. • excess mortar flows out of the borehole after the rebar has been fully inserted until the embedment mark.
	Observe the working time t_{work} (see Table B5), 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 B5).

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B16**
Intended Use Installation instructions	

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED
8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong
Tel : 2695 8318 E-mail : etl@ets-testconsult.com
Fax : 2695 3944 Web site : www.ets-testconsult.com

HOKLAS 022 TEST CAL

TEST REPORT

Form C/FD/R/77/Issue 1 (1/1) [06/06]

Tensile Load Test on Dowel Bar

Customer : Hilti (Hong Kong) Ltd
Address : 701-704, 7/F, Tower A, Manulife Financial Centre, 223 Wai Yip Street, Kwun Tong, Kowloon
Project : -
Test Location : ETL Laboratory
Anchor Type : Hilti HY 200 – R + Grade 500B Y10 Rebar
Amb.Temperature : 18°C

Report No. : FDA42070
Test Date : 22-Dec-2014
Report Date : 24-Dec-2014
Page No. : 3 of 4
Test Method : BS 5080:Part 1:1993 Cl 7.1
Test Procedure : TPF/003

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.0	0.00	0.00	0.00	0.00	0.00
4.0	0.00	0.07	0.01	0.09	0.07
8.0	0.09	0.21	0.18	0.21	0.18
12.0	0.27	0.39	0.33	0.35	0.36
16.0	0.45	0.53	0.48	0.44	0.43
20.0	0.73	0.71	0.63	0.55	0.57
24.0	0.91	0.88	0.88	0.61	0.76
28.0	1.15	1.05	1.00	0.77	0.96
32.0	1.36	1.26	1.22	0.89	1.19
36.0	1.45	1.47	1.51	1.12	1.53
40.0	2.14	2.22	2.25	2.27	2.29
44.0	-	-	-	-	-
48.0	-	-	-	-	-
52.0	-	-	-	-	-
56.0	-	-	-	-	-
60.0	-	-	-	-	-
64.0	-	-	-	-	-
68.0	-	-	-	-	-
Failure Load (kN)	42.4	41.9	42.6	43.6	43.1
Failure Mode	F7	F7	F7 / F4	F7 / F4	F7 / F4
Average Failure Load (kN)	42.7				
Standard Deviation (kN)	0.7				

A) Test Appratus
Load Cell : Comp. Load Cell CWFK-10t, 100kN (ET/930/15/01) S/N : K03360
Load Cell Indicator : XH315A1-8 (ET/930/36/02) S/N : -
Cylinder : RSCH302 (ET/903/29) S/N : E02121602-11
Digital Dial Gauge : Digital Indicator (ET/915/53) S/N : 1301344

B) Concrete Grade 30/20D

C) Anchor installed date 19-Dec-2014

D) Failure Modes
P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Bar Breaking

E) Min. distance between reaction frame and centre of the fixing (mm) 200

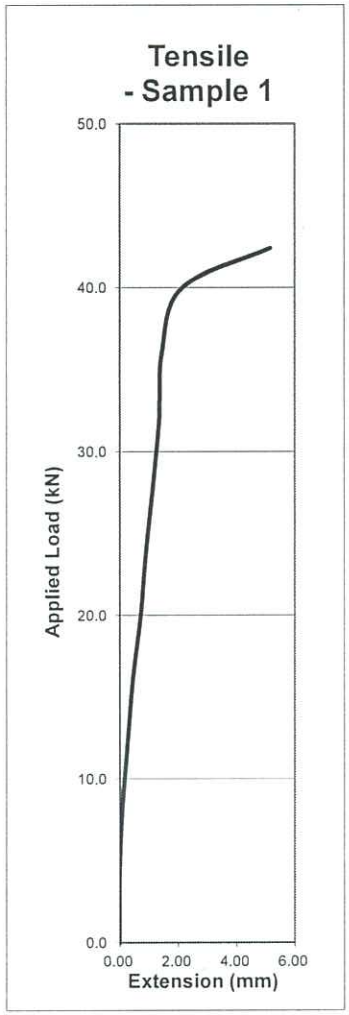
F) Min. distance between the centre of fixing and free edge (mm) 300

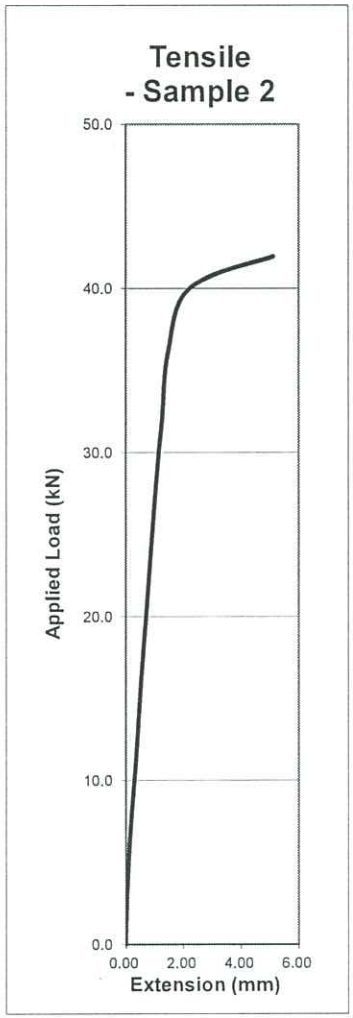
G) Rebar embedment depth (mm) 100

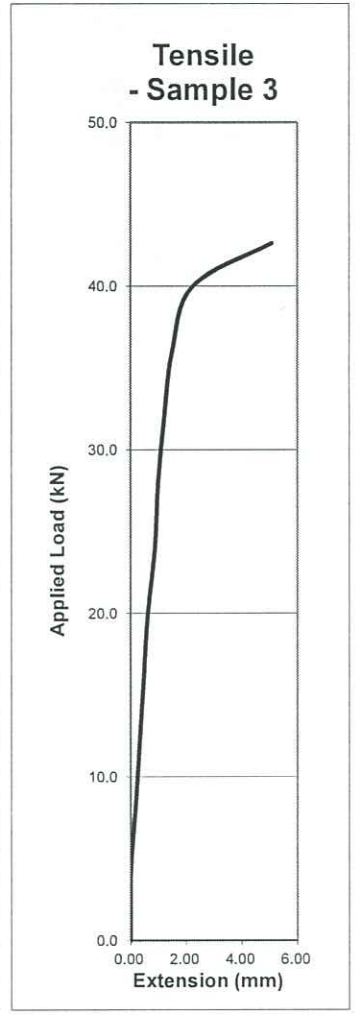
Tested By : KAN, Chi Wai / CHOW, Sui Luen
Approved Signatory : MONG, Seng Ming
Checked By : (Assistant Engineer)

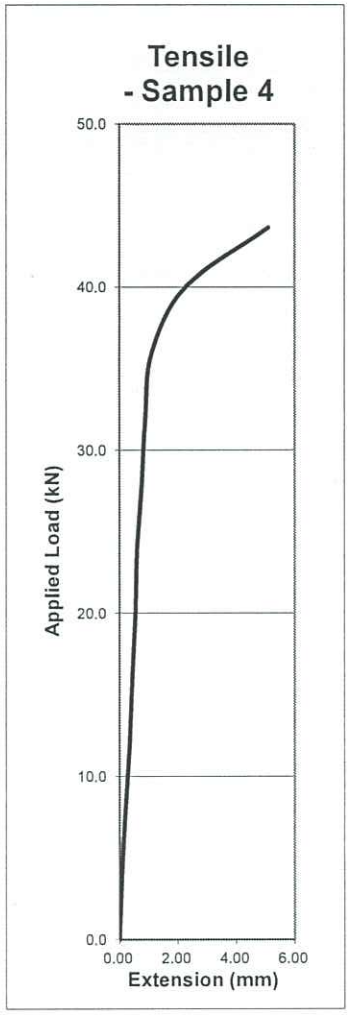
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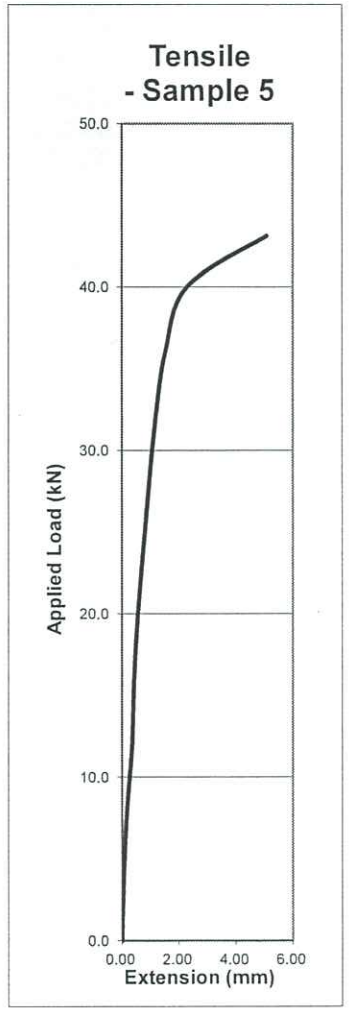
Hilti HY 200 – R + Grade 500B Y10 Rebar











Report Issue Date: 24-Dec-2014

- END OF REPORT -

Report No. FDA42070

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED
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Tel : 2695 8318 E-mail : etl@ets-testconsult.com
Fax : 2695 3944 Web site : www.ets-testconsult.com

HOKLAS 022 TEST CAL

TEST REPORT

Form C/FD/R/77/Issue 1 (1/1) [06/06]

Tensile Load Test on Dowel Bar

Customer : Hilti (Hong Kong) Ltd
Address : 701-704, 7/F, Tower A, Manulife Financial Centre, 223 Wai Yip Street, Kwun Tong, Kowloon
Project : -
Test Location : ETL Laboratory
Anchor Type : Hilti HY 200 – R + Grade 500B Y12 Rebar
Amb.Temperature : 18°C

Report No. : FDA42071
Test Date : 22-Dec-2014
Report Date : 24-Dec-2014
Page No. : 3 of 4
Test Method : BS 5080:Part 1:1993 Cl 7.1
Test Procedure : TPF/003

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.0	0.00	0.00	0.00	0.00	0.00
5.5	0.10	0.03	0.04	0.11	0.08
11.0	0.29	0.09	0.19	0.32	0.32
16.5	0.46	0.24	0.26	0.58	0.59
22.0	0.56	0.40	0.45	0.71	0.82
27.5	0.69	0.59	0.62	0.88	0.89
33.0	0.91	0.80	0.90	1.27	1.23
38.5	1.10	1.10	1.13	1.51	1.48
44.0	1.32	1.44	1.75	1.88	1.84
49.5	1.56	1.84	1.96	2.20	2.11
55.0	1.83	2.11	2.55	2.57	2.43
60.5	2.37	2.69	2.79	3.22	3.09
66.0	-	-	-	-	-
71.5	-	-	-	-	-
77.0	-	-	-	-	-
82.5	-	-	-	-	-
88.0	-	-	-	-	-
93.5	-	-	-	-	-
Failure Load (kN)	65.8	65.2	64.8	64.7	65.2
Failure Mode	F7 / F4	F7 / F4	F7 / F4	F7 / F4	F7 / F4
Average Failure Load (kN)	65.1				
Standard Deviation (kN)	0.4				

A) Test Appratus
Load Cell : Comp. Load Cell CWFK-50t, 500kN (ET/930/14/01) S/N : K03362
Load Cell Indicator : XK315A1-8 (ET/930/29/02) S/N : -
Cylinder : RSCH302 (ET/903/25) S/N : -
Digital Dial Gauge : Digital Indicator (ET/915/54) S/N : 103131

B) Concrete Grade 30/20D

C) Anchor installed date 19-Dec-2014

D) Failure Modes
P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Bar Breaking

E) Min. distance between reaction frame and centre of the fixing (mm) 240

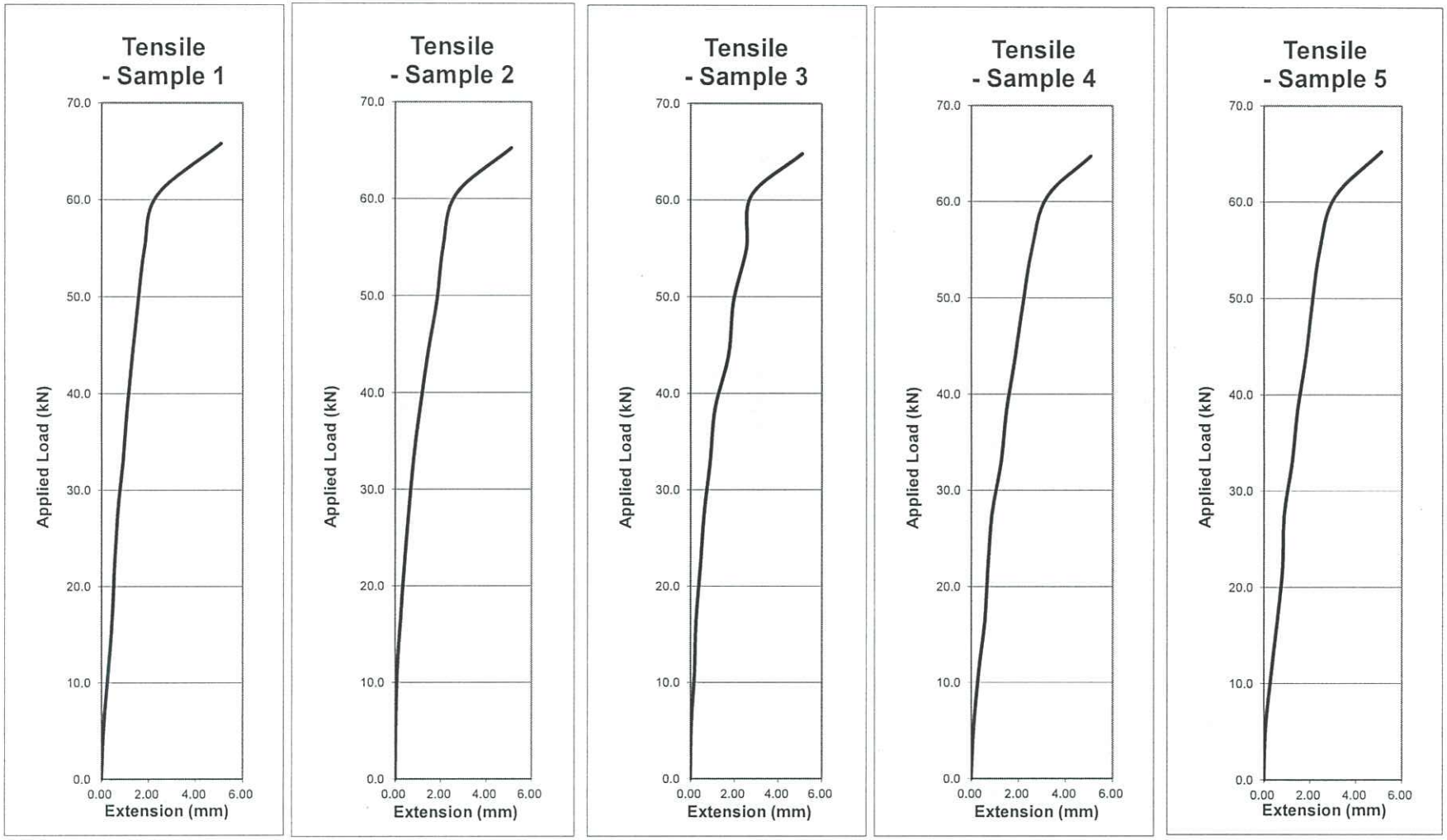
F) Min. distance between the centre of fixing and free edge (mm) 360

G) Rebar embedment depth (mm) 120

Tested By : CHAN, Hon Kwan / CHEUNG, Man Kit
Approved Signatory : MONG, Seng Ming
Checked By : (Assistant Engineer)

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Hilti HY 200 – R + Grade 500B Y12 Rebar



- END OF REPORT -

Report Issue Date: 24-Dec-2014

Report No. FDA42071

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

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Tel : 2695 8318 E-mail : etl@ets-testconsult.com
Fax : 2695 3944 Web site : www.ets-testconsult.com

HOKLAS 022 TEST CAL

TEST REPORT

Form C/FD/R/77/Issue 1 (1/1) [06/06]

Tensile Load Test on Dowel Bar

Customer : Hilti (Hong Kong) Ltd
Address : 701-704, 7/F, Tower A, Manulife Financial Centre, 223 Wai Yip Street, Kwun Tong, Kowloon
Project : -
Test Location : ETL Laboratory
Anchor Type : Hilti HY 200 – R + Grade 500B Y16 Rebar
Amb.Temperature : 18°C

Report No. : FDA42072
Test Date : 22-Dec-2014
Report Date : 24-Dec-2014
Page No. : 3 of 4
Test Method : BS 5080:Part 1:1993 Cl 7.1
Test Procedure : TPF/003

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.0	0.00	0.00	0.00	0.00	0.00
10.0	0.07	0.21	0.07	0.19	0.16
20.0	0.16	0.42	0.38	0.49	0.36
30.0	0.26	0.58	0.66	0.71	0.57
40.0	0.45	0.74	0.84	0.96	0.82
50.0	0.69	0.94	0.99	1.29	0.97
60.0	0.89	1.14	1.17	1.46	1.15
70.0	1.12	1.31	1.38	1.74	1.35
80.0	1.40	1.49	1.59	2.00	1.57
90.0	1.74	1.72	1.83	2.27	1.84
100.0	2.10	1.98	2.13	2.69	2.24
110.0	2.59	2.33	2.46	3.09	2.51
120.0	3.00	2.85	3.06	3.66	3.18
130.0	3.99	3.89	4.14	4.86	4.14
140.0	-	-	-	-	-
150.0	-	-	-	-	-
160.0	-	-	-	-	-
170.0	-	-	-	-	-
Failure Load (kN)	132.0	133.0	134.4	131.1	133.8
Failure Mode	F5 / F1	F5 / F1	F5 / F1	F5 / F1	F5 / F1
Average Failure Load (kN)	132.9				
Standard Deviation (kN)	1.3				

A) Test Appratus
Load Cell : Comp. Load Cell CWFK-50t, 500kN (ET/930/14/01) S/N : K03362
Load Cell Indicator : XK315A1-8 (ET/930/29/02) S/N : -
Cylinder : RSCH302 (ET/903/25) S/N : -
Digital Dial Gauge : Digital Indicator (ET/915/55) S/N : 102382

B) Concrete Grade 30/20D

C) Anchor installed date 19-Dec-2014

D) Failure Modes
P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Bar Breaking

E) Min. distance between reaction frame and centre of the fixing (mm) 320

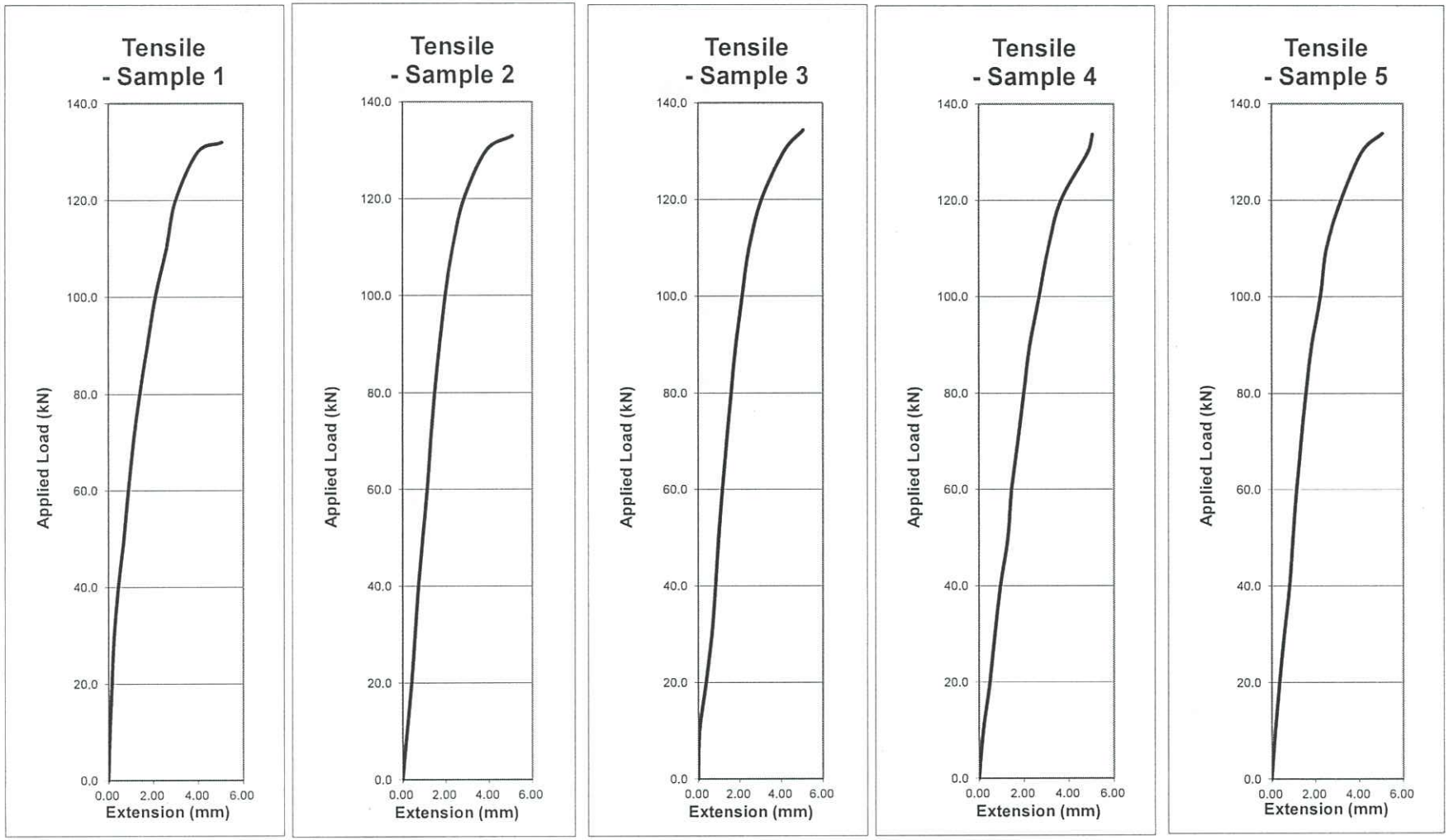
F) Min. distance between the centre of fixing and free edge (mm) 480

G) Rebar embedment depth (mm) 160

Tested By : CHOI, Chung Lung / CHAN, Hon Kwan
Approved Signatory : MONG, Seng Ming
Checked By : (Assistant Engineer)

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Hilti HY 200 – R + Grade 500B Y16 Rebar



- END OF REPORT -

Report Issue Date: 24-Dec-2014

Report No. FDA42072

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

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HOKLAS 022 TEST CAL

TEST REPORT

Form C/FD/R/77/Issue 1 (1/1) [06/06]

Tensile Load Test on Dowel Bar

Customer : Hilti (Hong Kong) Ltd
Address : 701-704, 7/F, Tower A, Manulife Financial Centre, 223 Wai Yip Street, Kwun Tong, Kowloon
Project : -
Test Location : ETL Laboratory
Anchor Type : Hilti HY 200 – R + Grade 500B Y20 Rebar
Amb.Temperature : 18°C

Report No. : FDA50473
Test Date : 11-Mar-2015
Report Date : 16-Mar-2015
Page No. : 3 of 4
Test Method : BS 5080:Part 1:1993 Cl 7.1.1
Test Procedure : TPF/003

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.0	0.00	0.00	0.00	0.00	0.00
16.0	0.38	0.11	0.19	0.25	0.14
32.0	0.58	0.39	0.51	0.61	0.20
48.0	0.76	0.63	0.84	0.98	0.35
64.0	0.95	0.89	1.04	1.30	0.82
80.0	1.17	1.14	1.25	1.85	0.98
96.0	1.28	1.36	1.46	2.10	1.15
112.0	1.53	1.57	1.70	2.37	1.44
128.0	1.74	1.76	1.91	2.62	1.66
144.0	1.97	2.03	2.14	2.92	1.82
160.0	2.31	2.35	2.45	3.02	2.01
176.0	2.96	3.14	3.48	3.94	2.53
192.0	-	-	-	-	-
208.0	-	-	-	-	-
224.0	-	-	-	-	-
Failure Load (kN)	178.4	178.8	180.6	181.4	181.8
Failure Mode	F5 / F1	F5 / F1	F5 / F1	F5 / F1	F5 / F1
Displacement	5.06	5.11	5.09	5.05	5.10
Average Failure Load (kN)	180.2				
Standard Deviation (kN)	1.5				

A) Test Appratus
Load Cell : Comp. Load Cell CWFK-50t, 500kN (ET/930/24/01) S/N : 034491
Load Cell Indicator : XK315A1-8 (ET/930/38/02) S/N : -
Cylinder : Hydraulic Cylinder RCH-606 (ET/903/12) S/N : -
Digital Dial Gauge : Digital Indicator (ET/915/52) S/N : 102389

B) Concrete Grade 30/20D

C) Anchor installed date 09-Mar-2015

D) Failure Modes
P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Bar Breaking

E) Min. distance between reaction frame and centre of the fixing (mm) 400

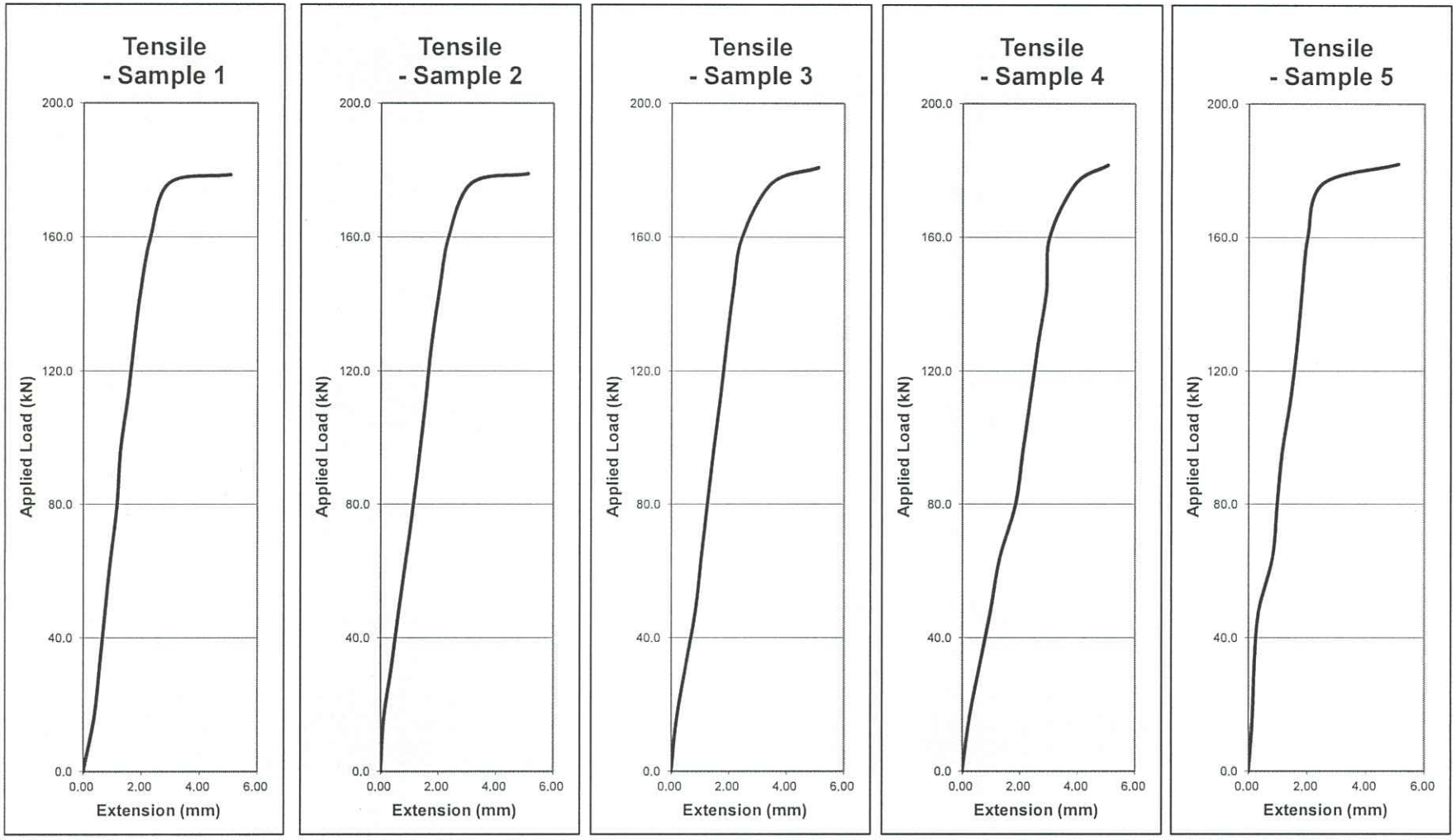
F) Min. distance between the centre of fixing and free edge (mm) 600

G) Rebar embedment depth (mm) 200

Tested By : CHUI, Chi To / TANG, Kam Fai
Approved Signatory : MONG, Seng Ming
Checked By : (Assistant Engineer)

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Hilti HY 200 – R + Grade 500B Y20 Rebar



Report Issue Date: 16-Mar-2015

- END OF REPORT -

Report No. FDA50473

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HOKLAS 022 TEST CAL

TEST REPORT

Form C/FD/R/77/Issue 1 (1/1) [06/06]

Tensile Load Test on Dowel Bar

Customer : Hilti (Hong Kong) Ltd
Address : 701-704, 7/F, Tower A, Manulife Financial Centre, 223 Wai Yip Street, Kwun Tong, Kowloon
Project : -
Test Location : ETL Laboratory
Anchor Type : Hilti HY200-R + Grade 500B Y25 Rebar
Amb.Temperature : 27°C

Report No. : FDA50850
Test Date : 27-Apr-2015
Report Date : 07-May-2015
Page No. : 3 of 4
Test Method : BS 5080:Part 1:1993 Cl 7.1.1
Test Procedure : TPF/003

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.0	0.00	0.00	0.00	0.00	0.00
25.0	0.08	0.09	0.18	0.14	0.31
50.0	0.24	0.39	0.28	0.36	0.54
75.0	0.42	0.66	0.45	0.67	0.80
100.0	0.63	0.85	0.72	1.00	1.10
125.0	0.86	1.05	1.06	1.27	1.37
150.0	1.18	1.52	1.45	1.59	1.77
175.0	1.62	2.10	1.91	2.04	2.21
200.0	2.20	2.64	2.50	2.51	2.76
225.0	3.01	3.25	3.16	3.08	3.38
250.0	3.88	4.17	4.03	4.16	4.42
275.0	-	-	-	-	-
300.0	-	-	-	-	-
325.0	-	-	-	-	-
350.0	-	-	-	-	-
Failure Load (kN)	258.3	256.0	256.4	254.7	253.1
Failure Mode	F1 / F5	F1 / F5	F1 / F5	F1 / F5	F1 / F5
Displacement	7.08	7.21	7.14	7.03	7.11
Average Failure Load (kN)	255.7				
Standard Deviation (kN)	1.9				

A) Test Appratus
Load Cell :Comp. Load Cell CWFK-50t, 500kN (ET/930/14/01) S/N : K03362
Load Cell Indicator : XK315A1-8 (ET/930/29/02) S/N : -
Cylinder : Hydraulic Cylinder RSCH302 (ET/903/29) S/N : E02121602-11
Digital Dial Gauge : Digital Indicator (ET/915/53) S/N : 1301344

B) Concrete Grade 30/20D

C) Anchor installed date 24-Apr-2015

D) Failure Modes
P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Bar Breaking

E) Min. distance between reaction frame and centre of the fixing (mm) 500

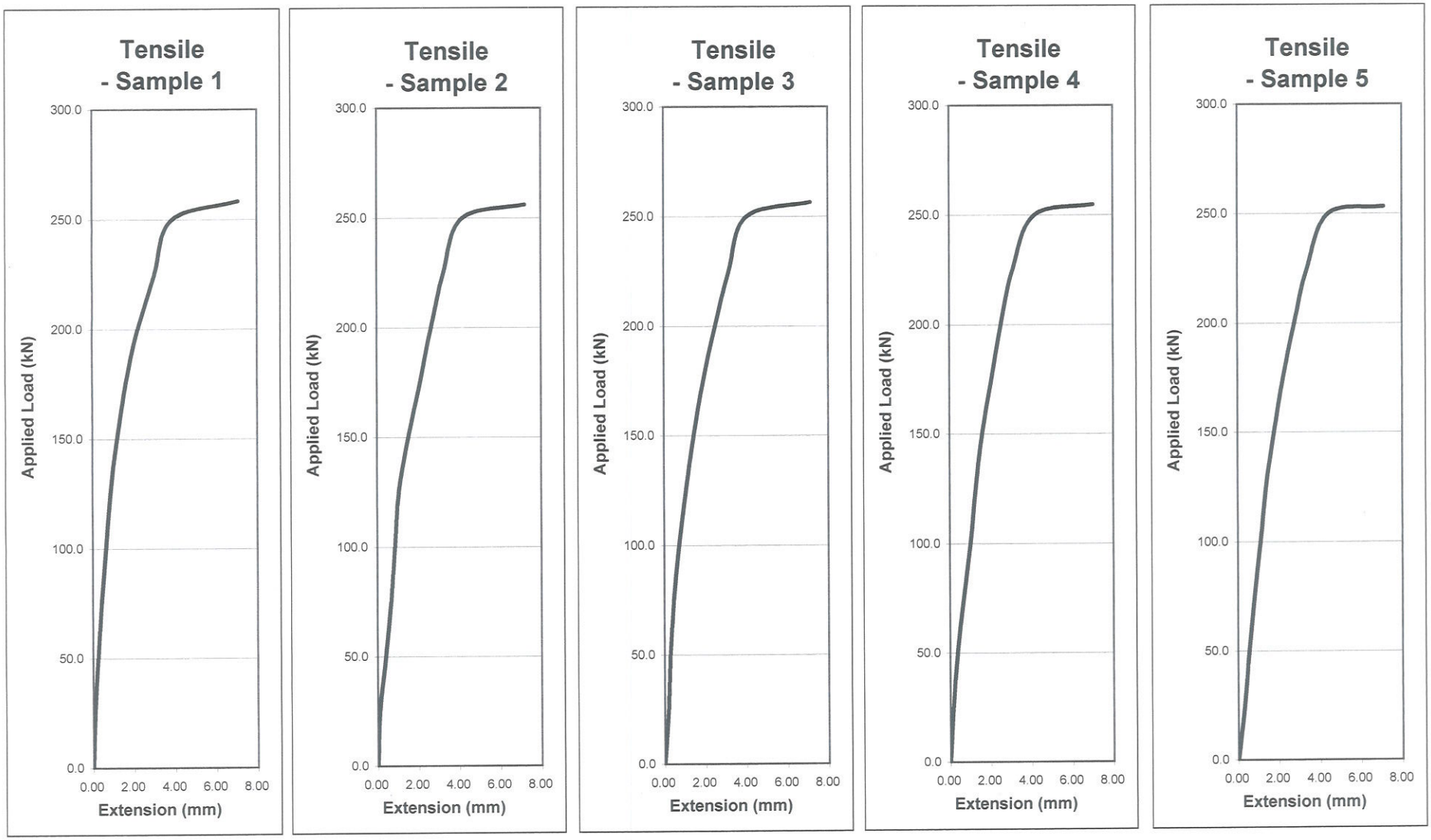
F) Min. distance between the centre of fixing and free edge (mm) 750

G) Rebar embedment depth (mm) 250

Tested By : CHUI, Chi To
Approved Signatory : MONG, Seng Ming
Checked By : (Assistant Engineer)

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Hilti HY200-R + Grade 500B Y25 Rebar



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HOKLAS 022 TEST CAL

TEST REPORT

Form C/FD/R/77/Issue 1 (1/1) [06/06]

Tensile Load Test on Dowel Bar

Customer : Hilti (Hong Kong) Ltd
Address : 701-704, 7/F, Tower A, Manulife Financial Centre, 223 Wai Yip Street, Kwun Tong, Kowloon
Project : -
Test Location : ETL Laboratory
Anchor Type : Hilti HY200-R + Grade 500B Y32 Rebar
Amb.Temperature : 27°C

Report No. : FDA50851
Test Date : 27-Apr-2015
Report Date : 07-May-2015
Page No. : 3 of 4
Test Method : BS 5080:Part 1:1993 Cl 7.1.1
Test Procedure : TPF/003

Load (kN)	*Dial Gauge Reading (mm)*				
	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*	*Sample 5*
0.0	0.00	0.00	0.00	0.00	0.00
40.5	0.06	0.14	0.08	0.12	0.14
81.0	0.26	0.38	0.16	0.35	0.36
121.5	0.53	0.74	0.41	0.67	0.68
162.0	0.84	0.98	0.69	0.90	0.95
202.5	1.18	1.27	0.94	1.34	1.17
243.0	1.49	1.55	1.33	1.66	1.42
283.5	2.03	1.93	1.75	2.08	1.86
324.0	2.66	2.47	2.26	2.54	2.27
364.5	3.29	3.14	2.94	3.04	3.00
405.0	4.22	4.15	3.89	4.16	4.04
445.5	-	-	-	-	-
486.0	-	-	-	-	-
Failure Load (kN)	410.3	414.2	417.0	411.5	413.8
Failure Mode	F1 / F5	F1 / F5	F1 / F5	F1 / F5	F1 / F5
Displacement	8.13	8.05	8.18	8.06	8.09
Average Failure Load (kN)	413.4				
Standard Deviation (kN)	2.6				

A) Test Appratus
Load Cell :Comp. Load Cell CWFK-50t, 500kN (ET/930/14/01) S/N : K03362
Load Cell Indicator : XK315A1-8 (ET/930/29/02) S/N : -
Cylinder : Hydraulic Cylinder RSCH302 (ET/903/29) S/N : E02121602-11
Digital Dial Gauge : Digital Indicator (ET/915/53) S/N : 1301344

B) Concrete Grade 30/20D

C) Anchor installed date 24-Apr-2015

D) Failure Modes
P = No sign of failure in anchor and/or structural member
F1 = Failure of anchor or its accessories
F2 = Failure in structural member
F3 = Pull out of anchor
F4 = Failure of structural member in a shear cone
F5 = Failure by continuous displacement or decreasing load
F6 = Failure in structural member with crack radiates outward from anchor
F7 = Other failure mode(s) : Bar Breaking

E) Min. distance between reaction frame and centre of the fixing (mm) 640

F) Min. distance between the centre of fixing and free edge (mm) 960

G) Rebar embedment depth (mm) 320

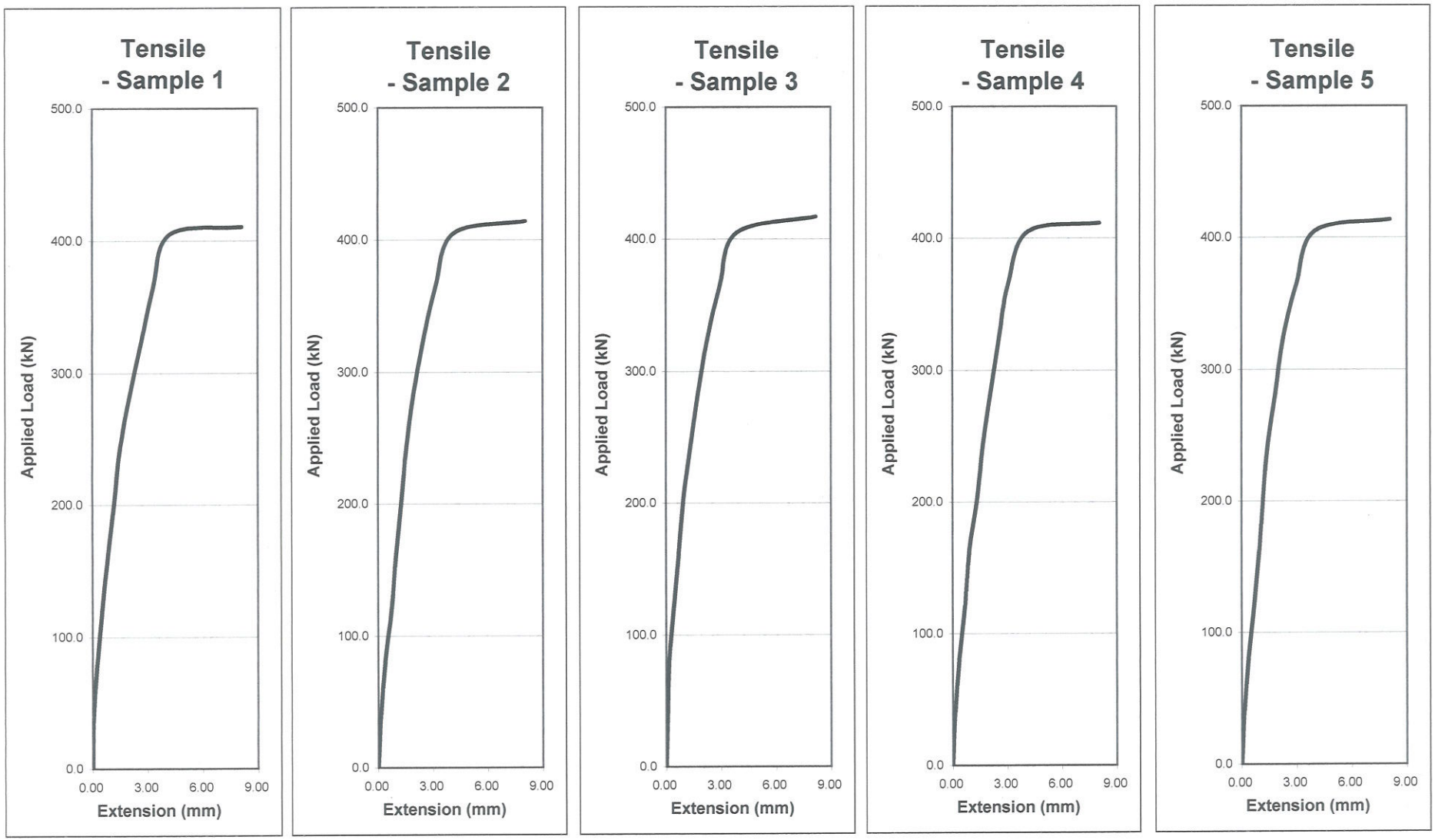
Tested By : CHUI, Chi To

Approved Signatory : MONG, Seng Ming

Checked By : (Assistant Engineer)

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Hilti HY200-R + Grade 500B Y32 Rebar



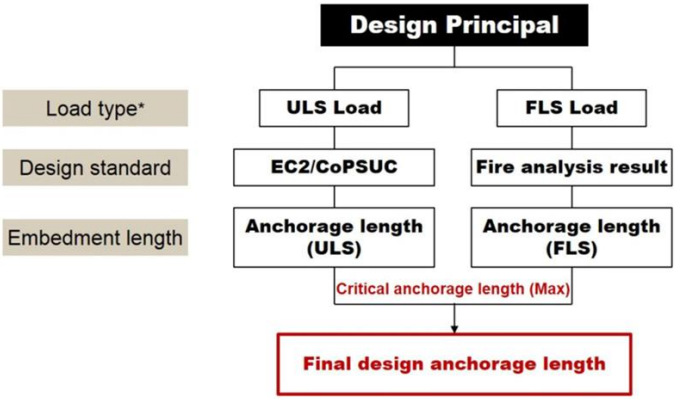
Report Issue Date: 07-May-2015

- END OF REPORT -
Page 4 of 4

Report No. FDA50851

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Design Principal



HY200 Fire Assessment

When the Hilti injection resin system for the post-installed rebar concrete-to-concrete connection application subjected to fire exposure, the system performance would undergo certain degree of reduction due to the effect of elevated temperature. An evaluation of the performance behavior under fire condition (in accordance with Code of Practice for Fire Safety in Buildings 2011 or other related standards) of injection resin used in post-installed concrete connection with rebar (Size Ø8 to 32 mm type 2 deformed bar for HY-200) is studied using Finite Element simulation method for supporting engineering design.

The maximum loads applicable through a rebar in concrete connection with Hilti injection resin as a function of both fire duration and anchorage length need to be assessed for the slab to slab connections, wall to slab connections, beam to beam connections and wall to beam connections.

The evaluation of the above characteristics need three steps procedure:

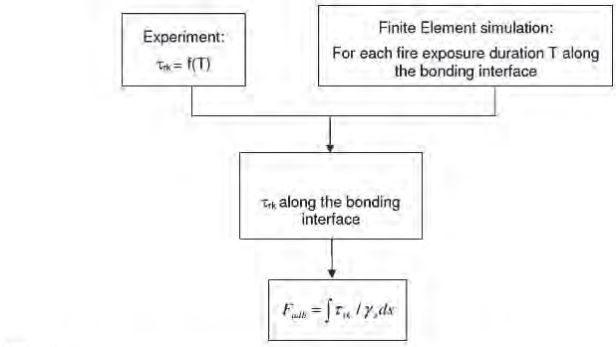


Figure 1 Evaluation Procedure

Step 1: Hilti resin with rebar subject to fire exposure experiments in different anchorage depth and fire rating and development the relationship for the bonding strength and the temperature.

Step 2: Consists in the finite element modeling of the temperature profiles at the bonding interface of the four considered connection types.

Step 3: Determination of the bonding stress along the bonding interface using step 1 and 2. The maximum load applicable through a rebar anchored with Hilti resin is then calculated by integrating this bonding stress over the interface area.

Step 1 experiments were carried out by the European laboratories and the related data are provided by Hilti for step **2** and step **3** for analysis. The bonding relations between the temperature and the critical bond stress are given as below:

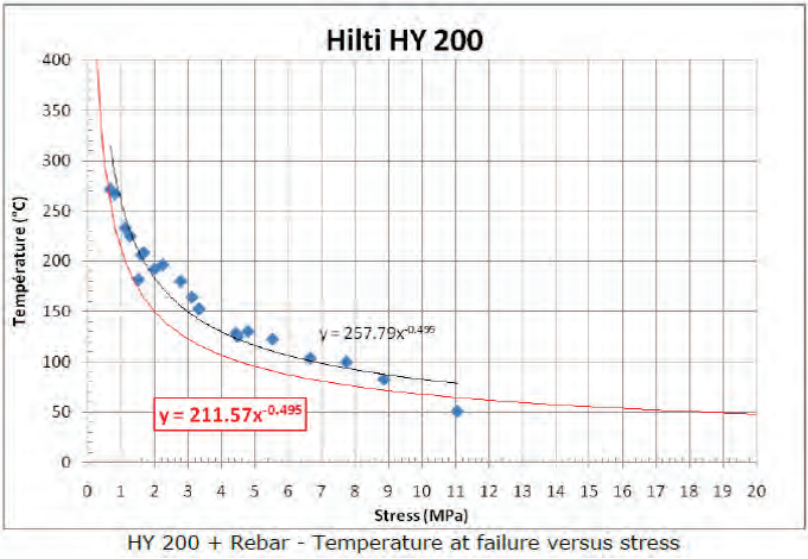


Figure 10 HILTI HIT-HY 200-A&R Characteristic bonding stress-temperature relationship
(blue points are experimental results; red points are the corresponding characteristic values)

More details about the experimental program can be found in the test report as “No EEM 11 26033756 on Fire Testing of Post installed rebar, threaded rod and HIT-Z connections with HY200 injection mortar”.

In this report, the following four types of connections (see **Figure 1** to **Figure 14**) are studied, and the related design tables are given for practical engineering usages.

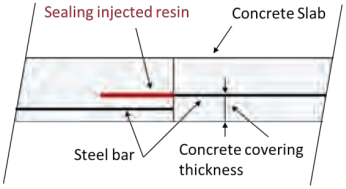


Figure 11 Slab to slab connection

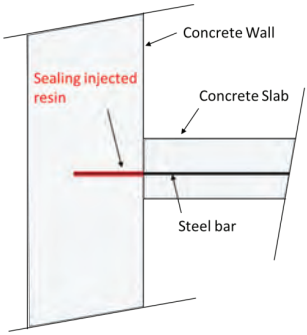


Figure 12 Wall to slab connection

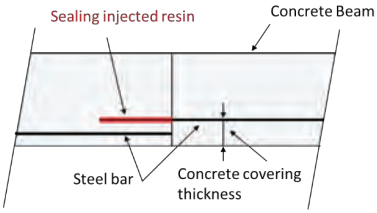


Figure 13 Beam to beam connection

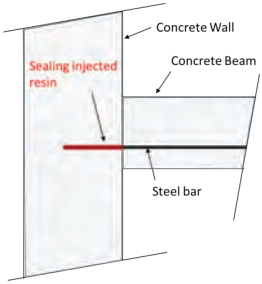
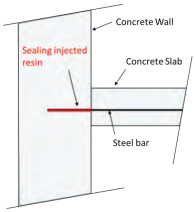


Figure 14 Wall to beam connection

Wall to slab connection

The maximum force in the rebar (resin adhesion strength) is given by:

$$F_{adh} = \int_0^{L_s} \frac{1}{\gamma_g} \pi * \emptyset * \tau_{rk}(x) dx$$



Where

- F_{adh} is the maximum force in the rebar;
- $\emptyset$ is the rebar diameter;
- $\tau_{rk}(x)$ is the characteristic bonding stress at a depth of x;
- L_s is the anchorage length;
- γ_g is the global safety factor, $\gamma_g = 1.43$;

			Maximum Force in the Rebar (kN)			
			R60	R120	R180	R240
Rebar Diameter (mm)	Rebar Maximum Load (kN)	Anchorage Depth (mm)	Cover = 25mm	Cover = 35mm	Cover = 45mm	Cover = 60mm
10	39.27	100	5.55	1.39	0.83	0.66
		120	12.28	2.64	1.37	1.01
		140	19.58	5.03	2.30	1.56
		160	26.87	9.60	3.88	2.42
		180	34.16	16.82	6.58	3.79
		200	39.27	24.11	11.15	5.97
		220		31.40	18.10	9.42
		240		38.70	25.39	14.82
		260		39.27	32.69	22.12
		280			39.27	29.41
		300				36.71
		320				39.27
12	56.55	120	14.74	3.16	1.65	1.22
		140	23.49	6.04	2.76	1.87
		160	32.24	11.52	4.65	2.91
		180	41.00	20.20	7.91	4.55
		200	49.75	28.95	13.42	7.16
		220	56.55	37.70	21.79	11.31
		240		46.45	30.55	17.79
		260		55.21	39.30	26.54
		280		56.55	48.05	35.29
		300			56.55	44.05
		320				52.80
		340				56.55
16	100.53	160	42.99	15.36	6.21	3.88
		180	54.66	26.93	10.54	6.06
		200	66.33	38.60	17.89	9.55
		220	78.00	50.27	29.06	15.10
		240	89.67	61.94	40.73	23.79
		260	100.53	73.61	52.40	35.46
		280		85.28	64.07	47.13
		300		96.95	75.74	58.80
		320		100.53	87.41	70.47
		340			99.08	82.14
		360			100.53	93.81
		380				100.53

			Maximum Force in the Rebar (kN)			
			R60	R120	R180	R240
Rebar Diameter (mm)	Rebar Maximum Load (kN)	Anchorage Depth (mm)	Cover = 25mm	Cover = 35mm	Cover = 45mm	Cover = 60mm
20	157.08	200	82.91	48.22	22.37	11.94
		220	97.50	62.81	36.33	18.87
		240	112.09	77.40	50.92	29.75
		260	126.68	91.99	65.50	44.34
		280	141.26	106.57	80.09	58.92
		300	155.85	121.16	94.68	73.51
		320	157.08	135.75	109.27	88.10
		340		150.34	123.85	102.69
		360		157.08	138.44	117.27
		380			153.03	131.86
		400			157.08	146.45
		420				157.08
25	245.44	250	149.23	105.82	72.76	46.30
		270	167.46	124.06	91.00	64.54
		290	185.70	142.29	109.23	82.77
		310	203.93	160.53	127.47	101.01
		330	222.17	178.76	145.70	119.24
		350	240.40	197.00	163.93	137.48
		370	245.44	215.23	182.17	155.71
		390		233.46	200.40	173.94
		410		245.44	218.64	192.18
		430			236.87	210.41
		450			245.44	228.65
		470				245.44
32	402.12	320	272.70	219.65	174.83	140.96
		340	296.04	242.99	198.17	164.30
		360	319.38	266.33	221.51	187.64
		380	342.72	289.67	244.85	210.98
		400	366.06	313.01	268.19	234.32
		420	389.40	336.35	291.53	257.66
		440	402.12	359.69	314.87	281.00
		460		383.03	338.21	304.34
		480		402.12	361.55	327.68
		500			384.89	351.02
		520			402.12	374.36
		540				397.70
		560				402.12

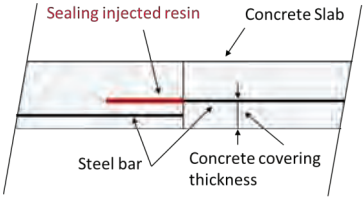
Slab to slab connection

The experimental temperature – bonding stress relationship is given by:

$$\tau = \left(\frac{\theta}{211.57}\right)^{-2.02}$$

Where:

- θ is the temperature in ℃
- τ is the bonding stress in MPa



Maximum Bonding Stress for a Slab to Slab Connection

	Bonding Stress (MPa)					
Concrete Depth (mm)	**R30**	**R60**	**R90**	**R120**	**R180**	**R240**
10	0.13					
20	0.23	0.11				
30	0.42	0.16	0.10			
40	0.80	0.23	0.14	0.11		
50	1.57	0.35	0.19	0.14		
60	3.17	0.55	0.27	0.18	0.11	
70	6.40	0.87	0.38	0.24	0.14	0.10
80	12.57	1.42	0.55	0.32	0.18	0.12
90		2.33	0.80	0.44	0.22	0.15
100		3.86	1.19	0.61	0.28	0.18
110		6.39	1.78	0.85	0.36	0.23
120		10.44	2.69	1.19	0.47	0.28
130			4.08	1.69	0.62	0.35
140			6.17	2.42	0.81	0.43
150			9.26	3.47	1.07	0.55
160			13.68	4.98	1.43	0.69
170				7.12	1.91	0.88
180				10.10	2.56	1.13
190	16.60			14.15	3.45	1.44
200					4.64	1.86
210		16.60			6.23	2.40
220					8.32	3.10
230			16.60		11.05	4.02
240					14.54	5.20
250				16.60		6.70
260						8.62
270					16.60	11.03
280						14.00
290						16.60
300 or above						

*Global safety factor (1.43) need to be apply to the bond stress

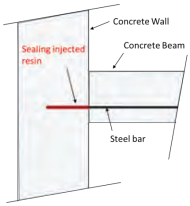
Wall to beam connection

The maximum force in the rebar (resin adhesion strength) is given by:

$$F_{adh} = \int_0^{L_s} \frac{1}{\gamma_g} \pi * \emptyset * \tau_{rk}(x) dx$$

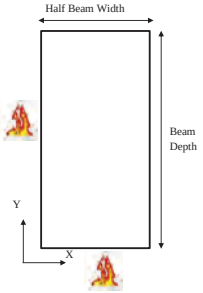
Where

- F_{adh} is the maximum force in the rebar;
- $\emptyset$ is the rebar diameter;
- $\tau_{rk}(x)$ is the characteristic bonding stress at a depth of x;
- L_s is the anchorage length;
- γ_g is the global safety factor, $\gamma_g = 1.43$;



		Rebar Anchorage Depth (mm)				
Rebar Diameter (mm)	Rebar Maximum Load (kN)	Cover (mm)	R60 (Beam Width = 300mm)	R120 (Beam Width = 300mm)	R180 (Beam Width = 400mm)	R240 (Beam Width = 400mm)
10	39.27	30	204			
		35	202			
		40	199	253		
		45	197	252		
		50	194	250		
		55	191	248		
		60	187	246	289	323
12	56.55	30	225			
		35	223			
		40	221	275		
		45	218	273		
		50	216	272		
		55	212	270		
		60	209	268	310	345
16	100.53	30	268			
		35	266			
		40	264	318		
		45	262	317		
		50	259	315		
		55	255	313		
		60	252	311	353	387
20	100.53	30	313			
		35	310			
		40	308	362		
		45	305	361		
		50	303	359		
		55	300	357		
		60	296	355	397	432
25	245.44	30	366			
		35	364			
		40	361	416		
		45	359	414		
		50	356	413		
		55	353	411		
		60	349	409	452	486
32	402.12	30	442			
		35	440			
		40	437	493		
		45	435	491		
		50	432	489		
		55	429	488		
		60	425	485	528	563

Beam to beam connection



The experimental temperature – bonding stress relationship is given by:

$$\tau = \left(\frac{\theta}{211.57}\right)^{-2.02}$$

Where:

- θ is the temperature in ℃
- τ is the bonding stress in MPa

Beam Width = 300mm, Fire Duration = 120 min								
Bond Stress (MPa)		X-Dir (mm)						
		40	50	70	90	110	130	150
Y-Dir (mm)	300	0.10	0.13	0.22	0.38	0.62	0.89	1.02
	250	0.10	0.13	0.22	0.37	0.60	0.86	0.98
	200	0.10	0.13	0.21	0.35	0.54	0.75	0.84
	150		0.12	0.18	0.27	0.40	0.51	0.56
	100			0.13	0.17	0.22	0.25	0.27
	50					0.10	0.10	0.10

Beam Width = 400mm, Fire Duration = 240 min								
Bond Stress (MPa)		X-Dir (mm)						
		80	100	120	140	160	180	200
Y-Dir (mm)	400	0.12	0.16	0.23	0.31	0.40	0.48	0.51
	350	0.12	0.16	0.23	0.31	0.40	0.47	0.50
	300	0.11	0.16	0.22	0.29	0.37	0.44	0.46
	250	0.11	0.15	0.20	0.26	0.32	0.37	0.39
	200	0.10	0.13	0.17	0.21	0.25	0.28	0.29
	150		0.10	0.12	0.15	0.17	0.18	0.19
	100					0.10	0.11	0.11

*Global safety factor (1.43) need to be apply to the bond stress

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Bautechnisches Prüfamt

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European Technical Assessment ETA-12/0083 of 21 June 2019

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Injection System Hilti HIT-HY 200-R for rebar connection
Product family to which the construction product belongs	Post-installed rebar connection under seismic action
Manufacturer	Hilti Aktiengesellschaft 9494 SCHAAN FÜRSTENTUM LIECHTENSTEIN
Manufacturing plant	Hilti Corporation
This European Technical Assessment contains	27 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 331522-00-0601
This version replaces	ETA-12/0083 issued on 26 March 2019

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Specific Part

1 Technical description of the product

The subject of this European technical assessment is the post-installed connection, by anchoring or overlap connection joint, of reinforcing bars (rebars) in existing structures made of normal weight concrete, using the injection mortar Hilti HIT-HY 200-R in accordance with the regulations for reinforced concrete construction.

Reinforcing bars are made of steel with a diameter ϕ from 8 to 32 mm according to Annex A. The reinforcing bar is placed into a drilled hole filled with injection mortar and is anchored via the bond between embedded reinforcing bar, injection mortar and concrete.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European assessment Document

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 European Technical Assessment is based lead to the assumption of a working life of the rebar connections 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 under static and quasi-static loading	See Annex C1
Characteristic resistance under seismic action	See Annex C2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with European Assessment Document EAD No. 331522-00-0601, the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 21 June 2019 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Baderschneider

Installed condition

Figure A1:

Overlap joint with existing reinforcement for rebar connections of slabs and beams.

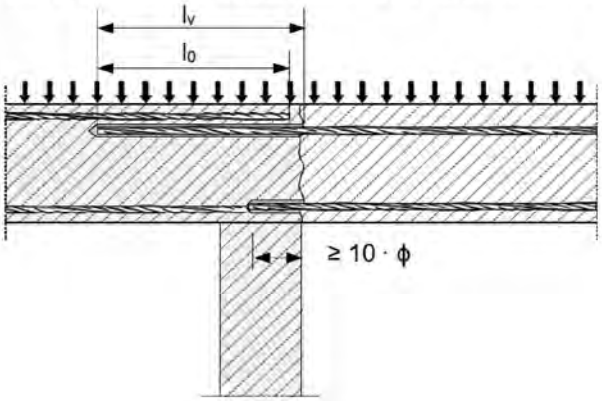


Figure A2:

Overlap joint with existing reinforcement at a foundation of a column or wall where the rebars are stressed in tension.

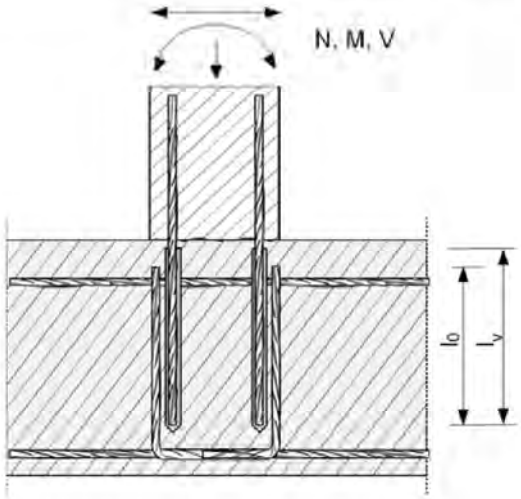
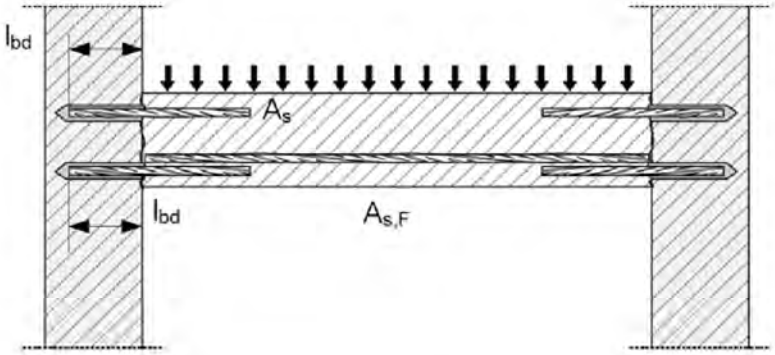


Figure A3:

End anchoring of slabs or beams.



Injection system Hilti HIT-HY 200-R for rebar connections	
Product description Installed condition: application examples of post-installed rebars	**Annex A1**

Figure A4:
Rebar connection for components stressed primarily in compression.

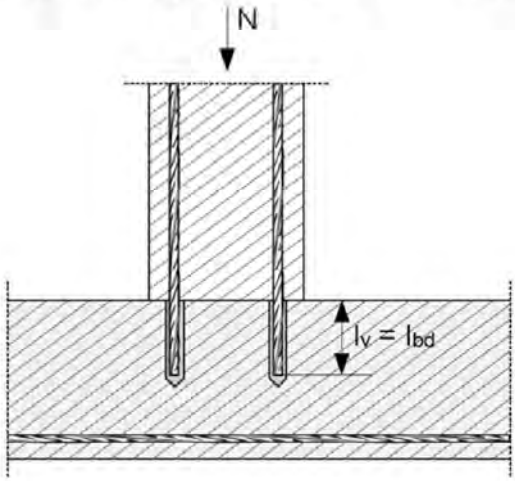
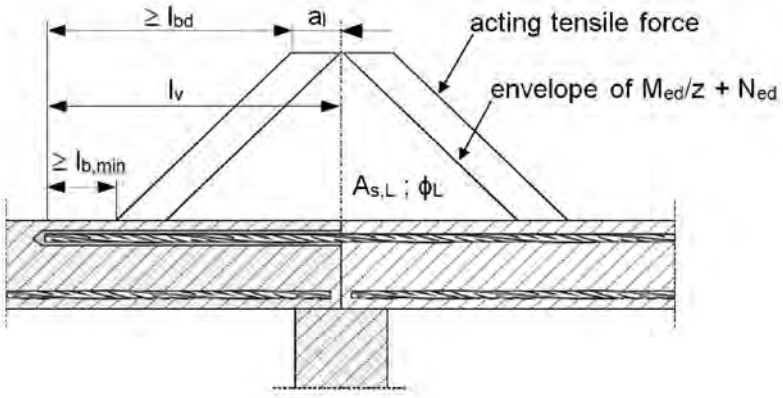


Figure A5:
Anchoring of reinforcement to cover the enveloped line of acting tensile force in the bending member.



Note to Figure A1 to Figure A5:

- In the Figures no transverse reinforcement is plotted, the transverse reinforcement as required by EN 1992-1-1:2004 + AC:2010 or EN 1998-1:2004 + AC:2009 shall be present.
- The shear transfer between existing and new concrete shall be designed according to EN 1992-1-1:2004 + AC:2010 or EN 1998-1:2004 + AC:2009.
- Preparing of joints according to Annex B2.

The reference to EN 1992-1-1:2004 + AC:2010 is cited in the following document as EN 1992-1-1 only.
The reference to EN 1998-1:2004 + AC:2009 is cited in the following document as EN 1998-1 only.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex A2**
Product description Installed condition: application examples of post-installed rebars	

Figure A6:
Overlap joint for the anchorage of a column stressed in bending to a foundation.

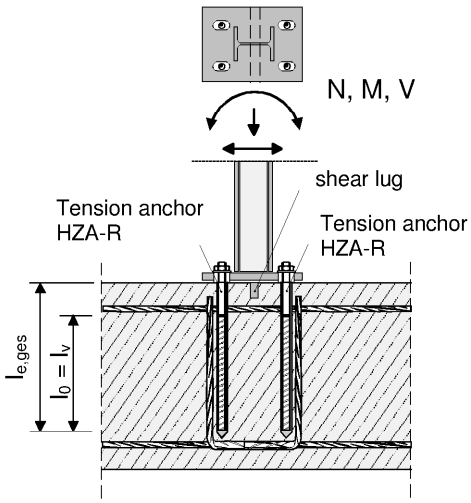


Figure A7:
Overlap joint for the anchorage of barrier posts.

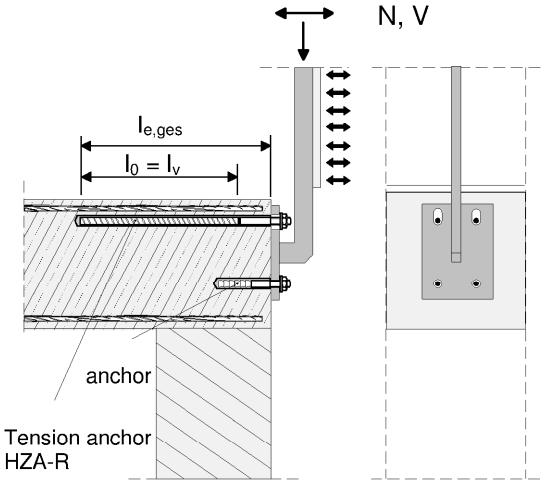
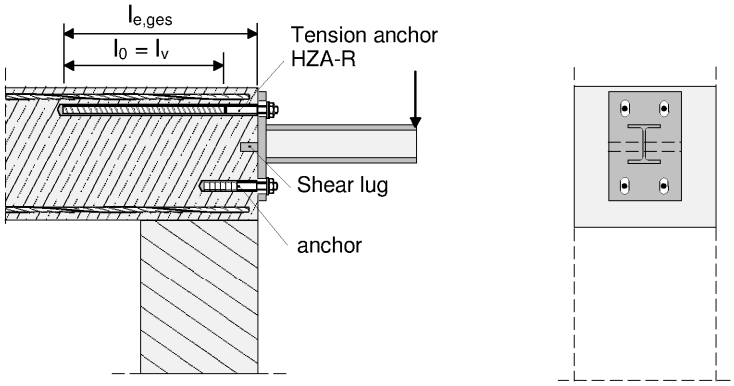


Figure A8:
Overlap joint for the anchorage of cantilever members.



Note to Figure A6 to A8:

- In the Figures no transverse reinforcement is plotted, the transverse reinforcement as required by EN 1992-1-1 shall be present.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex A3**
Product description Installed condition: application examples of HZA and HZA-R	

Product description: Injection mortar and steel elements

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

330 ml and 500 ml



Product name: "Hilti HIT-HY 200-R"

Static mixer Hilti HIT-RE-M

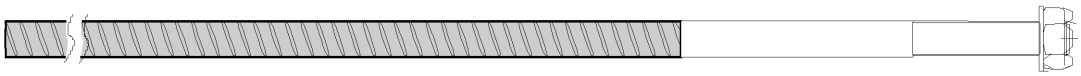


Steel elements



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.
- 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)



Hilti Tension Anchor HZA: M12 to M27 and HZA-R: M12 to M24

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex A4**
Product description Injection mortar / Static mixer / Steel elements	

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Table A1: Materials

Designation	Material
Reinforcing bars (rebars)	
Rebar EN 1992-1-1	Bars and de-coiled rods class B or C with f_{yk} and k according to NDP or NCL of EN 1992-1-1 $f_{uk} = f_{tk} = k \cdot f_{yk}$
Metal parts made of zinc coated steel	
Hilti tension anchor HZA	Round steel with threaded part: electroplated zinc coated ≥ 5 µm Rebar: Bars class B according to NDP or NCL of EN 1992-1-1
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
Metal parts made of stainless steel	
Hilti tension anchor HZA-R	Round steel with threaded part: Stainless steel 1.4404, 1.4362, 1.4571 EN 10088-1:2014 Rebar: Bars class B according to NDP or NCL of EN 1992-1-1
Washer	Stainless steel 1.4401, 1.4404, 1.4578, 1.4571, 1.4439, 1.4362 EN 10088-1:2014
Nut	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

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex A5**
Product description Materials	

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loading: rebar size ϕ8 to ϕ32mm, HZA M12 to M27 and HZA-R M12 to M24.
- Seismic loading: rebar size ϕ10 to ϕ32mm.

Base material:

- Compacted reinforced or unreinforced normal weight concrete without fibers according to EN 206:2013.
- Strength classes C12/15 to C50/60 according to EN 206:2013.
- Maximum chloride content of 0,40 % (CL 0.40) related to the cement content according to EN 206:2013.
- 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**
  -40 °C to +80 °C (max. long term temperature +50 °C and max. short term temperature +80 °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 EN 1992-1-1 and under seismic action in accordance with EN 1998-1.
- 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.

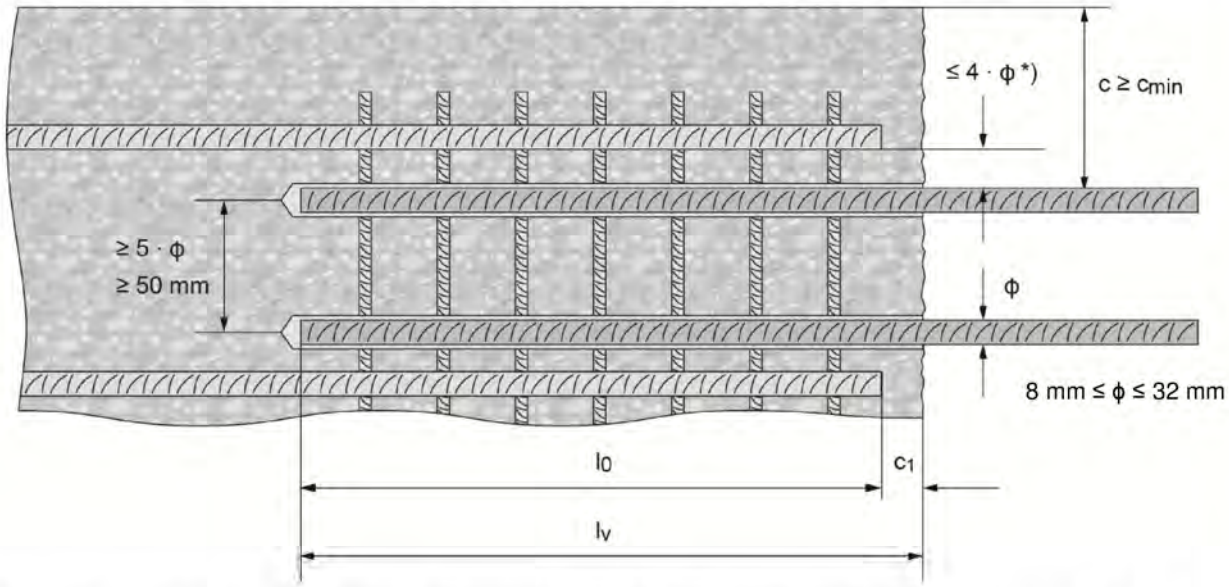
Installation:

- 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), compressed air drilling (CA), 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 for the overlap joint).

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B1**
Intended Use Specifications	

Figure B1: General construction rules for post-installed rebars

- Post-installed rebar may be designed for tension forces only.
- The transfer of shear forces between new concrete and existing structure shall be designed additionally according to EN 1992-1-1.
- The joints for concreting must be roughened to at least such an extent that aggregate protrudes.



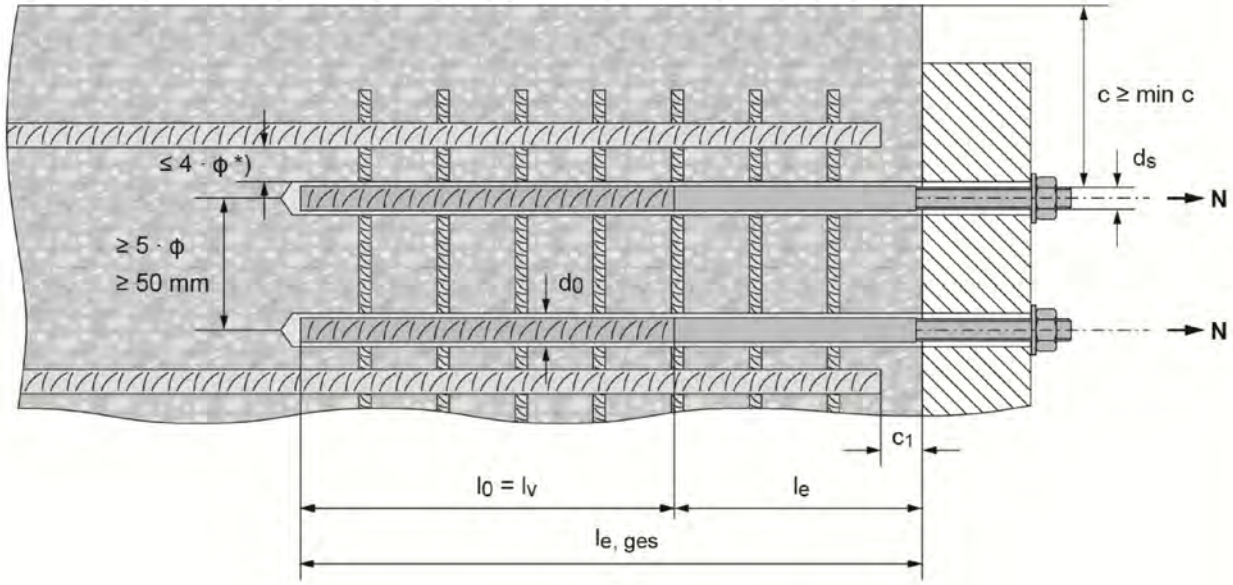
*) If the clear distance between lapped bars exceeds 4 · ϕ, then the lap length shall be increased by the difference between the clear bar distance and 4 · ϕ.

c concrete cover of post-installed rebar
c_1 concrete cover at end-face of existing rebar
c_{min} minimum concrete cover according to Table B3 and to EN 1992-1-1
ϕ diameter of reinforcement bar
l_0 lap length according to EN 1992-1-1 for static loading and according to EN 1998-1, section 5.6.3 for seismic action
l_v effective embedment depth ≥ $l_0 + c_1$
d_0 nominal drill bit diameter, see Annex B5

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B2**
Intended Use General construction rules for post-installed rebars	

Figure B2: General construction rules for Hilti tension anchor HZA and HZA-R

- Hilti tension anchor HZA / HZA-R may be designed for tension forces only.
- The tension forces must be transferred via an overlap joint to the reinforcement in the existing structure.
- The length of the bonded-in smooth shaft may not be accounted as anchorage.
- The transfer of shear forces shall be ensured by appropriate additional measures, e.g. by shear lugs or by anchors with a European technical assessment (ETA).
- In the anchor plate the holes for the Hilti tension anchor shall be executed as elongated holes with the axis in the direction of the shear force.



*) If the clear distance between lapped bars exceeds 4 · ϕ, then the lap length shall be increased by the difference between the clear bar distance and 4 · ϕ.

c concrete cover of Hilti tension anchor HZA / HZA-R
c_1 concrete cover at end-face of existing rebar
c_{min} minimum concrete cover according to Table B3 and to EN 1992-1-1
ϕ diameter of reinforcement bar
l_0 lap length, according to EN 1992-1-1
l_v effective embedment depth
l_e length of the smooth shaft or the bonded-in threaded part
$l_{e,ges}$ overall embedment depth
d_0 nominal drill bit diameter

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B3**
Intended Use General construction rules for HZA and HZA-R	

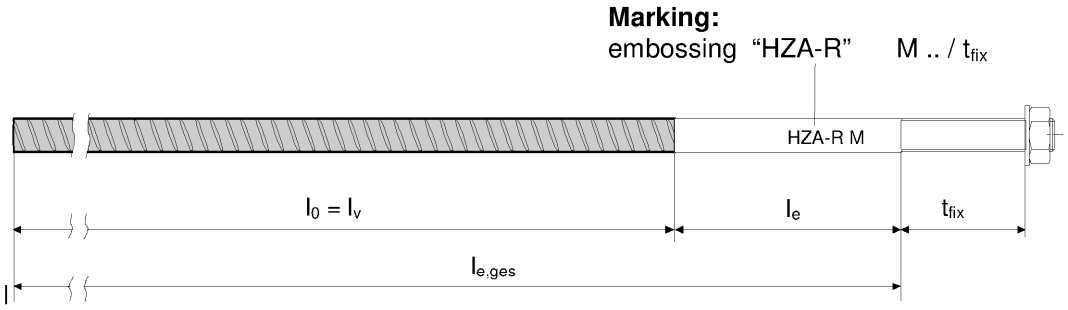
Table B1: Hilti tension anchor HZA dimensions

Hilti tension anchor HZA			**M12**	**M16**	**M20**	**M24**	**M27**
Rebar diameter	ϕ	[mm]	12	16	20	25	28
Nominal embedment depth and drill hole depth	$l_{e,ges}$	[mm]	90 to 800	100 to 1300	110 to 1300	120 to 1300	140 to 1300
Effective embedment depth ($l_v = l_{e,ges} - l_e$)	l_v	[mm]	$l_{e,ges} - 20$				
Length of smooth shaft	l_e	[mm]	20				
Nominal diameter of drill bit	d_0	[mm]	16	20	25	32	35
Maximum diameter of clearance hole in the fixture	d_f	[mm]	14	18	22	26	30
Maximum torque moment	T_{max}	[Nm]	40	80	150	200	270

Table B2: Hilti tension anchor HZA-R dimensions

Hilti tension anchor HZA-R			**M12**	**M16**	**M20**	**M24**
Rebar diameter	ϕ	[mm]	12	16	20	25
Nominal embedment depth and drill hole depth	$l_{e,ges}$	[mm]	170 to 800	180 to 1300	190 to 1300	200 to 1300
Effective embedment depth ($l_v = l_{e,ges} - l_e$)	l_v	[mm]	$l_{e,ges} - 100$			
Length of smooth shaft	l_e	[mm]	100			
Nominal diameter of drill bit	d_0	[mm]	16	20	25	32
Maximum diameter of clearance hole in the fixture	d_f	[mm]	14	18	22	26
Maximum torque moment	T_{max}	[Nm]	40	80	150	200

Hilti Tension Anchor HZA / HZA-R

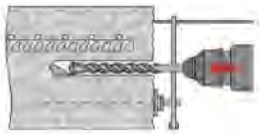


Injection system Hilti HIT-HY 200-R for rebar connections

Intended Use
Installation parameters for HZA and HZA-R

Annex B4

Table B3: Minimum concrete cover c_{min} [1] of post-installed rebar or tension anchor HZA-(R) depending on drilling method and drilling tolerance

Drilling method	Bar diameter [mm]	Minimum concrete cover c_{min} [1] [mm]		
		Without drilling aid	With drilling aid	
Hammer drilling **(HD)** and **(HDB)**[2]	$\phi < 25$	$30 + 0{,}06 \cdot l_v \geq 2 \cdot \phi$	$30 + 0{,}02 \cdot l_v \geq 2 \cdot \phi$	
	$\phi \geq 25$	$40 + 0{,}06 \cdot l_v \geq 2 \cdot \phi$	$40 + 0{,}02 \cdot l_v \geq 2 \cdot \phi$	
Compressed air drilling **(CA)**	$\phi < 25$	$50 + 0{,}08 \cdot l_v$	$50 + 0{,}02 \cdot l_v$	
	$\phi \geq 25$	$60 + 0{,}08 \cdot l_v \geq 2 \cdot \phi$	$60 + 0{,}02 \cdot l_v \geq 2 \cdot \phi$	
Diamond coring with roughening with Hilti Roughening tool TE-YRT **(RT)**	$\phi < 25$	$30 + 0{,}06 \cdot l_v \geq 2 \cdot \phi$	$30 + 0{,}02 \cdot l_v \geq 2 \cdot \phi$	
	$\phi \geq 25$	$40 + 0{,}06 \cdot l_v \geq 2 \cdot \phi$	$40 + 0{,}02 \cdot l_v \geq 2 \cdot \phi$	

[1] See Annexes B2 and B3, Figures B1 and B2.
[2] HDB = hollow drill bit Hilti TE-CD and TE-YD
Comments: The minimum concrete cover acc. EN 1992-1-1 must be observed.
The same minimum concrete covers apply for rebar elements in the case of seismic loading, i.e. $c_{min,seis} = 2\ \phi$.

Table B4: Maximum embedment depth $l_{v,max}$ depending on bar diameter and dispenser

Elements		Dispensers	
Rebar	Hilti Tension Anchor	HDM 330, HDM 500	HDE 500
		Concrete temperature ≥ -10 °C	Concrete temperature ≥ 0 °C
Size	Size	$l_{v,max}$ [mm]	$l_{v,max}$ [mm]
ϕ 8 - 32	HZA M12 to M27 HZA-R M12 to M24	700	1000

Table B5: Maximum working time and minimum curing time

Temperature in the base material T	Maximum working time t_{work}	Minimum curing time t_{cure}
-10 °C to -5 °C	3 hours	20 hours
-4 °C to 0 °C	2 hours	8 hours
1 °C to 5 °C	1 hour	4 hours
6 °C to 10 °C	40 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 hours

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B5**
Intended Use Minimum concrete cover / Maximum embedment depth Maximum working time and minimum curing time	

Table B6: 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 B7: Installation parameters for use of the Hilti Roughening tool TE-YRT

	Roughening time $t_{roughen}$	Minimum blowing time $t_{blowing}$
h_{ef} [mm]	$t_{roughen}$ [sec] = h_{ef} [mm] / 10	$t_{blowing}$ [sec] = $t_{roughen}$ [sec] + 20
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

Hilti roughening tool TE-YRT and wear gauge RTG

Hilti roughening tool TE-YRT	
Wear gauge RTG	

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B6**
Intended Use Parameters for use of the Hilti Roughening tool TE-YRT	

Table B8: Parameters of drilling, cleaning and setting tools for hammer drilling and compressed air drilling

Element	Drill and clean					Installation		
Rebar / Hilti Tension Anchor	Hammer drilling (HD)	Compressed air drilling (CA)	Brush HIT-RB	Air nozzle HIT-DL	Extension for air nozzle	Piston plug HIT-SZ	Extension for piston plug	Maximum embedment depth
								-
Size	d_0 [mm]	d_0 [mm]	Size	Size	[-]	Size	[-]	$l_{v,max}$ [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 / HZA-(R) M12	14	-	14	14		14		250
	16	-	16	16		16		1000
	-	17	18	16		18		
ϕ 14	18	-	18	18		18		1000
	-	17	18	18		18		
ϕ 16 / HZA-(R) M16	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
	-	20	22	20		22		
ϕ 18	22	22	22	22		22		1000
ϕ 20 / HZA-(R) M20	25	-	25	25		25		1000
	-	26	28	25		28		
ϕ 22	28	28	28	28		28		1000
ϕ 24	32	32	32	32		32		1000
ϕ 25 / HZA-(R) M24	32	32	32			32		1000
ϕ 26	35	35	35			35		1000
ϕ 28 / HZA M27	35	35	35			35		1000
ϕ 30	-	35	35			35		1000
	37	-	37			37		
ϕ 32	40	40	40			40		1000

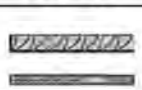
[1] Assemble extension HIT-VL 16/0,7 with coupler HIT-VL K for deeper drill holes.

Injection system Hilti HIT-HY 200-R for rebar connections

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

Annex B7

Table B9: Parameters of drilling and setting tools for hammer drilling with hollow drill bit

Element	**Drill** (no cleaning required)				**Installation**		
Rebar / Hilti Tension Anchor	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	[-]	$l_{v,max}$ [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 / HZA-(R) M12	14				14		400
	16				16		1000
ϕ 14	18				18		1000
ϕ 16 / M16	20				20	HIT-VL 16/0,7 and/or HIT-VL 16	1000
ϕ 18	22				22		1000
ϕ 20 / HZA-(R) M20	25				25		1000
ϕ 22	28				28		1000
ϕ 24	32				32		1000
ϕ 25 / HZA-(R) M24	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.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B8**
Intended Use Parameters of drilling and setting tools for hammer drilling with hollow drill bit	

Table B10: Parameters of drilling, cleaning and setting tools for diamond coring with roughening tool (RT)

Element	Drill and clean				Installation		
Rebar / Hilti Tension Anchor	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
							-
Size	d_0 [mm]	Size	Size	[-]	Size	[-]	$l_{v,max}$ [mm]
ϕ 14	18	18	18	HIT-DL V10/1	18	HIT-VL 11/1,0	1000
ϕ 16 / HZA-(R) M16	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 / HZA-(R) M20	25	25	25		25		1000
ϕ 22	28	28	28		28		1000
ϕ 24	32	32	32		32		1000
ϕ 25 / HZA-(R) M24	32	32			32		1000
ϕ 26	35	35			35		1000
ϕ 28 / HZA M27	35	35			35		1000
ϕ 30	37	37			37		1000
ϕ 32	40	40			40		1000

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

Injection system Hilti HIT-HY 200-R for rebar connections	Annex B9
Intended Use Parameters of drilling, cleaning and setting tools for diamond coring with roughening tool	

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Cleaning alternatives

Manual Cleaning (MC):
Hilti hand pump for blowing out drill holes with diameters $d_0 \leq 20$ mm and drill hole depths $h_0 \leq 10 \cdot \phi$.



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.



Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B10**
Intended Use Cleaning alternatives	

Installation instruction

Safety Regulations:

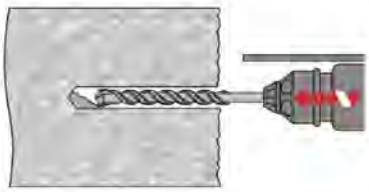


Review the Material Safety Data Sheet (MSDS) before use for proper and safe handling!
Wear well-fitting protective goggles and protective gloves when working with Hilti HIT-HY 200-R.
Important: Observe the installation instruction provided with each foil pack.

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

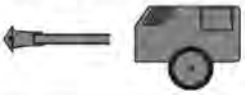


Drill hole to the required embedment depth with a hammer drill set in rotation-hammer mode or a compressed air drill using an appropriately sized carbide drill bit.

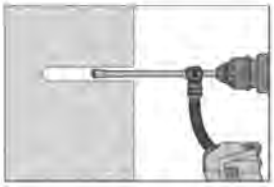
Hammer drill (HD)



Compressed air drill (CA)

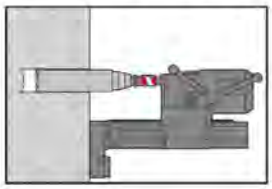


b) Hammer drilling with Hilti hollow drill bit TE-CD, TE-YD



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





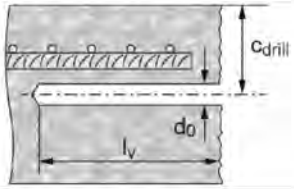
Diamond coring is permissible when suitable diamond core drilling machines and the corresponding core bits are used.

For the use in combination with Hilti roughening tool TE-YRT see parameters in Table B6 and B7.
Before roughening water needs to be removed from the borehole. Check usability of the roughening tool with the wear gauge RTG.
Roughen the borehole over the whole length to the required l_v.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B11**
Intended Use Installation instructions	

Deutsches Institut für Bautechnik DIBt

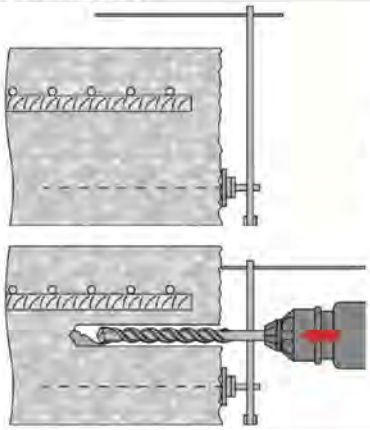
Splicing applications



- 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 $l_v > 20$ cm use drilling aid.



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

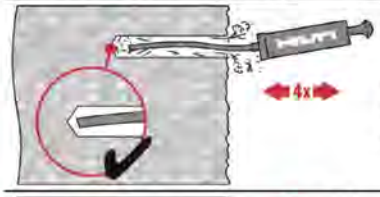
- Hilti drilling aid HIT-BH
- Lath or spirit level
- Visual check

Drill hole cleaning

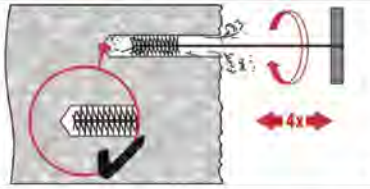
Just before setting the bar the drill hole must be free of dust and debris.
Inadequate hole cleaning = poor load values.

Manual Cleaning (MC)

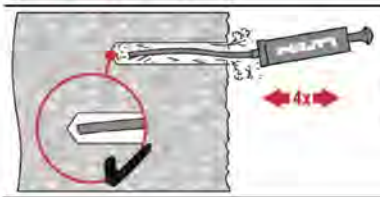
For drill hole diameters $d_0 \leq 20$ mm and drill hole depths $h_0 \leq 10 \cdot \phi$.



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 $h_{ef} \leq 10 \cdot \phi$.
Blow out at least 4 times from the back of the drill hole until return air stream is free of noticeable dust.

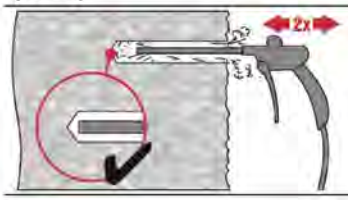
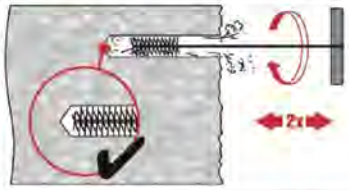
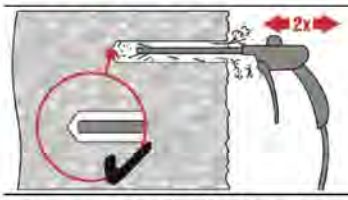
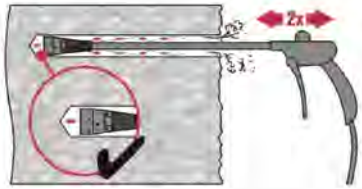
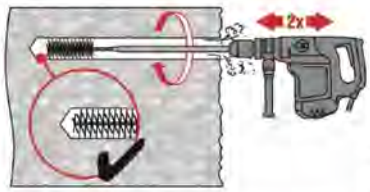
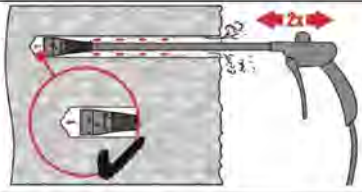


Brush 4 times with the specified brush (see Table B8) by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the drill hole (brush Ø ≥ drill hole Ø) - if not the brush is too small and must be replaced with the proper brush diameter.



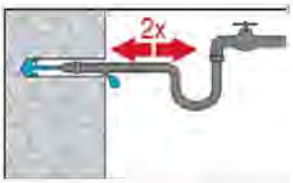
Blow out again with the Hilti hand pump at least 4 times until return air stream is free of noticeable dust.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B12**
Intended Use Installation instructions	

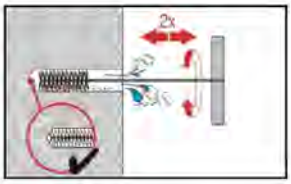
Compressed Air Cleaning (CAC)	For all drill hole diameters d_0 and all drill hole depths $h_0 \leq 20 \cdot \phi$.
	Blow 2 times from the back of the hole (if needed with nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h) until return air stream is free of noticeable dust. Safety tip: Do not inhale concrete dust.
	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 again with compressed air 2 times until return air stream is free of noticeable dust.
Compressed Air Cleaning (CAC)	For drill holes deeper than 250 mm (for ϕ 8 to ϕ 12) or deeper than 20 · ϕ (for ϕ > 12 mm)
	Use the appropriate air nozzle Hilti HIT-DL (see Table B8). 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 B8) 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 drillhole.
	Use the appropriate air nozzle Hilti HIT-DL (see Table B8). 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.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B13**
Intended Use Installation instructions	

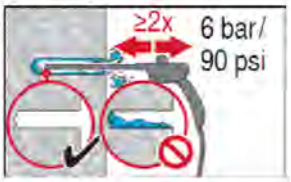
Cleaning of diamond cored holes with roughening with Hilti roughening tool TE-YRT:
For all drill hole diameters d_0 and all drill hole depths h_0.



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

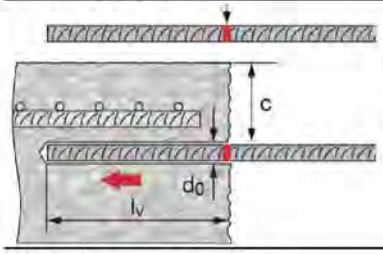


Brush 2 times with the specified brush (see Table 10) by inserting the steel brush Hilti HIT-RB to the back of the hole (if needed with extension) in a twisting motion and removing it.
The brush must produce natural resistance as it enters the drill hole (brush Ø ≥ drill hole Ø) - if not the brush is 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. Blow time see Table B7.
For drill hole diameters ≥ 32 mm the compressor has to supply a minimum air flow of 140 m³/h.

Rebar preparation

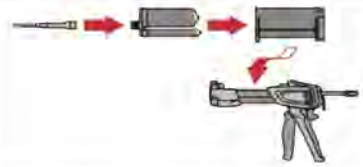


Before use, make sure the rebar is dry and free of oil or another residue.

Mark the embedment depth on the rebar (e.g. with tape) → l_v.

Insert Rebar in drill hole to verify hole and setting depth l_v.

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.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B14**
Intended Use Installation instructions	

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

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

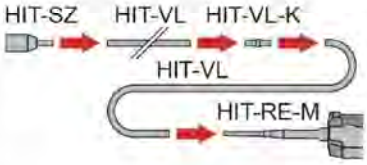


Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull.
Fill approximately 2/3 of the drill hole to ensure that the annular gap between the anchor and the concrete is completely filled with adhesive along the embedment length.

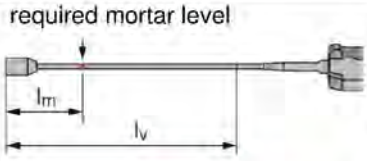


After injection is completed, depressurize the dispenser by pressing the release trigger. This will prevent further adhesive discharge from the mixer.

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 B8 and Table B9).
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_v with tape or marker on the injection extension.
Estimation:
$l_m = 1/3 \cdot l_v$
Precise formula for optimum mortar volume:
$l_m = l_v \cdot (1{,}2 \cdot (\phi^2 / d_0^2) - 0{,}2)$

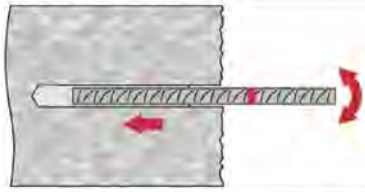
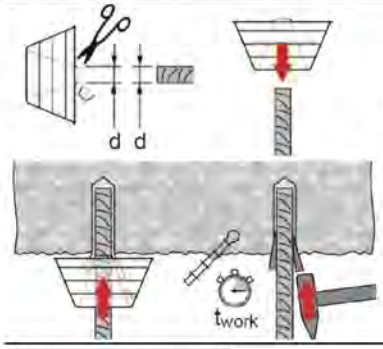
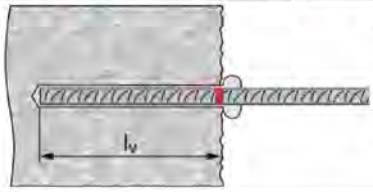
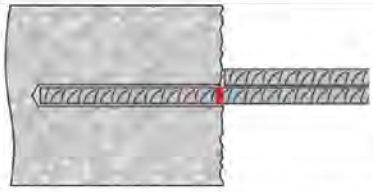
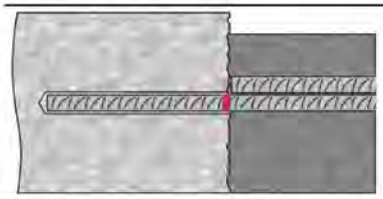


For overhead installation the injection is only possible with the aid of extensions and piston plugs. Assemble HIT-RE-M mixer, extension(s) and appropriately sized piston plug (see Table B8 and Table B9). Insert piston plug to back of the hole and inject adhesive. During injection the piston plug will 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.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex B15**
Intended Use Installation instructions	

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_v is reached: embedment mark at concrete surface. • excess mortar flows out of the borehole after the rebar has been fully inserted until the embedment mark.
	Observe the working time t_{work} (see Table B5), 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 B5).

Injection system Hilti HIT-HY 200-R for rebar connections

Intended Use
Installation instructions

Annex B16

Minimum anchorage length and minimum lap length under static loading

The minimum anchorage length $l_{b,min}$ and the minimum lap length $l_{0,min}$ according to EN 1992-1-1 shall be multiplied by the amplification factor α_{lb} given in Table C1.
The design bond strength $f_{bd,PIR}$ is given in Table C3. It is obtained by multiplying the bond strength f_{bd} according to EN 1992-1-1 with the factor according to Table C2.

Table C1: Amplification factor α_{lb} for hammer drilling (HD) and (HDB) and compressed air drilling (CA) and diamond coring with roughening with Hilti roughening tool TE-YRT.

	Amplification factor α_{lb} [-]								
Size	Concrete class								
[mm]	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
ϕ 8 to ϕ 32 HZA M12 to M27 HZA-R M12 to M24	1,0								

Table C2: Bond efficiency factor k_b for hammer drilling (HD) and (HDB) and compressed air drilling (CA) and diamond coring with roughening with Hilti roughening tool TE-YRT.

	Bond efficiency factor k_b [-]								
Size	Concrete class								
[mm]	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
ϕ 8 to ϕ 32 HZA M12 to M27 HZA-R M12 to M24	1,0								

Table C3: Design values of the bond strength $f_{bd,PIR}$[1)] in N/mm² for hammer drilling (HD) and (HDB) and compressed air drilling (CA) and diamond coring with roughening with Hilti roughening tool TE-YRT.

	Bond strength $f_{bd,PIR}$ [N/mm²]								
Size	Concrete class								
[mm]	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
ϕ 8 to ϕ 32 HZA M12 to M27 HZA-R M12 to M24	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3

[1)] According to EN 1992-1-1 for good bond conditions. For all other bond conditions multiply the values by 0,7.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex C1**
Performances Amplification factor and bond efficiency factor Design values of the bond strength $f_{bd,PIR}$ for static loading	

Minimum anchorage length and minimum lap length under seismic action

The minimum anchorage length $l_{b,min}$ and the minimum lap length $l_{0,min}$ according to EN 1992-1-1 shall be multiplied by the relevant amplification factor α_{lb} given in Table C1.
The design bond strength $f_{bd,seis}$ is given in Table C5. It is obtained by multiplying the bond strength $f_{bd,}$ according to EN 1992-1-1 by the factor $k_{b,seis}$ according to Table C4.
The minimum concrete cover according to Table B1 and $c_{min,seis} = 2\phi$ applies.

Table C4: Seismic bond efficiency factor $k_{b,seis}$ for hammer drilling (HD) and (HDB) and compressed air drilling (CA) and diamond coring with roughening with Hilti roughening tool TE-YRT.

	Bond efficiency factor $k_{b,seis}$ [-]							
Size	Concrete class							
[mm]	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
ϕ 10 to ϕ 18	1,0				0,90	0,82	0,76	0,71
ϕ 20 to ϕ 30	1,0						0,92	0,86
ϕ 32	1,0							

Table C5: Design values of the bond strength $f_{bd,seis}$ [1] in N/mm² for seismic action for hammer drilling (HD) and (HDB) and compressed air drilling (CA) and diamond coring with roughening with Hilti roughening tool TE-YRT.

	Bond strength $f_{bd,seis}$ [N/mm²]							
Size	Concrete class							
[mm]	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
ϕ 10 to ϕ 18	2,0	2,3	2,7	3,0	3,0	3,0	3,0	3,0
ϕ 20 to ϕ 30	2,0	2,3	2,7	3,0	3,4	3,7	3,7	3,7
ϕ 32	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3

[1] According to EN 1992-1-1 for good bond conditions. For all other bond conditions multiply the values by 0,7.

Injection system Hilti HIT-HY 200-R for rebar connections	**Annex C2**
Performances Design values of the bond strength $f_{bd,seis}$ for seismic action	

LEGEND
Technical Services, Inc.
www.legend-group.com
88 Empire Drive • St. Paul, Minnesota • 55103
(651) 642-1150 • fax (651) 642-1239

VOC Content Test Certificate

October 25, 2011

Supplier: Hilti Entwicklungsgesellschaft mbH
BU Anchors
Hiltistrasse 6
86916 Kaufering
GERMANY

Sample Description: Hilti HIT-HY 200-R

Date Tested: October 4, 2011

Test Method: SCAQMD method 304-91 "Determination of Volatile Organic Compounds (VOC) in Various Materials" as referenced by South Coast Air Quality Management District (SCAQMD) Rule 1168. The values also comply with the requirements of EPA test method #24.

Test Data:

Specification	Product
LEED 2009 (LEED 3.0) **LEED 2.2** IEQ-4.1: Low-Emitting Materials – Adhesives and Sealants	**Hilti HIT-HY 200-R**
Green Building Council of Australia Green Star Office Design 3.0, IEQ-13 Green Star Office Design 2.0, IEQ-13 Green Star Office Interiors 1.1, IEQ-11	
Multipurpose Construction Adhesive; VOC Limit: 70 g/L	**Product contains: 13 g/L of VOC**

Tom Barrett
Vice President/Strategic Analytical Services

Kelly French
Chemist III/Lab Supervisor

Attn. : To whom it may concern

Date : 1 April 2025
Ref. : 057/AC/SC/25

Subject : Country of Origin- Hilti HIT-HY 200-R Adhesive Anchor

Dear Sir / Madam,

Enclosed please find the information of Hilti HIT-HY 200-R Adhesive Anchor. .

Brand Name : Hilti

Model Name : Hilti HIT-HY 200-R Adhesive Anchor

Manufacturer : Hilti Corporation

Address of Manufacturer : FL-9494, Principality of Liechtenstein.

Manufacturer Contact Person : Spencer Cheung

Supplier : Hilti (Hong Kong) Ltd

Address of Supplier : 701-704, 7/F, Tower A, Manulife Financial Centre,
223 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

Supplier Contact Person : Spencer Cheung (+852 9732 1231)

Country of Origin : Germany

Should you have further questions, please do not hesitate to contact our Technical Representatives, Customer Service Hotline at 8228-8118, or email us at hksales@hilti.com.

Yours faithfully,

Spencer C.

Spencer Cheung
Head of Product Leadership Strategy

Hilti (Hong Kong) Ltd.
701-704 | Tower A | Manulife Financial Centre
223 Wai Yip Street | Kwun Tong
Kowloon | Hong Kong
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www.hilti.com.hk

HIT-HY 200-R

Safety information for 2-Component-products

Issue date: 13/09/2022 Revision date: 13/09/2022 Supersedes: 27/09/2018 Version: 3.3

SECTION 1: Kit identification

1.1 Product identifier

Product name	HIT-HY 200-R
	
Product code	BU Anchor

1.2 Details of the supplier of the Safety information for 2-Component-products

Hilti (Hong Kong) Ltd.
701-704, 7/F, Tower A, Manulife Financial Centre
223 Wai Yip Street, Kwun Tong
Kowloon - Hong Kong
T +852 27734 700
hksales@hilti.com

SECTION 2: General information

Storage	Storage temperature : 5 - 25 °C

A SDS for each of these components is included. Please do not separate any component SDS from this cover page

This Kit should be handled in accordance with good laboratory practices and appropriate personal protective equipment should be used

SECTION 3:

Classification of the Product

Classification according to the United Nations GHS

Eye Irrit. 2A	H319
Skin Sens. 1	H317
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Label elements

Labelling according to the United Nations GHS

Hazard pictograms (GHS UN)



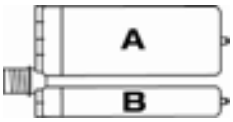
GHS07 GHS09

Signal word (GHS UN)	Warning
Hazardous ingredients	methacrylates, dibenzoyl peroxide
Hazard statements (GHS UN)	H317 - May cause an allergic skin reaction. H319 - Causes serious eye irritation. H410 - Very toxic to aquatic life with long lasting effects.
Precautionary statements (GHS UN)	P280 - Wear eye protection, protective clothing, protective gloves. P262 - Do not get in eyes, on skin, or on clothing. P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P302+P352 - IF ON SKIN: Wash with plenty of water.

P337+P313 - If eye irritation persists: Get medical advice/attention.
P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.

Additional information

2-Component-foilpack, contains:
Component A: Urethane methacrylate resin, inorganic filler
Component B: Dibenzoyl peroxide, phlegmatized



Name	General description	Quantity	Unit	Classification according to the United Nations GHS
HIT-HY 200-R, A		1	pcs (pieces)	Skin Sens. 1, H317
HIT-HY 200-R, B		1	pcs (pieces)	Org. Perox. Not classified Eye Irrit. 2A, H319 Skin Sens. 1, H317 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

SECTION 4: General advice

General advice	For professional users only

SECTION 5: Safe handling advice

General measures	Spilled material may present a slipping hazard
Environmental precautions	Prevent entry to sewers and public waters Notify authorities if liquid enters sewers or public waters
Storage conditions	Keep cool. Protect from sunlight.
Precautions for safe handling	Wear personal protective equipment Avoid contact with skin and eyes Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work Provide good ventilation in process area to prevent formation of vapour
Methods for cleaning up	This material and its container must be disposed of in a safe way, and as per local legislation Mechanically recover the product Store away from other materials.
For containment	Collect spillage.
Incompatible materials	Sources of ignition Direct sunlight
Incompatible products	Strong bases Strong acids

SECTION 6: First aid measures

First-aid measures after eye contact	Rinse immediately with plenty of water Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if pain, blinking or redness persists
First-aid measures after ingestion	Rinse mouth Get medical advice/attention. Do not induce vomiting Obtain emergency medical attention
First-aid measures after inhalation	Remove person to fresh air and keep comfortable for breathing. Allow affected person to breathe fresh air Allow the victim to rest

First-aid measures after skin contact	Wash contaminated clothing before reuse. Wash with plenty of water/… If skin irritation or rash occurs: Get medical advice/attention.
First-aid measures general	Take off immediately all contaminated clothing. Never give anything by mouth to an unconscious person If you feel unwell, seek medical advice (show the label where possible)
Symptoms/effects after eye contact	May cause severe irritation
Symptoms/effects after skin contact	May cause an allergic skin reaction.
Other medical advice or treatment	Treat symptomatically

SECTION 7: Fire fighting measures

Firefighting instructions	Use water spray or fog for cooling exposed containers Exercise caution when fighting any chemical fire Prevent fire fighting water from entering the environment
Protection during firefighting	Self-contained breathing apparatus Do not enter fire area without proper protective equipment, including respiratory protection
Hazardous decomposition products in case of fire	Thermal decomposition generates : Carbon dioxide Carbon monoxide

SECTION 8: Other information

No data available

HIT-HY 200-R, B

Safety Data Sheet

according to the United Nations GHS (Rev. 4, 2011)

Issue date: 13/09/2022 Revision date: 13/09/2022 Supersedes: 27/09/2018 Version: 3.3

SECTION 1: Identification

1.1. GHS Product identifier

Product form	Mixture
Product name	HIT-HY 200-R, B
UN-No. (ADR)	3077
Product code	BU Anchor

1.2. Other means of identification

No additional information available

1.3. Recommended use of the chemical and restrictions on use

Use of the substance/mixture	Composite mortar component for fasteners in the construction industry
Recommended use	For professional use only

1.4. Supplier's details

Supplier

Hilti (Hong Kong) Ltd.
701-704, 7/F, Tower A, Manulife Financial Centre
223 Wai Yip Street, Kwun Tong
HK– Kowloon
Hong Kong
T +852 27734 700
hksales@hilti.com

Department issuing data specification sheet

Hilti Entwicklungsgesellschaft mbH
Hiltistraße 6
DE– 86916 Kaufering
Deutschland
T +49 8191 906876
anchor.hse@hilti.com

1.5. Emergency phone number

Emergency number	Schweizerisches Toxikologisches Informationszentrum – 24h Service +41 44 251 51 51 (international) +852 27734 700

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

Classification according to the United Nations GHS

Organic peroxide Not classified		Expert judgment
Serious eye damage/eye irritation, Category 2A	H319	Expert judgment
Skin sensitisation, Category 1	H317	Calculation method
Hazardous to the aquatic environment – Acute Hazard, Category 1	H400	Calculation method
Hazardous to the aquatic environment – Chronic Hazard, Category 1	H410	Calculation method

Full text of H-statements: see section 16

2.2. GHS Label elements, including precautionary statements

Labelling according to the United Nations GHS

Hazard pictograms (GHS UN)



Signal word (GHS UN)	Warning
Hazardous ingredients	dibenzoyl peroxide
Hazard statements (GHS UN)	H317 - May cause an allergic skin reaction H319 - Causes serious eye irritation H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS UN)	P280 - Wear eye protection, protective clothing, protective gloves. P262 - Do not get in eyes, on skin, or on clothing. P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P333+P313 - If skin irritation or rash occurs: Get medical advice, medical attention. P337+P313 - If eye irritation persists: Get medical advice, medical attention. P302+P352 - IF ON SKIN: Wash with plenty of water.

2.3. Other hazards which do not result in classification

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to the United Nations GHS
dibenzoyl peroxide	CAS-No.: 94-36-0	10 – 25	Organic Peroxides, Type B, H241 Serious eye damage/eye irritation, Category 2, H319 Skin sensitisation, Category 1, H317 Hazardous to the aquatic environment – Acute Hazard, Category 1, H400 (M=10) Hazardous to the aquatic environment – Chronic Hazard, Category 1, H410 (M=10)

Full text of H-statements: see section 16

SECTION 4: First-aid measures

4.1. Description of necessary first-aid measures

First-aid measures general	Take off immediately all contaminated clothing. Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
First-aid measures after inhalation	Remove person to fresh air and keep comfortable for breathing. Allow affected person to breathe fresh air. Allow the victim to rest.
First-aid measures after skin contact	Wash contaminated clothing before reuse. Wash with plenty of water/…. If skin irritation or rash occurs: Get medical advice/attention.
First-aid measures after eye contact	Rinse immediately with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if pain, blinking or redness persists.
First-aid measures after ingestion	Rinse mouth. Get medical advice/attention. Do not induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms/effects, acute and delayed

Symptoms/effects after skin contact	May cause an allergic skin reaction.
Symptoms/effects after eye contact	May cause severe irritation.
Potential adverse human health effects and symptoms	No additional information available.

4.3. Indication of immediate medical attention and special treatment needed, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media	Water spray. Carbon dioxide. Dry powder. Foam. Sand.
Unsuitable extinguishing media	Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Hazardous decomposition products in case of fire	Thermal decomposition generates : Carbon dioxide. Carbon monoxide.

5.3. Special protective actions for fire-fighters

Firefighting instructions	Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering the environment.
Protection during firefighting	Self-contained breathing apparatus. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	Spilled material may present a slipping hazard.

6.1.1. For non-emergency personnel

Emergency procedures	Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment	Use personal protective equipment as required. Equip cleanup crew with proper protection.
Emergency procedures	Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and materials for containment and cleaning up

For containment	Collect spillage.
Methods for cleaning up	This material and its container must be disposed of in a safe way, and as per local legislation. Mechanically recover the product. Store away from other materials.
Other information	Dispose of materials or solid residues at an authorized site.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	Wear personal protective equipment. Avoid contact with skin and eyes. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapour.
Hygiene measures	Do not eat, drink or smoke when using this product. Always wash hands after handling the product. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions	Keep cool. Protect from sunlight.
Incompatible products	Strong bases. Strong acids.
Incompatible materials	Sources of ignition. Direct sunlight.
Heat and ignition sources	Keep away from heat and direct sunlight.
Storage temperature	5 – 25 °C

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Appropriate engineering controls

Appropriate engineering controls	Ensure adequate ventilation.
Environmental exposure controls	Avoid release to the environment.
Consumer exposure controls	Avoid contact during pregnancy/while nursing.
Other information	Do not eat, drink or smoke during use.

8.3. Individual protection measures, such as personal protective equipment (PPE)

Hand protection: Wear protective gloves. The permeation time is not the maximum wearing time! Generally speaking, it must be reduced. Contact with either mixtures of substances or different substances may shorten the protective function's effective duration.

Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Disposable gloves	Nitrile rubber (NBR)	6 (> 480 minutes)	0,12		EN ISO 374

Eye protection: Wear security glasses which protect from splashes

Type	Field of application	Characteristics	Standard
Safety glasses	Droplet	clear	EN 166, EN 170

Personal protective equipment symbol(s)



8.4. Exposure limit values for the other components

No additional information available

SECTION 9: Physical and chemical properties

9.1. Basic physical and chemical properties

Physical state	Solid
Appearance	Thixotropic paste
Colour	white.
Odour	characteristic.
Odour threshold	Not determined
Melting point	Not available
Freezing point	Not available
Boiling point	Not available
Flammability	Flammable
Lower explosion limit	Not applicable
Upper explosion limit	Not applicable
Flash point	Not applicable
Auto-ignition temperature	Not self-igniting
Decomposition temperature	Not available
SADT	65 °C
pH	Not available
pH solution	Not available
Viscosity, kinematic (calculated value) (40 °C)	21052.632 mm²/s
Partition coefficient n-octanol/water (Log Kow)	Not available
Vapour pressure	Not available
Vapour pressure at 50 °C	Not available
Density	1.9 g/ml AW 4.3.23
Relative density	Not available
Relative vapour density at 20 °C	Not applicable
Solubility	Water: Not miscible
Viscosity, dynamic	40 Pa·s HN-0333

Particle size	Not available

9.2. Data relevant with regard to physical hazard classes (supplemental)

Explosive properties	Product is not explosive

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No additional information available.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials

Strong acids. Strong bases.

10.6. Hazardous decomposition products

fume. Carbon monoxide. Carbon dioxide. Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	Not classified
Acute toxicity (dermal)	Not classified
Acute toxicity (inhalation)	Not classified
Skin corrosion/irritation	Not classified
Serious eye damage/irritation	Causes serious eye irritation.
Respiratory or skin sensitisation	May cause an allergic skin reaction.
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified
Reproductive toxicity	Not classified
STOT-single exposure	Not classified
STOT-repeated exposure	Not classified
Aspiration hazard	Not classified

HIT-HY 200-R, B	
Viscosity, kinematic	21052.632 mm²/s

dibenzoyl peroxide	
Animal studies and expert judgment for classification	False

Potential adverse human health effects and symptoms	No additional information available.

SECTION 12: Ecological information

12.1. Toxicity

Hazardous to the aquatic environment, short–term (acute)	Very toxic to aquatic life.
Classification procedure (Hazardous to the aquatic environment, short–term (acute))	Calculation method

Hazardous to the aquatic environment, long–term (chronic)	Very toxic to aquatic life with long lasting effects.
Classification procedure (Hazardous to the aquatic environment, long–term (chronic))	Calculation method

dibenzoyl peroxide (94-36-0)	
LC50 - Fish [2]	0.0602 mg/l (96h; Oncorhynchus mykiss; ECHA)
EC50 - Crustacea [1]	0.11 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Static system, Fresh water, Experimental value, GLP)
ErC50 algae	0.0711 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Pseudokirchneriella subcapitata, Static system, Fresh water, Experimental value, GLP)
NOEC (acute)	0.0316 mg/l (96h; Oncorhynchus mykiss; ECHA)
NOEC chronic fish	0.001 mg/l

12.2. Persistence and degradability

HIT-HY 200-R, B	
Persistence and degradability	Not established.

dibenzoyl peroxide (94-36-0)	
Persistence and degradability	Readily biodegradable in water. Not established. May cause long-term adverse effects in the environment.

12.3. Bioaccumulative potential

HIT-HY 200-R, B	
Bioaccumulative potential	Not established.

dibenzoyl peroxide (94-36-0)	
Partition coefficient n-octanol/water (Log Kow)	3.71
Bioaccumulative potential	Low bioaccumulation potential (Log Kow < 4).

12.4. Mobility in soil

HIT-HY 200-R, B	
Mobility in soil	No additional information available

dibenzoyl peroxide (94-36-0)	
Surface tension	No data available (test not performed)
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	3.8 (log Koc, OECD 121: Estimation of the Adsorption Coefficient (Koc) on Soil and on Sewage Sludge using High Performance Liquid Chromatography (HPLC), Experimental value)
Ecology - soil	Low potential for mobility in soil.

12.5. Other adverse effects

Ozone	Not classified
Other adverse effects	No additional information available
Other information	Avoid release to the environment.

SECTION 13: Disposal considerations

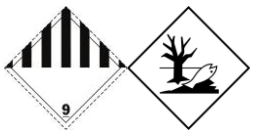
13.1. Disposal methods

Regional legislation (waste)	Disposal must be done according to official regulations.

Product/Packaging disposal recommendations	After curing, the product can be disposed of with household waste. . Full or only partially emptied cartridges must be disposed of as special waste in accordance with official regulations. Packaging contaminated by the product : Dispose in a safe manner in accordance with local/national regulations.
Ecology - waste materials	Avoid release to the environment.

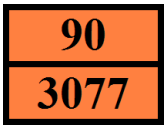
SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / RID

ADR	IMDG	IATA	RID
14.1. UN number			
UN 3077	UN 3077	UN 3077	UN 3077
14.2. UN proper shipping name			
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide)	Environmentally hazardous substance, solid, n.o.s. (dibenzoyl peroxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide)
Transport document description			
UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide), 9, III, (-)	UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide), 9, III, MARINE POLLUTANT	UN 3077 Environmentally hazardous substance, solid, n.o.s. (dibenzoyl peroxide), 9, III	UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide), 9, III
14.3. Transport hazard class(es)			
9	9	9	9
			
14.4. Packing group			
III	III	III	III
14.5. Environmental hazards			
Dangerous for the environment: Yes	Dangerous for the environment: Yes Marine pollutant: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes
not restricted according ADR Special Provision SP375, IATA-DGR Special Provision A197 and IMDG-Code 2.10.2.7			

14.6. Special precautions for user

Overland transport

Classification code (ADR)	M7
Special provisions (ADR)	274, 335, 375, 601
Limited quantities (ADR)	5kg
Packing instructions (ADR)	P002, IBC08, LP02, R001
Mixed packing provisions (ADR)	MP10
Transport category (ADR)	3
Orange plates	

Tunnel restriction code (ADR)	-

Transport by sea

Special provisions (IMDG)	274, 335, 966, 967, 969
Limited quantities (IMDG)	5 kg
Packing instructions (IMDG)	LP02, P002
EmS-No. (Fire)	F-A
EmS-No. (Spillage)	S-F
Stowage category (IMDG)	A
Stowage and handling (IMDG)	SW23

Air transport

PCA packing instructions (IATA)	956
PCA max net quantity (IATA)	400kg
CAO packing instructions (IATA)	956
Special provisions (IATA)	A97, A158, A179, A197, A215

Rail transport

Special provisions (RID)	274, 335, 375, 601
Limited quantities (RID)	5kg
Packing instructions (RID)	P002, IBC08, LP02, R001

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations specific for the product in question

No additional information available

SECTION 16: Other information

SDS Major/Minor	None
Issue date	13/09/2022
Revision date	13/09/2022
Supersedes	27/09/2018

Section	Changed item	Change	Comments
3	Composition/information on ingredients	Modified	
14	Transport information	Added	

Abbreviations and acronyms

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE - Acute Toxicity Estimate
BCF - Bioconcentration factor
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
DMEL - Derived Minimal Effect level
DNEL - Derived-No Effect Level
EC50 - Median effective concentration
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association
IMDG - International Maritime Dangerous Goods

	LC50 - Median lethal concentration LD50 - Median lethal dose LOAEL - Lowest Observed Adverse Effect Level NOAEC - No-Observed Adverse Effect Concentration NOAEL - No-Observed Adverse Effect Level NOEC - No-Observed Effect Concentration OECD - Organisation for Economic Co-operation and Development PBT - Persistent Bioaccumulative Toxic PNEC - Predicted No-Effect Concentration REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006 RID - Regulations concerning the International Carriage of Dangerous Goods by Rail TLM - Median Tolerance Limit vPvB - Very Persistent and Very Bioaccumulative
Other information	None.

Full text of H-statements:	
H241	Heating may cause a fire or explosion
H317	May cause an allergic skin reaction
H319	Causes serious eye irritation
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

SDS_UN_Hilti

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

HIT-HY 200-R, A

Safety Data Sheet

according to the United Nations GHS (Rev. 4, 2011)

Issue date: 13/09/2022 Revision date: 13/09/2022 Supersedes: 27/09/2018 Version: 3.4

SECTION 1: Identification

1.1. GHS Product identifier

Product form	Mixture
Product name	HIT-HY 200-R, A
Product code	BU Anchor

1.2. Other means of identification

No additional information available

1.3. Recommended use of the chemical and restrictions on use

Use of the substance/mixture	Composite mortar component for fasteners in the construction industry
Recommended use	For professional use only

1.4. Supplier's details

Supplier

Hilti (Hong Kong) Ltd.
701-704, 7/F, Tower A, Manulife Financial Centre
223 Wai Yip Street, Kwun Tong
HK– Kowloon
Hong Kong
T +852 27734 700
hksales@hilti.com

Department issuing data specification sheet

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Hiltistraße 6
DE– 86916 Kaufering
Deutschland
T +49 8191 906876
anchor.hse@hilti.com

1.5. Emergency phone number

Emergency number	Schweizerisches Toxikologisches Informationszentrum – 24h Service +41 44 251 51 51 (international) +852 27734 700

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

Classification according to the United Nations GHS

Skin sensitisation, Category 1	H317	Calculation method

Full text of H-statements: see section 16

2.2. GHS Label elements, including precautionary statements

Labelling according to the United Nations GHS

Hazard pictograms (GHS UN)



Signal word (GHS UN)	Warning
Hazardous ingredients	2-Propenoic acid, 2-methyl-, 1,4-butanediyl ester, 2,2'-(m-tolylimino)diethanol, 2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol
Hazard statements (GHS UN)	H317 - May cause an allergic skin reaction
Precautionary statements (GHS UN)	P280 - Wear eye protection, protective clothing, protective gloves. P262 - Do not get in eyes, on skin, or on clothing. P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P333+P313 - If skin irritation or rash occurs: Get medical advice, medical attention.

P337+P313 - If eye irritation persists: Get medical advice, medical attention.
P302+P352 - IF ON SKIN: Wash with plenty of water.

2.3. Other hazards which do not result in classification

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to the United Nations GHS
2-Propenoic acid, 2-methyl-, 1,4-butanediyl ester	CAS-No.: 2082-81-7	10 – 25	Acute toxicity (oral) Not classified Skin sensitisation, category 1B, H317
2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol	CAS-No.: 27813-02-1	5 – 10	Flammable liquids Not classified Acute toxicity (oral) Not classified Serious eye damage/eye irritation, Category 2A, H319 Skin sensitisation, Category 1, H317
1,1'-(p-tolylimino)dipropan-2-ol	CAS-No.: 38668-48-3	0.1 – 1	Acute toxicity (oral), Category 2, H300 Serious eye damage/eye irritation, Category 2A, H319 Hazardous to the aquatic environment – Acute Hazard, Category 3, H402 Hazardous to the aquatic environment – Chronic Hazard, Category 3, H412

Full text of H-statements: see section 16

SECTION 4: First-aid measures

4.1. Description of necessary first-aid measures

First-aid measures general: Take off immediately all contaminated clothing. Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. Allow affected person to breathe fresh air. Allow the victim to rest.

4.2. Most important symptoms/effects, acute and delayed

Symptoms/effects after skin contact: May cause an allergic skin reaction.

Symptoms/effects after eye contact: May cause severe irritation.

Potential adverse human health effects and symptoms: No additional information available.

4.3. Indication of immediate medical attention and special treatment needed, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media	Water spray. Carbon dioxide. Dry powder. Foam. Sand.
Unsuitable extinguishing media	Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Hazardous decomposition products in case of fire	Thermal decomposition generates : Carbon dioxide. Carbon monoxide.

5.3. Special protective actions for fire-fighters

Firefighting instructions	Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering the environment.
Protection during firefighting	Self-contained breathing apparatus. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Spilled material may present a slipping hazard.

6.1.1. For non-emergency personnel

Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders

Emergency procedures: Ventilate area.

6.2. Environmental precautions

No additional information available

6.3. Methods and materials for containment and cleaning up

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

No additional information available

7.2. Conditions for safe storage, including any incompatibilities

Incompatible products	Strong bases. Strong acids.
Incompatible materials	Sources of ignition. Direct sunlight.
Heat and ignition sources	Keep away from heat and direct sunlight.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Appropriate engineering controls

Appropriate engineering controls: Ensure adequate ventilation.

8.3. Individual protection measures, such as personal protective equipment (PPE)

Hand protection: Wear protective gloves. The permeation time is not the maximum wearing time! Generally speaking, it must be reduced. Contact with either mixtures of substances or different substances may shorten the protective function's effective duration.

Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Disposable gloves	Nitrile rubber (NBR)	6 (> 480 minutes)	0,12		EN ISO 374

Eye protection	Wear security glasses which protect from splashes

Type	Field of application	Characteristics	Standard
Safety glasses	Droplet	clear	EN 166, EN 170

Personal protective equipment symbol(s)



8.4. Exposure limit values for the other components

No additional information available

SECTION 9: Physical and chemical properties

9.1. Basic physical and chemical properties

Physical state	Solid
Appearance	Thixotropic paste
Colour	Light grey.
Odour	characteristic.
Odour threshold	Not determined
Melting point	Not available
Freezing point	Not available
Boiling point	Not available
Flammability	Flammable
Lower explosion limit	Not applicable
Upper explosion limit	Not applicable
Flash point	> 109 °C DIN EN ISO 1523
Auto-ignition temperature	Not self-igniting
Decomposition temperature	Not available
pH	Not available
pH solution	Not available
Viscosity, kinematic (calculated value) (40 °C)	27777.778 mm²/s
Partition coefficient n-octanol/water (Log Kow)	Not available
Vapour pressure	Not available
Vapour pressure at 50 °C	Not available
Density	1.8 g/ml AW 4.3.23
Relative density	Not available
Relative vapour density at 20 °C	Not applicable
Solubility	Water: Not miscible
Viscosity, dynamic	50 Pa·s HN-0333
Particle size	Not available

9.2. Data relevant with regard to physical hazard classes (supplemental)

Explosive properties	Product is not explosive

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

No additional information available

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

Strong acids. Strong bases.

10.6. Hazardous decomposition products

No additional information available

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	Not classified
Acute toxicity (dermal)	Not classified
Acute toxicity (inhalation)	Not classified

1,1'-(p-tolylimino)dipropan-2-ol (38668-48-3)	
LD50 oral rat	25 mg/kg
LD50 dermal rat	> 2000 mg/kg

2-Propenoic acid, 2-methyl-, 1,4-butanediyl ester (2082-81-7)	
LD50 oral rat	10066 mg/kg
LD50 dermal rat	> 3000 mg/kg

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
LD50 oral rat	> 5000 mg/kg (Rat; OECD 401: Acute Oral Toxicity; Literature study; >=2000 mg/kg bodyweight; Rat; Experimental value)
LD50 dermal rabbit	≥ 5000 mg/kg bodyweight (Rabbit; Experimental value)

Skin corrosion/irritation	Not classified
Serious eye damage/irritation	Not classified
Respiratory or skin sensitisation	May cause an allergic skin reaction.
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified
Reproductive toxicity	Not classified
STOT-single exposure	Not classified
STOT-repeated exposure	Not classified
Aspiration hazard	Not classified

HIT-HY 200-R, A	
Viscosity, kinematic	27777.778 mm²/s

1,1'-(p-tolylimino)dipropan-2-ol	
Animal studies and expert judgment for classification	False

2-Propenoic acid, 2-methyl-, 1,4-butanediyl ester	
Animal studies and expert judgment for classification	False

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol	
Animal studies and expert judgment for classification	False

Potential adverse human health effects and symptoms	No additional information available.

SECTION 12: Ecological information

12.1. Toxicity

Hazardous to the aquatic environment, short–term (acute)	Not classified
Hazardous to the aquatic environment, long–term (chronic)	Not classified

1,1'-(p-tolylimino)dipropan-2-ol (38668-48-3)	
LC50 - Fish [1]	≈ 17 mg/l
LC50 - Other aquatic organisms [1]	245 mg/l
EC50 - Crustacea [1]	28.8 mg/l
NOEC (acute)	57.8 mg/l

2-Propenoic acid, 2-methyl-, 1,4-butanediyl ester (2082-81-7)	
LC50 - Other aquatic organisms [1]	9.79 mg/l
NOEC (acute)	7.51 mg/l
NOEC (chronic)	20 mg/l

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
LC50 - Fish [1]	493 mg/l (48 h; Leuciscus idus; GLP)
EC50 - Crustacea [1]	> 143 mg/l (48 h; Daphnia magna; GLP)
ErC50 algae	97.2 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Pseudokirchneriella subcapitata, Static system, Fresh water, Experimental value, GLP)
Threshold limit - Algae [1]	> 97.2 mg/l (72 h; Pseudokirchneriella subcapitata; GLP)
Threshold limit - Algae [2]	> 97.2 mg/l (72 h; Pseudokirchneriella subcapitata; GLP)

12.2. Persistence and degradability

HIT-HY 200-R, A	
Persistence and degradability	Not established.

2-Propenoic acid, 2-methyl-, 1,4-butanediyl ester (2082-81-7)	
Not rapidly degradable	
Biodegradation	84 %

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
Not rapidly degradable	
Persistence and degradability	Readily biodegradable in water.

12.3. Bioaccumulative potential

HIT-HY 200-R, A	
Bioaccumulative potential	Not established.

1,1'-(p-tolylimino)dipropan-2-ol (38668-48-3)	
Partition coefficient n-octanol/water (Log Pow)	2.1

2-Propenoic acid, 2-methyl-, 1,4-butanediyl ester (2082-81-7)	
Partition coefficient n-octanol/water (Log Kow)	3.1

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
BCF - Fish [1]	≤ 100

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
BCF - Fish [2]	3.2 Quantitative structure-activity relationship (QSAR)
Partition coefficient n-octanol/water (Log Kow)	0.97 (OECD 102 method)
Bioaccumulative potential	Low bioaccumulation potential (BCF < 500).

12.4. Mobility in soil

HIT-HY 200-R, A	
Mobility in soil	No additional information available

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	1.9 (log Koc, Calculated value)
Ecology - soil	Highly mobile in soil.

12.5. Other adverse effects

Ozone: Not classified
Other adverse effects: No additional information available
Other information: Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Regional legislation (waste): Disposal must be done according to official regulations.
Product/Packaging disposal recommendations: After curing, the product can be disposed of with household waste. . Full or only partially emptied cartridges must be disposed of as special waste in accordance with official regulations. Packaging contaminated by the product : Dispose in a safe manner in accordance with local/national regulations.
Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / RID

ADR	IMDG	IATA	RID
14.1. UN number			
Not regulated	Not regulated	Not regulated	Not regulated
14.2. UN proper shipping name			
Not regulated	Not regulated	Not regulated	Not regulated
14.3. Transport hazard class(es)			
Not regulated	Not regulated	Not regulated	Not regulated
14.4. Packing group			
Not regulated	Not regulated	Not regulated	Not regulated
14.5. Environmental hazards			
Not regulated	Not regulated	Not regulated	Not regulated
No supplementary information available			

14.6. Special precautions for user

Overland transport

Not regulated

Transport by sea
Not regulated

Air transport
Not regulated

Rail transport
Not regulated

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations specific for the product in question

No additional information available

SECTION 16: Other information

SDS Major/Minor	None
Issue date	13/09/2022
Revision date	13/09/2022
Supersedes	27/09/2018

Section	Changed item	Change	Comments
3	Composition/information on ingredients	Modified	

Abbreviations and acronyms

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE - Acute Toxicity Estimate
BCF - Bioconcentration factor
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
DMEL - Derived Minimal Effect level
DNEL - Derived-No Effect Level
EC50 - Median effective concentration
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association
IMDG - International Maritime Dangerous Goods
LC50 - Median lethal concentration
LD50 - Median lethal dose
LOAEL - Lowest Observed Adverse Effect Level
NOAEC - No-Observed Adverse Effect Concentration
NOAEL - No-Observed Adverse Effect Level
NOEC - No-Observed Effect Concentration
OECD - Organisation for Economic Co-operation and Development
PBT - Persistent Bioaccumulative Toxic
PNEC - Predicted No-Effect Concentration
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS - Safety Data Sheet
vPvB - Very Persistent and Very Bioaccumulative

Other information	None.

Full text of H-statements:	
H300	Fatal if swallowed
H317	May cause an allergic skin reaction
H319	Causes serious eye irritation
H402	Harmful to aquatic life
H412	Harmful to aquatic life with long lasting effects

SDS_UN_Hilti

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Hilti HIT-HY 200 Injectable Mortar Job Reference

Year	Project Name	Customer Name	Project type
2023	WEST KOWLOON - LYRIC THEATRE - (IPS)	GAMMON CONSTRUCTION LIMITED	Community & Cultural
2023	KAI TAK SPORTS PARK	HIP HING ENGINEERING CO LTD	Sport & Recreation
2023	HKIA 3508 TERMINAL 2	WELL PARK CONSTRUCTION LIMITED	Transport
2023	WONG CHUK HANG STATION PH3 (SITE C)	CHINA OVERSEAS BUILDING	Residential
2023	KAM SHEUNG RD STATION PH1, LOT 1040 DD 103	CHINA OVERSEAS BUILDING	Residential
2023	SAI SHA SHK SHAP SZE HEUNG, TPTL 157 DD165, 207, 21	SANFIELD (MANAGEMENT) LIMITED	Residential
2023	R6 CTL KLN ROUTE-CENTRAL TUNNEL HY/2018/08	BOUYGUES TRAVAUX PUBLICS	Infrastructure
2023	KAI TAK NEW ACUTE HOSPITAL (SITE B)	CHINA STATE CONSTRUCTION	Health
2023	KAI TAK AREA 1F1 (6568) ELDERLY	SANFIELD (MANAGEMENT) LIMITED	Residential
2023	TIN SHUI WAI T.L.23 TIN WING STOP	SANFIELD (MANAGEMENT) LIMITED	Residential
2024	MTR NEW EXT. (REF. 1601)-KWU TUNG STATION ON EAST	DRAGAGES HONG KONG LIMITED	Transport
2024	CHINESE MEDICINE HOSPITAL TKO	CHINA STATE CONSTRUCTION	Health
2024	HKIA 3408 3RW CONCOURSE	BUCG - CCCL JOINT VENTURE	Transport
2024	WEST KOWLOON - LYRIC THEATRE - (IPS)	GAMMON CONSTRUCTION LIMITED	Community & Cultural
2024	KAI TAK SPORTS PARK	HIP HING ENGINEERING CO LTD	Sport & Recreation
2024	KAM SHEUNG RD STATION PH1, LOT 1040 DD 103	CHINA OVERSEAS BUILDING	Residential
2024	TMTL 496, SO KWUN WAT, AREA 56, TUEN MUN	TEAMFIELD-HANISON JOINT VENTURE	Residential
2024	R6 CTL KLN ROUTE-CENTRAL TUNNEL HY/2018/08	BOUYGUES TRAVAUX PUBLICS	Infrastructure
2024	HKIA 3508 TERMINAL 2	GAMMON ENGINEERING & CONSTRUCTION	Transport
2024	UNITED CHRISTIAN HOSPITAL	DOUBLE PANDA ENGINEERING COMPANY	Health
2025	MTR NEW EXT. (REF. 1601)-KWU TUNG STATION ON EAST	DRAGAGES HONG KONG LIMITED	Transport
2025	HKIA 3408 3RW CONCOURSE	BUCG - CCCL JOINT VENTURE	Transport
2025	WEST KOWLOON - LYRIC THEATRE - (IPS)	GAMMON CONSTRUCTION LIMITED	Community & Cultural