



HIT-HY 200-A V3 HIT-HY 200-R V3 INJECTION MORTAR

Product Technical Datasheet
Concrete-to-concrete
Update: July 24



HIT-HY 200-A V3 and HIT-HY 200-R V3 injection mortars

Rebar design (EN 1992-1, EOTA TR 069, EN 1998-1) / Rebar elements / Concrete

Injection mortar system



Hilti HIT-HY 200-A V3



Hilti HIT-HY 200-R V3
(330 / 500 ml foil pack)

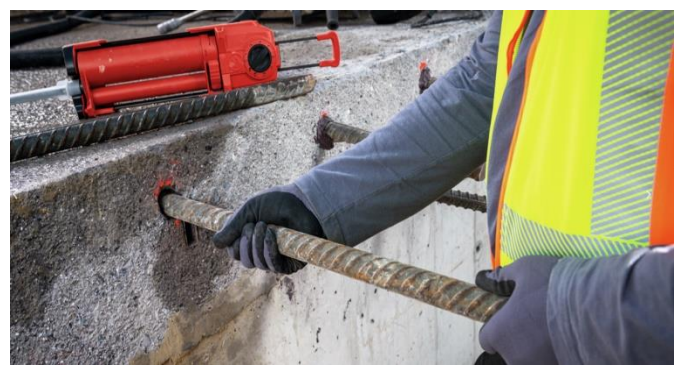
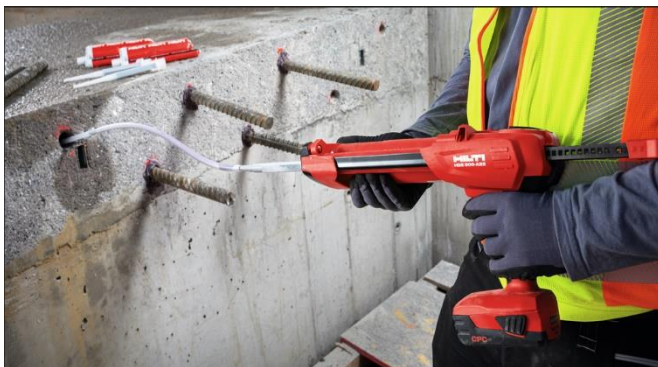


Rebar ($\phi 8$ - $\phi 40$)

Benefits

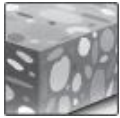


- **safe set** technology: Makes installation steps faster, simpler, and safer. Automatic borehole cleaning with hollow drill bits and accurate dosing with HDE.
- HY 200-R V3 version is formulated for best handling and cure time specifically for rebar applications.
- Suitable for concrete C12/15 to C50/60.
- Suitable for dry and water saturated concrete.
- For rebar diameters up to 40 mm for static design according to EN 1992-1-1.
- Non-corrosive to rebars.
- Good load capacity at elevated temperatures.
- Suitable for embedment lengths up to 1000 mm, and for HIT-HY 200-R V3 suitable up to 1300 mm for $\phi 34$ - $\phi 40$.
- Suitable for applications down to -10 °C concrete temperature.

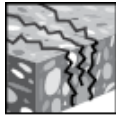


Application condition

Base material

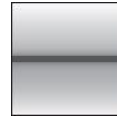


Concrete (uncracked)



Concrete (cracked)

Load conditions



Static/
quasi-static



Seismic



Fire
Resistance

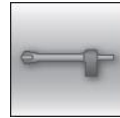
Installation conditions



Hammer drilled holes



Diamond cored holes with roughening



Hollow Drill bit drilling

Other information

100
YEARS

ETA
Working life 100 years



PROFIS
Engineering Design Software



Concrete-to-Concrete connections Handbook

Linked Approvals/Certificates and Instructions for use.

Approvals/certificates

Approval no	Application / loading condition	Authority / Laboratory	Date of issue
ETA-19/0600	Static and quasi-static / Seismic / Fire	DIBt, Berlin	09-04-2024
ETA-19/0665	Static and quasi-static	iTAB, Milan	29-06-2023
No. 11/2023	Engineering Judgement (120-years working life based on EAD 330087-01-0601)	BERGMEISTER, Vienna	16-04-2024
No. 03/2024	Engineering Judgement (120-years working life based on EAD 332402-00-0601-v01-)	BERGMEISTER, Vienna	20-03-2024

Instructions for use(IFU)

Material			
Injection mortar	IFU Hilti HIT-HY 200 A V3	IFU Hilti HIT-HY 200-R V3	-
Dispenser	IFU HDM	IFU HDE 500-22	IFU HDE 500-A12

Link to Hilti Webpage

Injection mortars / Dispenser				
HIT-HY 200-A V3	HIT-HY 200-R V3	HDE 500-22	HDE 500-A12	HDM 500

Mechanical properties and dimensions rebar

Mechanical properties and dimensions of the rebars are standardized and can be taken from the ETA.

Material quality

Part	Material
Rebar EN 1992-1-1:2004	Bars and de-coiled rods class B or C according to NDP or NCL of EN 1992-1-1

Static and quasi-static loading based on ETA-19/0600. Design according to EN 1992-1-1

All data in this section applies to:

- According to EN 1992-1-1 for good bond conditions. For all other bond conditions multiply the values by 0,7
- Hammer drilling, Hammer drilling with Hilti hollow drill bit(TE-CD, TE-YD), Compressed air drilling,
- Diamond coring with roughening with Hilti Roughening tool TE-YRT
- The data for rebar $\phi 34 - \phi 40$ is only suitable with HIT-HY 200-R V3; it is not valid for HIT-HY 200-A V3 due to the shorter working time
- Design values of the bond strength for a working life of 50 Years.

For specific design cases refer to [PROFIS Engineering](#)

Design bond strength in N/mm² for above methods of drilling techniques according to mortar IFU & ETA -19/0600.

Rebar - size [mm]	Concrete class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
	$f_{bd,PIR}$ [N/mm ²]								
$\phi 8 - \phi 32$	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
$\phi 34$	1,6	2,0	2,3	2,7	2,9	3,3	3,6	3,9	4,2
$\phi 36$	1,6	1,9	2,2	2,6	2,9	3,3	3,6	3,8	3,8
$\phi 40$	1,5	1,8	2,1	2,5	2,8	3,1	3,4	3,4	3,4

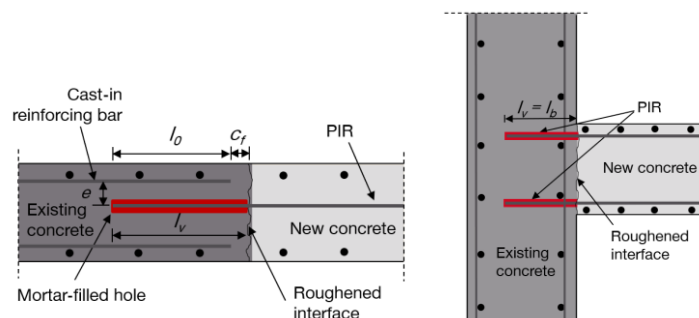
Minimum anchorage length and minimum lap length

Post-installed rebar applications as per EN 1992-1-1	Typical examples
Lap splice applications	
End anchorage applications – simply supported / compression load-only connections	

The minimum anchorage length $l_{b,min}$ and the minimum lap length $l_{0,min}$ according for applications designed as per EN 1992-1-1 shall be multiplied by relevant **Amplification factor α_{lb}** in the table below.

Amplification factor α_{lb} for the min. anchorage length and min. lap length according to mortar IFU & ETA -19/0600.

Rebar - size [mm]	Concrete class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
	α_{lb} [-]								
$\phi 8 - \phi 40$	1,0								



Refer to the table for data on dispensers and corresponding maximum embedment depth $l_{v,max}$ due to mortar installation limitations



Anchorage length and lap length for characteristic steel strength $f_{yk} = 500 \text{ N/mm}^2$ for good bond conditions

- $l_{b,min}$ Minimum anchorage length for simply supported connections under tension loading assuming $\sigma_{sd} = f_{yd}$
- $l_{o,min}$ Minimum anchorage length for overlap splice joint
- $l_{bd,y}$ Anchorage length for simply supported connections (design for yielding)
- $l_{o,PIR,y}$ Anchorage length for overlap joint (design for yielding)
- α_2 Coefficient related to Concrete Cover

For specific design cases refer to [PROFIS Engineering](#)

Rebar-size [mm]	Concrete class	Design Resistance (Yielding) [kN]	$l_{b,min}$ [mm]	$l_{o,min}$ [mm]	$l_{bd,y}$ ($\alpha_2=1$) [mm]	$l_{bd,y}$ ($\alpha_2=0,7$) [mm]	$l_{o,PIR,y}$ ($\alpha_2=1$) [mm]	$l_{o,PIR,y}$ ($\alpha_2=0,7$) [mm]
$\phi 8$	C20/25	21,9	113	200	378	265	567	398
	C50/60		100	200	202	142	303	213
$\phi 10$	C20/25	34,1	142	213	473	331	710	497
	C50/60		100	200	253	177	380	266
$\phi 12$	C20/25	49,2	170	255	567	397	851	596
	C50/60		120	200	303	212	455	318
$\phi 14$	C20/25	66,9	198	298	662	463	993	695
	C50/60		140	210	354	248	531	372
$\phi 16$	C20/25	87,4	227	340	756	529	1134	794
	C50/60		160	240	404	283	606	425
$\phi 18$	C20/25	110,6	255	383	851	595	1277	893
	C50/60		180	270	455	319	683	479
$\phi 20$	C20/25	136,6	284	426	945	662	1418	993
	C50/60		200	300	506	354	759	531
$\phi 22$	C20/25	165,3	312	468	1040	728	1560	1092
	C50/60		220	330	556	389	834	584
$\phi 24$	C20/25	196,7	340	511	1134	794	1701	1191
	C50/60		240	360	607	425	911	638
$\phi 25$	C20/25	213,4	354	532	1181	827	1772	1241
	C50/60		250	375	632	442	948	663
$\phi 26$	C20/25	230,8	369	553	1229	860	1844	1290
	C50/60		260	390	657	460	986	690
$\phi 28$	C20/25	267,7	397	596	1323	926	1985	1389
	C50/60		280	420	708	495	1062	743
$\phi 30$	C20/25	307,3	425	638	1418	992	2127	1488
	C50/60		300	450	758	531	1137	797
$\phi 32$	C20/25	349,7	454	681	1512	1059	2268	1589
	C50/60		320	480	809	566	1214	849
$\phi 34$	C20/25	394,7	482	723	1607	1125	2411	1688
	C50/60		340	510	880	616	1320	924
$\phi 36$	C20/25	442,6	534	801	1779	1245	2669	1868
	C50/60		360	540	1030	721	1545	1082
$\phi 40$	C20/25	546,4	621	932	2070	1449	3105	2174
	C50/60		400	600	1279	895	1919	1343

The highlighted values exceed the maximum length given in ETA-19/0600 and IFU.

Seismic Loading based on ETA-19/0600. Seismic design according to EN 1998-1

All data in this section applies to:

- According to EN 1992-1-1 for good bond conditions. For all other bond conditions multiply the values by 0,7
- Hammer drilling, Hammer drilling with Hilti hollow drill bit (TE-CD, TE-YD), Compressed air drilling,
- Diamond coring with roughening with Hilti Roughening tool TE-YRT
- The data for rebar $\phi 34 - \phi 40$ is only suitable with HIT-HY 200-R V3; it is not valid for HIT-HY 200-A V3 due to the shorter working time
- Design values of the bond strength for a working life of 50 Years

For specific design cases refer to [PROFIS Engineering](#)

For detailed technical contents, refer to [Concrete-to-Concrete connections Handbook](#)

Seismic reduction factor $k_{b,seis}$ for above methods of drilling techniques according to mortar IFU & ETA-19/0600

Rebar - size	Reduction factor $k_{b,seis}$							
	Concrete class							
	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
$\phi 10 - \phi 18$	1,0				0,90	0,82	0,76	0,71
$\phi 20 - \phi 30$	1,0						0,92	0,86
$\phi 32$	1,0							
$\phi 34$	1,0		0,90	0,83		0,76	0,71	
$\phi 36$	1,0		0,90	0,82		0,76	0,71	
$\phi 40$	1,0		0,91	0,80	0,73	0,67	0,63	

Design bond strength in N/mm^2 for above methods of drilling techniques according to mortar IFU & ETA-19/0600

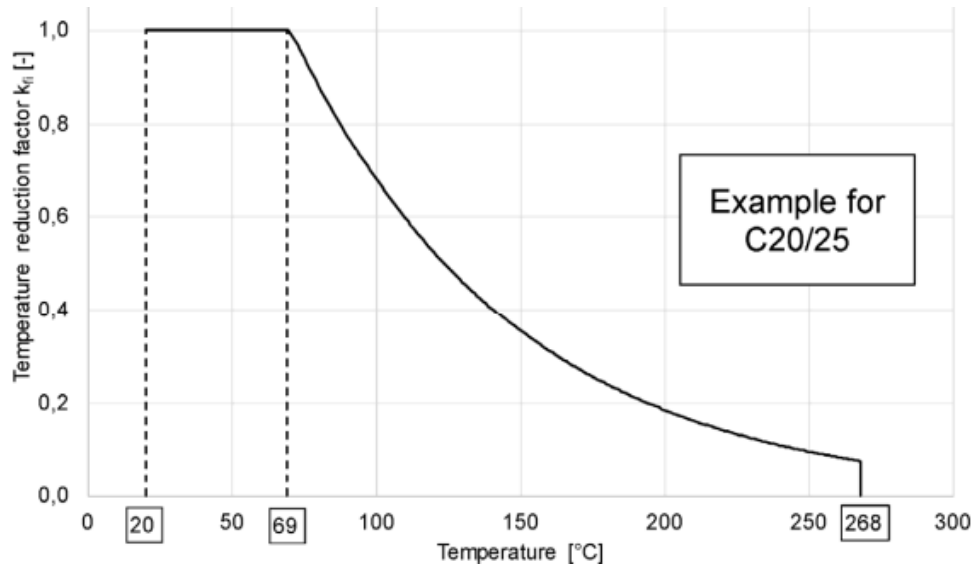
Rebar - size	Bond resistance $f_{bd,seis}$							
	Concrete class							
	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
$\phi 10 - \phi 18$	2,0	2,3	2,7	3,0				
$\phi 20 - \phi 30$	2,0	2,3	2,7	3,0	3,4	3,7		
$\phi 32$	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
$\phi 34$	2,0	2,3	2,7	2,9	3,0			
$\phi 36$	1,9	2,2	2,6	2,9				
$\phi 40$	1,8	2,1	2,5					

Fire resistance based on ETA-19/0600 for working life of 50 years

For evidence under fire exposure the anchorage length should be calculated according to EN 1992-1-1:2004+AC:2010 Equation 8.3 using the temperature-dependent bond resistance $f_{bd,fi}$.

For specific design cases refer to [PROFIS Engineering](#)

Temperature reduction factor $k_{fi}(\theta)$ for concrete class C20/25 for good bond conditions



The design value of the bond strength $f_{bd,fi}$ under fire exposure have to be calculated by the following equation:

$$f_{bd,fi} = k_{fi}(\theta) \cdot f_{bd,PIR} \cdot \frac{\gamma_c}{\gamma_{M,fi}}$$

$$\text{With } \theta \leq 268^\circ\text{C: } k_{fi}(\theta) = 24,661 \cdot \frac{e^{(-0,013 \cdot \theta)}}{f_{bd,PIR}^{4,3}} \leq 1,0$$

$$\theta > 268^\circ\text{C} \quad k_{fi}(\theta) = 0,0$$

$f_{bd,fi}$ = Design value of the bond resistance in case of fire in N/mm²

θ = Temperature in °C in the mortar layer

$k_{b,fi}(\theta)$ = Reduction factor under fire exposure

$f_{bd,PIR}$ = Design value of the bond resistance in N/mm² in cold condition considering the concrete classes, rebar diameter, the drilling method, and the bond conditions according to EN 1992-1-1

γ_c = Partial safety factor according to EN 1992-1-1

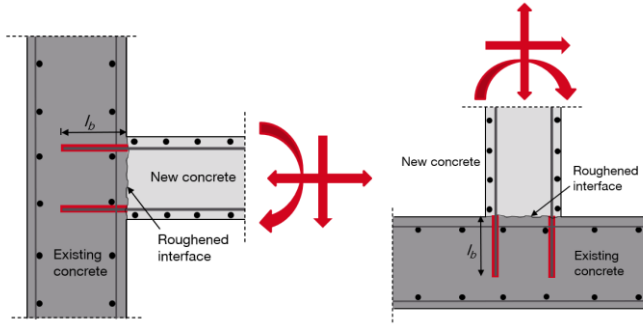
$\gamma_{M,fi}$ = Partial safety factor according to EN 1992-1-2

Bond strength $f_{bd,fi}$ in N/mm² for fire design for concrete classes C20/25 to C50/60

Rebar Temperature	Concrete class	50°C	100°C	150°C	200°C	250°C	268°C (θ_{max})
$f_{bd,fi}$ [N/mm ²]	C20/25	3,45	2,34	1,22	0,64	0,33	0,26
	C30/37	4,49					
	C50/60						

Static and quasi-static resistance based on ETA-19/0665. Design according to EOTA TR 069

For post-installed rebar solutions beyond provisions of EN 1992-1-1, such as end-anchorage applications with bi-axial and uni-axial bending and shear loads with compression or tension forces without the limitation of using strut-and-tie design approach can be designed using EOTA TR 069



Anchorage length $l_{bd,y}$ as per EOTA TR 069 Design provisions (Improved bond-splitting failure mode) for characteristic steel strength $f_{yk}=500 \text{ N/mm}^2$ for good bond conditions

All data in this section applies to:

- Hammer drilling,
- Effect of transverse reinforcement is not considered
- Effect of sustained loads are not considered
- Minimum spacing between rebars considered as 100 mm
- Minimum anchorage length $l_{b,min}$ shall apply as per EN 1992-1-1
- The maximum recommended installation length shall be applicable
- Concrete breakout resistance is not considered (it shall be calculated depending on the boundary conditions of the actual concrete application)
- In-service temperature range I (min. base material temperature -40°C , max. long/short term base material temperature: $+24^\circ\text{C}/+40^\circ\text{C}$)
- Material and installation factors: $\gamma_{Ms}=1,15$, $\gamma_{Mc}=1,5$, $\gamma_{inst}=1,0$
- Minimum concrete cover shall apply as per EOTA TR 069 and EN 1992-1-1
- Working life of 50 years

For specific design cases refer to [PROFIS Engineering](#).

Rebar-size [mm]	Concrete class	Design Resistance (Yielding) [kN]	Cracked concrete bond resistance as per ETA			Uncracked concrete bond resistance as per ETA		
			$l_{bd,y}$ ($C_d=3\phi$) [mm]	$l_{bd,y}$ ($C_d=5\phi$) [mm]	$l_{bd,y}$ ($C_d=8\phi$) [mm]	$l_{bd,y}$ ($C_d=3\phi$) [mm]	$l_{bd,y}$ ($C_d=5\phi$) [mm]	$l_{bd,y}$ ($C_d=8\phi$) [mm]
$\phi 8$	C20/25	21,9	-	253	253	-	129	109
	C50/60		-	212	212	-	100	100
$\phi 10$	C20/25	34,1	-	314	314	-	171	136
	C50/60		-	263	263	-	124	124
$\phi 12$	C20/25	49,2	-	320	320	-	206	163
	C50/60		-	269	269	-	149	149
$\phi 14$	C20/25	66,9	484	373	373	484	263	190
	C50/60		340	314	314	313	173	173
$\phi 16$	C20/25	87,4	605	426	426	605	325	218
	C50/60		361	359	359	361	198	198
$\phi 20$	C20/25	136,6	861	487	487	861	462	272
	C50/60		514	409	409	514	276	247
$\phi 25$	C20/25	213,4	1225	658	557	1225	658	371
	C50/60		731	483	483	731	393	309
$\phi 26$	C20/25	230,8	1304	700	580	1304	700	395
	C50/60		778	502	502	778	418	322

Rebar-size [mm]	Concrete class	Design Resistance (Yielding) [kN]	Cracked concrete bond resistance as per ETA			Uncracked concrete bond resistance as per ETA		
			$l_{bd,y}$ ($c_d=3\phi$) [mm]	$l_{bd,y}$ ($c_d=5\phi$) [mm]	$l_{bd,y}$ ($c_d=8\phi$) [mm]	$l_{bd,y}$ ($c_d=3\phi$) [mm]	$l_{bd,y}$ ($c_d=5\phi$) [mm]	$l_{bd,y}$ ($c_d=8\phi$) [mm]
φ28	C20/25	267,7	1465	787	624	1465	787	444
	C50/60		875	541	541	875	470	346
φ30	C20/25	307,3	1635	877	669	1635	877	496
	C50/60		975	580	580	975	524	371
φ32	C20/25	349,7	1810	972	596	1810	972	548
	C50/60		1080	580	542	1080	580	396

The highlighted values exceed the maximum length given in ETA-19/0665 and IFU.

Resistance to chemical substances

Chemical	Resistance	Chemical	Resistance
Air	+	Gasoline	+
Acetic acid 10%	+	Glycole	o
Acetone	o	Hydrogen peroxide 10%	o
Ammonia 5%	+	Lactic acid 10%	+
Benzyl alcohol	-	Machinery oil	+
Chloric acid 10%	o	Methylethylketon	o
Chlorinated lime 10%	+	Nitric acid 10%	o
Citric acid 10%	+	Phosphoric acid 10%	+
Concrete plasticizer	+	Potassium Hydroxide pH 13,2	+
De-icing salt (Calcium chloride)	+	Sea water	+
Demineralized water	+	Sewage sludge	+
Diesel fuel	+	Sodium carbonate 10%	+
Drilling dust suspension pH 13,2	+	Sodium hypochlorite 2%	+
Ethanol 96%	-	Sulfuric acid 10%	+
Ethylacetate	-	Sulfuric acid 30%	+
Formic acid 10%	+	Toluene	o
Formwork oil	+	Xylene	o

- + resistant
- o resistant in short term (max. 48h) contact
- not resistant

Electrical Conductivity

HIT-HY 200-A V3 and HIT-HY 200-R V3 in the hardened state **are not conductive electrically**. Its electric resistivity is $15,5 \cdot 10^9 \Omega \cdot \text{cm}$ (DIN IEC 93 – 12.93). It is adapted well to realize electrically insulating anchoring (ex: railway applications, subway)

Setting information

Installation temperature range

-10°C to +40°C

Service temperature range

Hilti HIT-HY 200-A V3 and HIT-HY 200-R V3 injection mortar may be applied in the temperature ranges given below. An elevated base material temperature may lead to a reduction of the design bond resistance.

ETA-19/0600

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

ETA-19/0665

Temperature range	Base material temperature	Maximum long-term base material temperature	Maximum short-term base material temperature
Temperature range I	-40 °C to +40 °C	+24 °C	+40 °C
Temperature range II	-40 °C to +80 °C	+50 °C	+80 °C
Temperature range III	-40 °C to +120 °C	+72 °C	+120 °C

Maximum short term base material temperature

Short-term elevated base material temperatures are those that occur over brief intervals, e.g., as a result of diurnal cycling.

Maximum long term base material temperature

Long-term elevated base material temperatures are roughly constant over significant periods of time.

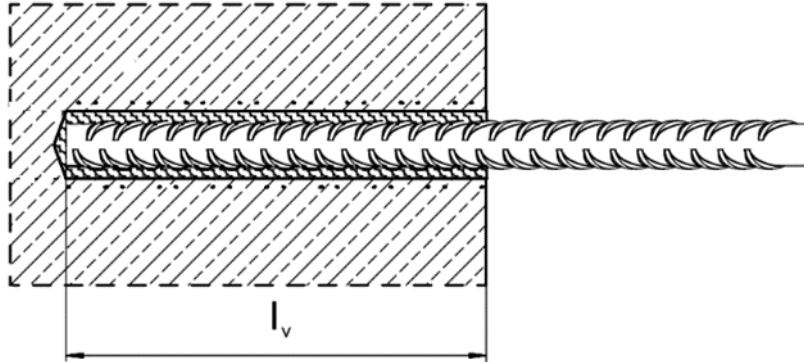
Curing and working time

Temperature of the base material ^{a)}	HIT-HY 200-A V3		HIT-HY 200-R V3	
	Maximum working time	Minimum curing time	Maximum working time	Minimum curing time
T	t _{work}	t _{cure}	t _{work}	t _{cure}
- 10°C to - 5°C	1,5 h	7 h	3 h	20 h
> 5°C to 0°C	50 min	4 h	1,5 h	8 h
> 0°C to 5°C	25 min	2 h	45 min	4 h
> 5°C to 10°C	15 min	75 min	30 min	2,5 h
> 10°C to 20°C	7 min	45 min	15 min	1,5 h
> 20°C to 30°C	4 min	30 min	9 min	1 h
> 30°C to 40°C	3 min	30 min	6 min	1 h

^{a)} The Minimum Foil pack temperature is 0°C







Dispensers and corresponding maximum embedment depth $l_{v,max}$

Rebar	Dispenser	
	HDM 330, HDM 500	HDE 500
	Concrete temp. $\geq -10^{\circ}\text{C}$	Concrete temp. $\geq 0^{\circ}\text{C}$
	$l_{v,max}$ [mm]	$l_{v,max}$ [mm]
$\phi 8 - \phi 32$	700	1000
$\phi 34 - \phi 40$	-	1300



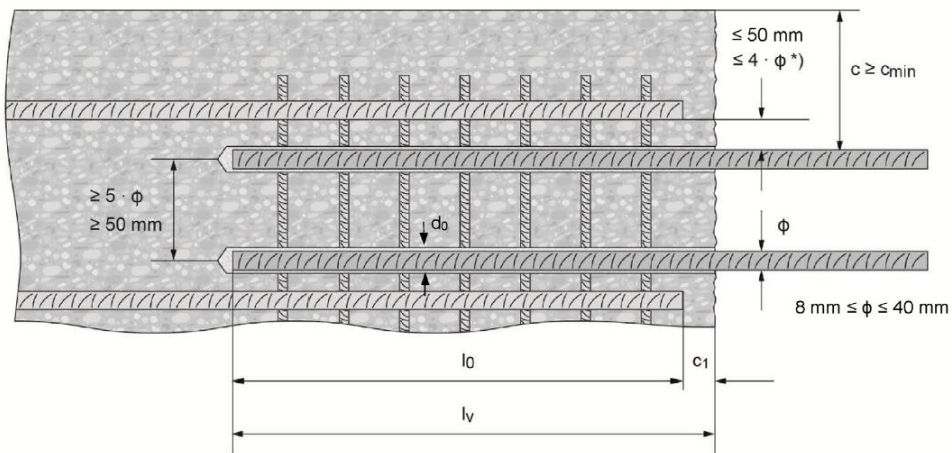
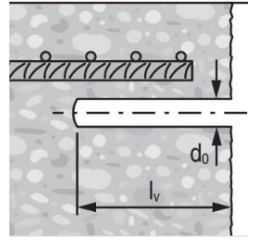
For detailed setting information on installation see instructions for use (IFU) given with the product. Approved installation methods can be found in the specific ETA/Certificate definitions.

Drilling and Installation equipment

Rotary Hammers (Corded and Cordless)		TE 2 - TE 70
Diamond Coring Machines		DD EC-1, DD 100 ... DD 160
Dispenser		HDE HDM
Other tools		Blow out pump, Compressed air gun Set of cleaning brushes
		Hammer drill bit TE-CX, TE-YX, TE-C, TE-Y
		Hollow drill bit TE-CD, TE-YD
		Diamond core bit SP-L, SP-HX, SP-H, P-U
		Roughening tools TE-YRT
		Piston plug

Minimum concrete cover c_{min} of the post-installed rebar

Drilling method	Bar diameter [mm]	Minimum concrete cover c_{min} [mm]	
		Without drilling aid	With drilling aid
Hammer drilling (HD) and (HDB)	$\phi < 25$	$30 + 0,06 \cdot l_v \geq 2 \cdot \phi$	$30 + 0,02 \cdot l_v \geq 2 \cdot \phi$
	$\phi \geq 25$	$40 + 0,06 \cdot l_v \geq 2 \cdot \phi$	$40 + 0,02 \cdot l_v \geq 2 \cdot \phi$
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)	$\phi < 25$	$30 + 0,06 \cdot l_v \geq 2 \cdot \phi$	$30 + 0,02 \cdot l_v \geq 2 \cdot \phi$
	$\phi \geq 25$	$40 + 0,06 \cdot l_v \geq 2 \cdot \phi$	$40 + 0,02 \cdot l_v \geq 2 \cdot \phi$



^{*)} If the clear distance between lapped bars exceeds $4 \cdot \phi$ or 50 mm, then the lap length shall be increased by the difference between the clear bar distance and the smaller of $4 \cdot \phi$ or 50 mm.

Where, c is concrete cover of post-installed rebar

$c_1 = c_f$ is the end-cover of existing rebar

d_0 is the nominal drill bit diameter

ϕ diameter of reinforcement bar

l_0 is the lap length

l_v is the installation length