HIT-HY 200
INJECTION MORTAR

Technical Datasheet

Update: Aug-18

HIT-HY 200 injection mortar

Anchor design (ETAG 001) / Rods&Sleeves / Concrete

Injection mortar system

Hilti HIT- HY 200-A

500 ml foil pack (also available as 330 ml foil pack)

Hilti HIT- HY 200-R

500 ml foil pack (also available as 330 ml foil pack)

Anchor rod:
HIT-V
HIT-V-F
HIT-V-R
HIT-V-HCR
(M8-M30)

Internally threaded sleeve:
HIS-N
HIS-RN
(M8-M20)

Anchor rod:
HIT-Z
HIT-Z-F
HIT-Z-R
(M8-M20)

Benefits

- **SafeSet** technology: drilling and borehole cleaning in one step with Hilti hollow drill bit
- Suitable for non-cracked and cracked concrete C 20/25 to C 50/60
- ETA Approved for seismic performance category C1, C2[a)]
- Maximum load performance in cracked concrete and non-cracked concrete
- High corrosion / corrosion resistance[b)]
- Small edge distance and anchor spacing possible
- Manual cleaning for borehole diameter up to 20mm and $h_{ef} \leq 10d$ for non-cracked concrete only
- Two mortar versions: HY 200-R for slow cure applications and HY 200-A for fast cure applications

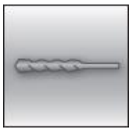
a) HIS-N internally threaded sleeves not approved for Seismic.
b) High Corrosion resistant rods available only for HIT-V. Corrosion resistant rods available for HIT-V and HIS-N

Base material

Concrete (non-cracked)

Concrete (cracked)

Installation conditions

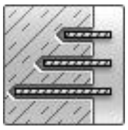


Hammer drilled holes

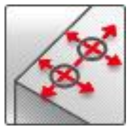
Diamond drilled holes [c)]

SAFESET

Hilti **SafeSet** technology

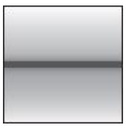


Variable embedment depth



Small edge distance and spacing

Load conditions



Static/ quasi-static

Seismic, ETA-C1, C2[a)]

Fire resistance

Other information

European Technical Assessment

CE

CE conformity

A4 316

Corrosion resistance[b)]

HCR highMo

High corrosion resistance[b)]

PROFIS Anchor design Software

a) HIS-N internally threaded sleeves not approved for Seismic category C2.
b) High Corrosion resistant rods available only for HIT-V. Corrosion resistant rods available for HIT-V and HIS-N
c) Diamond drilling only covered for HIT-Z rods

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical Assessment [a]	DIBt, Berlin	ETA-11/0493/ 2017-07-28 (HY200 A)
European technical Assessment [a]	DIBt, Berlin	ETA-12/0006/ 2017-05-30 (HY200 A)
European technical Assessment [a]	DIBt, Berlin	ETA-12/0084/ 2017-07-28 (HY200 R)
European technical Assessment [a]	DIBt, Berlin	ETA-12/0028/ 2017-05-30 (HY200 R)
Shockproof fastenings in civil defence installations	Federal Office for Civil Protection, Bern	BZS D 13-604 / 2013-12-31 BZS D 13-603 / 2013-12-31
Fire test report	IBMB, Brunswick	3501/676/13 / 2012-08-03

a) All data given in this section according to ETA-11/0493, issue 2017-07-28, ETA-12/0006, issue 2017-05-30, ETA-12/0084, issue 2017-07-28 and ETA-12/0028, issue 2017-05-30

Static and quasi-static resistance (for a single anchor)

All data in this section applies to:
- Correct setting (See setting instruction)
- No edge distance and spacing influence
- *Steel* failure
- Minimum base material thickness
- One typical embedment depth, as specified in the table
- One anchor material, as specified in the tables
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- Temperature range I (min. base material temp. -40°C, max. long/short term base material temp.: +24°C/40°C)

For hammer drilled holes, hammer drilled holes with Hilti hollow drill bit:

Anchorage depth [1]

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
HIT-V										
Embedment depth		[mm]	80	90	110	125	170	210	240	270
Base material thickness		[mm]	110	120	140	161	234	266	300	340
HIS-N										
Embedment depth		[mm]	90	110	125	170	205	-	-	-
Base material thickness		[mm]	120	150	170	230	270	-	-	-
HIT-Z										
Effective anchorage depth[2]	$h_{ef} = l_{Helix}$	[mm]	50	60	60	96	100	-	-	-
Effective embedment depth[3]	$h_{ef} = h_{nom,min}$	[mm]	70	90	110	145	180	-	-	-
Base material thickness		[mm]	130	150	170	245	280	-	-	-

1) The allowed range of embedment depth is shown in the setting details.
2) For combined pull-out and concrete cone failure
3) For concrete cone failure

Mean ultimate resistance

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension $N_{R,um}$	HIT-V 5.8	[kN]	*18,9*	*30,5*	*44,1*	*83,0*	*129,2*	*185,9*	*241,5*	*295,1*
	HIS-N 8.8		*26,3*	*48,3*	*70,4*	*131,3*	*121,8*	-	-	-
	HIT-Z [a]		*25,2*	*39,9*	*57,8*	*100,8*	*153,3*	-	-	-
Shear $V_{R,um}$	HIT-V 5.8	[kN]	*9,5*	*15,8*	*22,1*	*41,0*	*64,1*	*92,4*	*120,8*	*147,0*
	HIS-N 8.8		*13,7*	*24,2*	*35,7*	*66,2*	*60,9*	-	-	-
	HIT-Z [a]		*12,6*	*20,0*	*28,4*	*50,4*	*76,7*	-	-	-
Cracked concrete										
Tension $N_{R,um}$	HIT-V 5.8	[kN]	*18,9*	28,2	*44,1*	66,8	105,9	145,4	177,7	212,0
	HIS-N 8.8		*26,3*	*48,3*	66,8	105,9	*121,8*	-	-	-
	HIT-Z [a]		*25,2*	*39,9*	55,1	83,4	115,4	-	-	-
Shear $V_{R,um}$	HIT-V 5.8	[kN]	*9,5*	*15,8*	*22,1*	*41,0*	*64,1*	*92,4*	*120,8*	*147,0*
	HIS-N 8.8		*13,7*	*24,2*	*35,7*	*66,2*	*60,9*	-	-	-
	HIT-Z [a]		*12,6*	*20,0*	*28,4*	*50,4*	*76,7*	-	-	-

a) Hilti anchor rod HIT-Z-F: M16 and M20

Characteristic resistance

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rk}	HIT-V 5.8	[kN]	18,0	29,0	42,0	70,6	111,9	153,7	187,8	224,0
	HIS-N 8.8		25,0	46,0	67,0	111,9	116,0	-	-	-
	HIT-Z [a)]		24,0	38,0	54,3	88,2	122,0	-	-	-
Shear V_{Rk}	HIT-V 5.8	[kN]	9,0	15,0	21,0	39,0	61,0	88,0	115,0	140,0
	HIS-N 8.8		13,0	23,0	34,0	63,0	58,0	-	-	-
	HIT-Z [a)]		12,0	19,0	27,0	48,0	73,0	-	-	-
Cracked concrete										
Tension N_{Rk}	HIT-V 5.8	[kN]	15,1	21,2	35,2	50,3	79,8	109,6	133,9	159,7
	HIS-N 8.8		24,7	39,9	50,3	79,8	105,7	-	-	-
	HIT-Z [a)]		21,1	30,7	41,5	62,9	86,9	-	-	-
Shear V_{Rk}	HIT-V 5.8	[kN]	9,0	15,0	21,0	39,0	61,0	88,0	115,0	140,0
	HIS-N 8.8		13,0	23,0	34,0	63,0	58,0	-	-	-
	HIT-Z [a)]		12,0	19,0	27,0	48,0	73,0	-	-	-

a) Hilti anchor rod HIT-Z-F: M16 and M20

Design resistance

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rd}	HIT-V 5.8	[kN]	12,0	19,3	28,0	47,1	74,6	102,5	125,2	149,4
	HIS-N 8.8		16,7	30,7	44,7	74,6	77,3	-	-	-
	HIT-Z [a)]		16,0	25,3	36,2	58,8	81,3	-	-	-
Shear V_{Rd}	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-
	HIT-Z [a)]		9,6	15,2	21,6	38,4	58,4	-	-	-
Cracked concrete										
Tension N_{Rd}	HIT-V 5.8	[kN]	10,1	14,1	23,5	33,5	53,2	73,0	89,2	106,5
	HIS-N 8.8		16,5	26,6	33,5	53,2	70,4	-	-	-
	HIT-Z [a)]		14,1	20,5	27,7	41,9	58,0	-	-	-
Shear V_{Rd}	HIT-V 5.8	[kN]	7,2	12,0	16,8	31,2	48,8	70,4	92,0	112,0
	HIS-N 8.8		10,4	18,4	27,2	50,4	46,4	-	-	-
	HIT-Z [a)]		9,6	15,2	21,6	38,4	58,4	-	-	-

a) Hilti anchor rod HIT-Z-F: M16 and M20

Recommended loads [b)]

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete										
Tension N_{Rec}	HIT-V 5.8	[kN]	8,6	13,8	20,0	33,6	53,3	73,2	89,4	106,7
	HIS-N 8.8		11,9	21,9	31,9	53.3	55,2	-	-	-
	HIT-Z [a)]		11,4	18,1	25,9	42,0	58,1	-	-	-
Shear V_{Rec}	HIT-V 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0
	HIS-N 8.8		7,4	13,1	19,4	36,0	33,1	-	-	-
	HIT-Z [a)]		6,9	10,9	15,4	27,4	41,7	-	-	-
Cracked concrete										
Tension N_{Rec}	HIT-V 5.8	[kN]	7,2	10,1	16,8	24,0	38,0	52,2	63,7	76,1
	HIS-N 8.8		11,9	19,8	23,9	38,0	50,3	-	-	-
	HIT-Z [a)]		10,0	14,6	19,8	29,9	41,4	-	-	-
Shear V_{Rec}	HIT-V 5.8	[kN]	5,1	8,6	12,0	22,3	34,9	50,3	65,7	80,0
	HIS-N 8.8		7,4	13,1	19,4	36,0	33,1	-	-	-
	HIT-Z [a)]		6,9	10,9	15,4	27,4	41,7	-	-	-

a) Hilti anchor rod HIT-Z-F: M16 and M20

b) With overall partial safety factor for action γ = 1,4. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

Seismic resistance (for a single anchor)

All data in this section applies to:
- Correct setting (See setting instruction with hammer drilling)
- No edge distance and spacing influence
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- Temperature range I (min. base material temp. -40°C, max. long/short term base material temp.: +24°C/40°C)
- Installation temperature range -10°C to +40°C
- α_{gap} = 1,0 (using Hilti seismic filling set)

For hammer drilled holes and hammer drilled holes with Hilti hollow drill bit:

Anchorage depth for seismic C2

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
HIT-V										
Embedment depth	h_{ef}	[mm]	-	-	-	125	170	210	-	-
HIT-Z										
Effective anchorage depth [2)]	$h_{ef} = l_{Helix}$	[mm]	-	-	60	96	100	-	-	-
Effective embedment depth [3)]	h_{ef}	[mm]	-	-	60	96	100	-	-	-
Base material thickness		[mm]	-	-	170	245	280	-	-	-

2) For combined pull-out and concrete cone failure
3) For concrete cone failure

Characteristic resistance in case of seismic performance category C2

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Tension $N_{Rk,seis}$	HIT-V 8.8, AM 8.8	[kN]	-	-	-	24,5	45,9	55,4	-	-
	HIT-Z [a)]		-	-	29,4	53,4	73,9	-	-	-
Shear $V_{Rk,seis}$	HIT-V 8.8, AM 8.8	[kN]	-	-	-	46,0	77,0	103,0	-	-
	HIT-Z [a)]		-	-	*23,0*	*41,0*	*61,0*	-	-	-

a) Hilti anchor rod HIT-Z-F: M16 and M20

Design resistance in case of seismic performance category C2

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Tension $N_{Rd,seis}$	HIT-V 8.8, AM 8.8	[kN]	-	-	-	16,3	30,6	36,9	-	-
	HIT-Z [a)]		-	-	19,6	35,6	49,3	-	-	-
Shear $V_{Rd,seis}$	HIT-V 8.8, AM 8.8	[kN]	-	-	-	36,8	61,6	82,4	-	-
	HIT-Z [a)]		-	-	18,4	32,8	48,8	-	-	-

a) Hilti anchor rod HIT-Z-F: M16 and M20

Anchorage depth for seismic C1

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
HIT-V										
Embedment depth	h_{ef}	[mm]	-	90	110	125	170	210	240	270
HIT-Z										
Effective anchorage depth [1)]	$h_{ef} = l_{Helix}$	[mm]	50	60	60	96	100	-	-	-
Effective embedment depth [2)]	h_{ef}	[mm]	60	60	60	96	100	-	-	-
Base material thickness		[mm]	-	-	170	245	280	-	-	-

1) For combined pull-out and concrete cone failure
2) For concrete cone failure

Characteristic resistance in case of seismic performance category C1

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Tension $N_{Rk,seis}$	HIT-V 8.8, AM 8.8	[kN]	-	14,7	29,0	42,8	67,8	93,1	113,8	135,8
	HIT-Z [a)]; HIT-Z-R		17,9	26,1	35,3	53,4	73,9	-	-	-
Shear $V_{Rk,seis}$	HIT-V 8.8, AM 8.8	[kN]	-	*23,0*	*34,0*	*63,0*	*98,0*	*141,0*	*184,0*	*224,0*
	HIT-Z [a)]		*7,0*	*17,0*	*16,0*	*28,0*	*45,0*	-	-	-
	HIT-Z-R		*8,0*	*19,0*	*22,0*	*31,0*	*48,0*	-	-	-

a) Hilti anchor rod HIT-Z-F: M16 and M20

Design resistance in case of seismic performance category C1

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Tension $N_{Rd,seis}$	HIT-V 8.8, AM 8.8	[kN]	-	9,8	19,4	28,5	45,2	62,1	75,8	90,5
	HIT-Z [a)]; HIT-Z-R		11,9	17,4	23,5	35,6	49,3	-	-	-
Shear $V_{Rd,seis}$	HIT-V 8.8, AM 8.8	[kN]	-	18,4	27,2	50,4	78,4	112,8	147,2	179,2
	HIT-Z [a)]		5,6	13,6	12,8	22,4	36,0	-	-	-
	HIT-Z-R		6,4	15,2	17,6	24,8	38,4	-	-	-

a) Hilti anchor rod HIT-Z-F: M16 and M20

Materials

Materials properties for HIT-V

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Nominal tensile strength f_{uk}	HIT-V 5.8 (F)	[N/mm²]	500	500	500	500	500	500	500	500
	HIT-V 8.8 (F) AM 8.8 (HDG)		800	800	800	800	800	800	800	800
	HIT-V-R		700	700	700	700	700	700	500	500
	HIT-V-HCR		800	800	800	800	800	700	700	700
Yield strength f_{yk}	HIT-V 5.8 (F)	[N/mm²]	400	400	400	400	400	400	400	400
	HIT-V 8.8 (F) AM 8.8 (HDG)		640	640	640	640	640	640	640	640
	HIT-V-R		450	450	450	450	450	450	210	210
	HIT-V-HCR		640	640	640	640	640	400	400	400
Stressed cross-section A_s	HIT-V	[mm²]	36,6	58,0	84,3	157	245	353	459	561
Moment of resistance W	HIT-V	[mm³]	31,2	62,3	109	277	541	935	1387	1874

Mechanical properties for HIS-N

Anchor size			M8	M10	M12	M16	M20
Nominal tensile strength f_{uk}	HIS-N	[N/mm²]	490	490	460	460	460
	Screw 8.8		800	800	800	800	800
	HIS-RN		700	700	700	700	700
	Screw A4-70		700	700	700	700	700
Yield strength f_{yk}	HIS-N	[N/mm²]	410	410	375	375	375
	Screw 8.8		640	640	640	640	640
	HIS-RN		350	350	350	350	350
	Screw A4-70		450	450	450	450	450
Stressed cross-section A_s	HIS-(R)N	[mm²]	51,5	108,0	169,1	256,1	237,6
	Screw		36,6	58	84,3	157	245
Moment of resistance W	HIS-(R)N	[mm³]	145	430	840	1595	1543
	Screw		31,2	62,3	109	277	541

Mechanical properties for HIT-Z

Anchor size			M8	M10	M12	M16	M20
Nominal tensile strength f_{uk}	HIT-Z(-F) [a)]	[N/mm²]	650	650	650	610	595
	HIT-Z-R		650	650	650	610	595
Yield strength f_{yk}	HIT-Z(-F) [a)]	[N/mm²]	520	520	520	490	480
	HIT-Z-R		520	520	520	490	480
Stressed cross-section of thread A_s	HIT-Z(-F) [a)] HIT-Z-R	[mm²]	36,6	58,0	84,3	157	245
Moment of resistance W	HIT-Z(-F) [a)] HIT-Z-R	[mm³]	31,9	62,5	109,7	278	542

a) Hilti anchor rod HIT-Z-F: M16 and M20

Material quality for HIT-V

Part	Material
Zinc coated steel	
Threaded rod, HIT-V 5.8 (F)	Strength class 5.8; Elongation at fracture A5 > 8% ductile Electroplated zinc coated ≥ 5μm; (F) hot dip galvanized ≥ 45 μm
Threaded rod, HIT-V 8.8 (F)	Strength class 8.8; Elongation at fracture A5 > 12% ductile Electroplated zinc coated ≥ 5μm; (F) hot dip galvanized ≥ 45 μm
Hilti Meter rod, AM 8.8 (HDG)	Strength class 8.8; Elongation at fracture A5 > 12% ductile Electroplated zinc coated ≥ 5μm (HDG) hot dip galvanized ≥ 45 μm
Washer	Electroplated zinc coated ≥ 5 μm, hot dip galvanized ≥ 45 μm
Nut	Strength class of nut adapted to strength class of threaded rod. Electroplated zinc coated ≥ 5μm, hot dip galvanized ≥ 45 μm
Hilti Filling set (F)	Filling washer: Electroplated zinc coated ≥ 5 μm / (F) Hot dip galvanized ≥ 45 μm
	Spherical washer: Electroplated zinc coated ≥ 5 μm / (F) Hot dip galvanized ≥ 45 μm
	Lock nut: Electroplated zinc coated ≥ 5 μm / (F) Hot dip galvanized ≥ 45 μm
Stainless Steel	
Threaded rod, HIT-V-R	Strength class 70 for ≤ M24 and strength class 50 for > M24; Elongation at fracture A5 > 8% ductile Stainless steel 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362
Washer	Stainless steel 1.4401, 1.4404, 1.4578, 1.4571, 1.4439, 1.4362 EN 10088-1:2014
Nut	Stainless steel 1.4401, 1.4404, 1.4578, 1.4571, 1.4439, 1.4362 EN 10088-1:2014
High corrosion resistant steel	
Threaded rod, HIT-V-HCR	Strength class 80 for ≤ M20 and class 70 for > M20, Elongation at fracture A5 > 8% ductile High corrosion resistance steel 1.4529; 1.4565;
Washer	High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014
Nut	High corrosion resistant steel 1.4529, 1.4565 EN 10088-1:2014

Material quality for HIS-N

Part		Material
HIS-N	Int. threaded sleeve	Electroplated zinc coated ≥ 5 μm
	Screw 8.8	Strength class 8.8, A5 > 8 % Ductile; Steel galvanized ≥ 5 μm
HIS-RN	Int. threaded sleeve	Stainless steel 1.4401,1.4571
	Screw 70	Strength class 70, A5 > 8 % Ductile; Stainless steel 1.4401; 1.4404, 1.4578; 1.4571; 1.4439; 1.4362

Material quality for HIT-Z

Part	Material
Threaded rod HIT-Z	Elongation at fracture > 8% ductile; Electroplated zinc coated ≥ 5 μm
Washer	Electroplated zinc coated ≥ 5 μm
Nut	Strength class of nut adapted to strength class of anchor rod. Electroplated zinc coated ≥ 5 μm
HIT-Z-F	Elongation at fracture > 8% ductile Multilayer coating, ZnNi-galvanized according to DIN 50979:2008-07
Washer	Multilayer coating, ZnNi-galvanized according to DIN 50979:2008-07
Nut	Multilayer coating, ZnNi-galvanized according to DIN 50979:2008-07
HIT-Z-R	Elongation at fracture > 8% ductile; Stainless steel 1.4401, 1.4404 EN 10088-1:2014
Washer	Stainless steel A4 according to EN 10088-1:2014
Nut	Strength class of nut adapted to strength class of anchor rod. Stainless steel 1.4401, 1.4404 EN 10088-1:2014

Setting information

In service temperature range

Hilti HIT-HY 200 A (R) injection mortar with anchor rod HIT-V / HIS-(R)N may be applied in the temperature ranges given below. An elevated base material temperature leads to a reduction of the design bond resistance.

Temperature in the base material

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

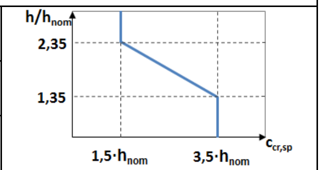
Max short term base material temperature
Short-term elevated base material temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling.

Max 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	HIT-HY 200-A		HIT-HY 200-R	
	Maximum working time t_{work}	Minimum curing time t_{cure}	Maximum working time t_{work}	minimum curing time t_{cure}
$- 10°C < T_{BM} \leq - 5°C$	1,5 h	7 h	3 h	20 h
$- 5°C < T_{BM} \leq 0°C$	50 min	4 h	2 h	8 h
$0°C < T_{BM} \leq 5°C$	25 min	2 hour	1 h	4 h
$5°C < T_{BM} \leq 10°C$	15 min	75 min	40 min	2,5 h
$10°C < T_{BM} \leq 20°C$	7 min	45 min	15 min	1,5 h
$20°C < T_{BM} \leq 30°C$	4 min	30 min	9 min	1 h
$30°C < T_{BM} \leq 40°C$	3 min	30 min	6 min	1 h

Setting details for HIT-V

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Nominal diameter of drill bit	d	[mm]	10	12	14	18	22	28	30	35
Eff. embedment depth and drill hole depth [a)]	$h_{ef,min}$	[mm]	60	60	70	80	90	96	108	120
	$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600
Minimum base material thickness	h_{min}	[mm]	h_{ef} + 30 mm ≥100 mm			$h_{ef} + 2\ d_0$				
Maximum diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22	26	30	33
Thickness of Hilti filling set	h_{fs}	[mm]	-	-	-	11	13	15	-	-
Effective fixture thickness with Hilti filling set	$t_{fix,eff}$	[mm]	$t_{fix,eff} - h_{fs}$							
Max. torque moment [b)]	T_{max}	[Nm]	10	20	40	80	150	200	270	300
Minimum spacing	s_{min}	[mm]	40	50	60	75	90	115	120	140
Minimum edge distance	c_{min}	[mm]	40	45	45	50	55	60	75	80
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	$2\ c_{cr,sp}$							
Critical edge distance for splitting failure [c)]	$c_{cr,sp}$	[mm]	**$1{,}0 \cdot h_{ef}$**		for $h / h_{ef} \geq 2{,}00$					
			$4{,}6\ h_{ef} - 1{,}8\ h$		for $2{,}00 > h / h_{ef} > 1{,}3$					
			$2{,}26\ h_{ef}$		for $h / h_{ef} \leq 1{,}3$					
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	$2\ c_{cr,sp}$							
Critical edge distance for concrete cone failure [d)]	$c_{cr,N}$	[mm]	$1{,}5\ h_{ef}$							

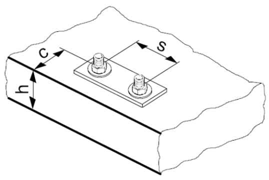
For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

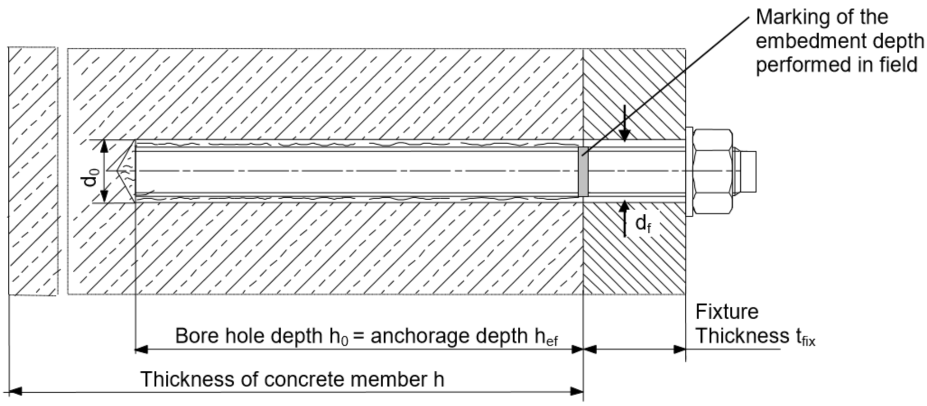
a) $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$ (h_{ef}: embedment depth)

b) Maximum recommended torque moment to avoid splitting failure during instalation with minimum spacing and edge distance

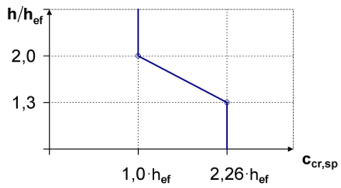
c) h: base material thickness ($h \geq h_{min}$)

d) The critical edge distance for concrete cone failure depends on the embedment depth h_{ef} and the design bond resistance. The simplified formula given in this table is on the save side.





Setting details for HIS-N

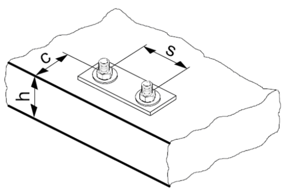
Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**
Nominal diameter of drill bit	d_0	[mm]	14	18	22	28	32
Diameter of element	d	[mm]	12,5	16,5	20,5	25,4	27,6
Effective anchorage and drill hole depth	h_{ef}	[mm]	90	110	125	170	205
Minimum base material thickness	h_{min}	[mm]	120	150	170	230	270
Diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22
Thread engagement length; min - max	h_s	[mm]	8-20	10-25	12-30	16-40	20-50
Minimum spacing	s_{min}	[mm]	60	75	90	115	130
Minimum edge distance	c_{min}	[mm]	40	45	55	65	90
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$				
Critical edge distance for splitting failure [b]	$c_{cr,sp}$	[mm]	**$1{,}0 \cdot h_{ef}$** for $h / h_{ef} \geq 2{,}0$ **$4{,}6\ h_{ef} - 1{,}8\ h$** for $2{,}0 > h / h_{ef} > 1{,}3$ **$2{,}26\ h_{ef}$** for $h / h_{ef} \leq 1{,}3$				
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	2 $c_{cr,N}$				
Critical edge distance for concrete cone failure [c]	$c_{cr,N}$	[mm]	1,5 h_{ef}				
Max. torque moment [a]	T_{max}	[Nm]	10	20	40	80	150

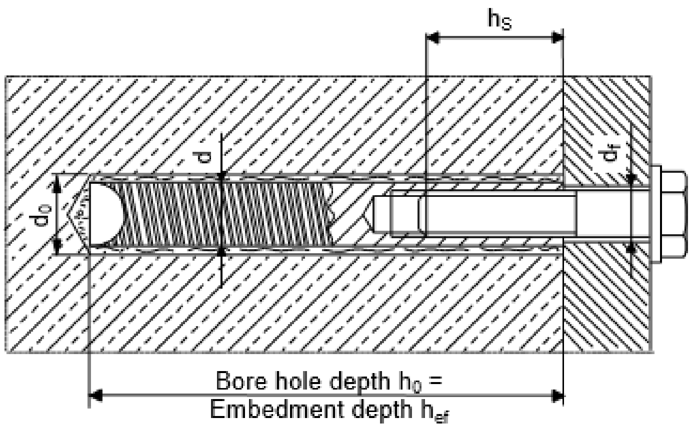
For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

a) Max. recommended torque moment to avoid splitting failure during Instalation with minimum spacing and edge distance

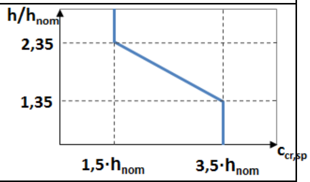
b) h: base material thickness ($h \geq h_{min}$)

c) The critical edge distance for concrete cone failure depends on the embedment depth h_{ef} and the design bond resistance. The simplified formula given in this table is on the save side.



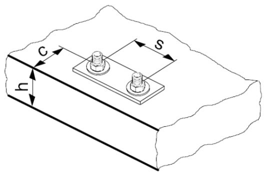


Settings details HIT-Z, HIT-Z-F and HIT-Z-R

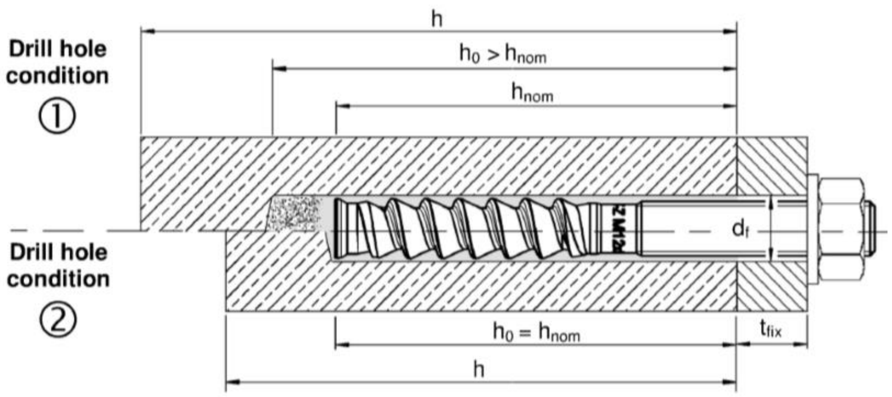
Anchor size			M8	M10	M12	M16	M20
Nominal diameter of drill bit	d_0	[mm]	10	12	14	18	22
Length of anchor	min l	[mm]	80	95	105	155	215
	max l	[mm]	120	160	196	420	450
Nominal embedment depth range[a)]	$h_{nom,min}$	[mm]	60	60	60	96	100
	$h_{nom,max}$	[mm]	100	120	144	192	220
Borehole condition 1 Min. base material thickness	h_{min}	[mm]	h_{nom} + 60 mm			h_{nom} + 100 mm	
Borehole condition 2 Min. base material thickness	h_{min}	[mm]	h_{nom} + 30 mm ≥100 mm			h_{nom} + 45 mm ≥45 mm	
Maximum depth of drill hole	h_0	[mm]	h – 30 mm			h – 2 d_0	
Pre-setting: Diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22
Through-setting: Diameter of clearance hole in the fixture	d_f	[mm]	11	14	16	20	24
Maximum fixture thickness	t_{fix}	[mm]	48	87	120	303	326
Maximum fixture thickness with seismic filling set	t_{fix}	[mm]	41	79	111	292	314
Installation torque moment[b)]	T_{inst}	[Nm]	10	25	40	80	150
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$				
Critical edge distance for splitting failure[c)]	$c_{cr,sp}$	[mm]	**1,5 · h_{nom}**	for h / h_{nom} ≥ 2,35			
			6,2 h_{nom} - 2,0 h	for 2,35 > h / h_{nom} > 1,35			
			3,5 h_{nom}	for h / hnom ≤ 1,35			
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	2 $C_{cr,N}$				
Critical edge distance concrete cone failure[d)]	$c_{cr,N}$	[mm]	1,5 h_{nom}				

For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

a) $H_{nom,min} \le h_{nom} \le h_{nom,max}$ (h_{nom}: embedment depth)
b) Recommended torque moment to avoid splitting failure during instalation with minimum spacing and edge distance
c) h: base material thickness (h ≥ h_{min})
d) The critical edge distance for concrete cone failure depends on the embedment depth h_{ef} and the design bond resistance. The simplified formula given in this table is on the save side.

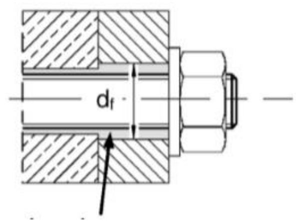


Pre-setting:
Install anchor before positioning fixture



Drill hole condition 1 → non-cleaned borehole
Drill hole condition 2 → drilling dust is completely removed

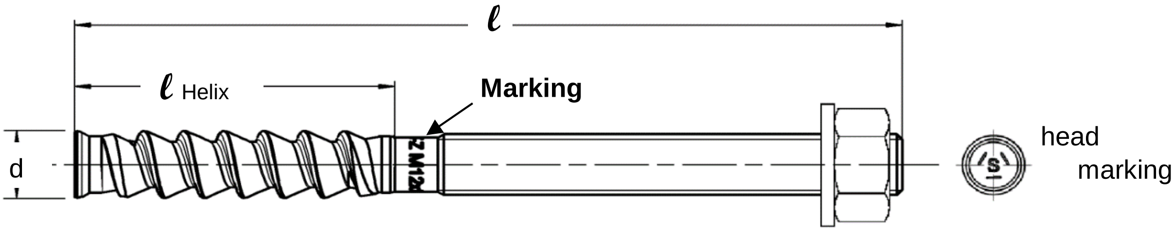
Through-setting: Install anchor through positioned fixture



Annular gap filled with Hilti HIT-HY 200-A

Anchor dimension for HIT-Z

Anchor size			M8	M10	M12	M16	M20
Length of anchor	min ℓ	[mm]	80	95	105	155	215
	max ℓ		120	160	196	420	450
Helix length	ℓ_{Helix}	[mm]	50	60	60	96	100



Minimum edge distance and spacing for HIT-Z

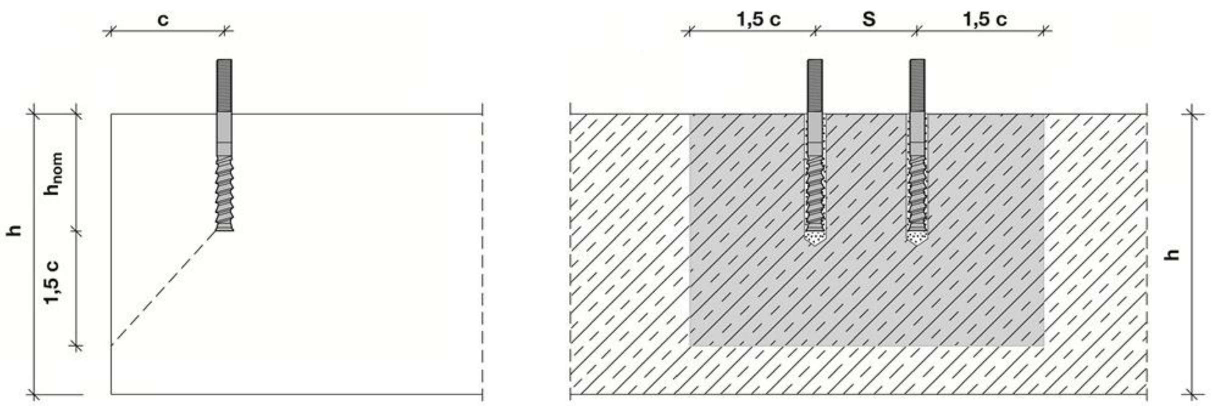
For the calculation of minimum spacing and minimum edge distance of anchors in combination with different embedment depth and thickness of concrete member the following equation shall be fulfilled: $\mathbf{A_{i,req} < A_{i,cal}}$

Required interaction area $A_{i,cal}$ for HIT-Z

Anchor size		M8	M10	M12	M16	M20
Cracked concrete	[mm²]	19200	40800	58800	94700	148000
Non-cracked concrete	[mm²]	22200	57400	80800	128000	198000

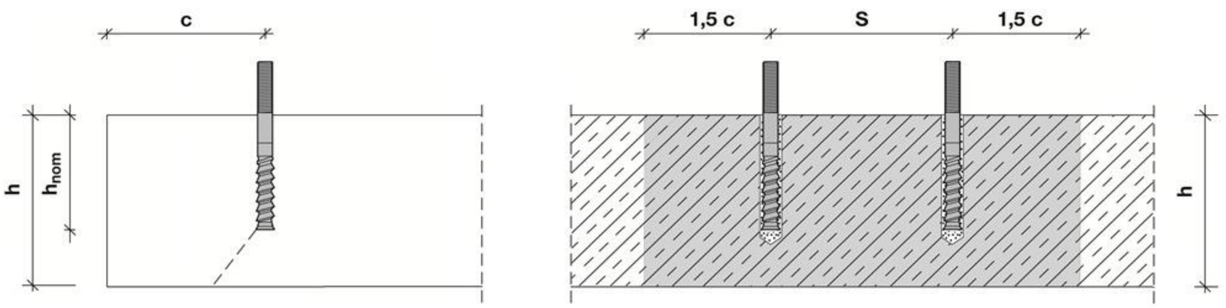
Effective area $A_{i,ef}$ of HIT-Z

Member thickness $h \geq h_{nom} + 1{,}5 \cdot c$



Single anchor and group of anchors with s > 3·c	[mm²]	$\mathbf{A_{i,cal} = (6 \cdot c) \cdot (h_{nom} + 1{,}5 \cdot c)}$	with c ≥ 5·d
Group of anchors with s ≤ 3·c	[mm²]	$\mathbf{A_{i,cal} = (3 \cdot c + s) \cdot (h_{nom} + 1{,}5 \cdot c)}$	with c ≥ 5·d and s ≥ 5·d

Member thickness $h \leq h_{nom} + 1{,}5 \cdot c$



Single anchor and group of anchors with s >	[mm²]	$\mathbf{A_{i,cal} = (6 \cdot c) \cdot h}$	with c ≥ 5·d
Group of anchors with s ≤ 3·c	[mm²]	$\mathbf{A_{i,cal} = (3 \cdot c + s) \cdot h}$	with c ≥ 5·d and s ≥ 5·d

Best case minimum edge distance and spacing with required member thickness and embedment depth

Anchor size			M8	M10	M12	M16	M20
Cracked concrete							
Member thickness	h ≥	[mm]	140	200	240	300	370
Embedment depth	h_{nom} ≥	[mm]	80	120	150	200	220
Minimum spacing	s_{min}	[mm]	40	50	60	80	100
Corresponding edge distance	c ≥	[mm]	40	55	65	80	100
Minimum edge distance	c_{min} =	[mm]	40	50	60	80	100
Corresponding spacing	s ≥	[mm]	40	60	65	80	100
Non-cracked concrete							
Member thickness	h ≥	[mm]	140	230	270	340	410
Embedment depth	h_{nom} ≥	[mm]	80	120	150	200	220
Minimum spacing	s_{min}	[mm]	40	50	60	80	100
Corresponding edge distance	c ≥	[mm]	40	70	80	100	130
Minimum edge distance	c_{min}	[mm]	40	50	60	80	100
Corresponding spacing	s ≥	[mm]	40	145	160	160	235

Best case minimum member thickness and embedment depth with required minimum edge distance and spacing (borehole condition 1)

Anchor size			M8	M10	M12	M16	M20
Cracked concrete							
Member thickness	h ≥	[mm]	120	120	120	196	200
Embedment depth	h_{nom} ≥	[mm]	60	60	60	96	100
Minimum spacing	s_{min}	[mm]	40	50	60	80	100
Corresponding edge distance	c ≥	[mm]	40	100	140	135	215
Minimum edge distance	c_{min} =	[mm]	40	60	90	80	125
Corresponding spacing	s ≥	[mm]	40	160	220	235	365
Non cracked concrete							
Member thickness	h ≥	[mm]	120	120	120	196	200
Embedment depth	h_{nom} ≥	[mm]	60	60	60	96	100
Minimum spacing	s_{min}	[mm]	40	50	60	80	100
Corresponding edge distance	c ≥	[mm]	50	145	200	190	300
Minimum edge distance	c_{min}	[mm]	40	80	115	110	165
Corresponding spacing	s ≥	[mm]	65	240	330	310	495

Minimum edge distance and spacing – Explanation

Minimum edge and spacing geometrical requirements are determined by testing the installation conditions in which two anchors with a given spacing can be set close to an edge without forming a crack in the concrete due to tightening torque.

The HIT-Z boundary conditions for edge and spacing geometry can be found in the tables to the left. If the embedment depth and slab thickness are equal to or greater than the values in the table, then the edge and spacing values may be utilized.

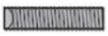
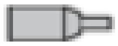
PROFIS Anchor software is programmed to calculate the referenced equations in order to determine the optimized related minimum edge and spacing based on the following variables:

Cracked or non-cracked concrete	For cracked concrete it is assumed that a reinforcement is present which limits the crack width to 0,3 mm, allowing smaller values for minimum edge distance and minimum spacing
Anchor diameter	For smaller anchor diameter a smaller installation torque is required, allowing smaller values for minimum edge distance and minimum spacing
Slab thickness and embedment depth	Increasing these values allows smaller values for minimum edge distance and minimum spacing

Installation equipment

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Rotary hammer	HIT-V	TE 2 – TE 16				TE 40 - TE 80			
	HIT-Z	TE 2 – TE 40			TE 40 – TE 80		-		
	HIS-N	TE (-A) – TE 16(-A)	TE 40 – TE 80				-		
Other tools		compressed air gun and blow out pump, set of cleaning brushes, dispenser Hollow Drill Bit							

Cleaning, drilling and installation parameters

HIT-V	HIT-Z	HIS-N	Drill bit diameters d$_0$ [mm]		Cleaning and installation	
			Hammer drill (HD)	Hollow Drill Bit (HDB)	Brush HIT-RB	Piston plug HIT-SZ
						
M8	**M8**	**-**	10	-	10	-
M10	**M10**	**-**	12	12	12	12
M12	**M12**	**M8**	14	14	14	14
M16	**M16**	**M10**	18	18	18	18
M20	**M20**	**M12**	22	22	22	22
M24	**-**	**M16**	28	28	28	28
M27	**-**	**-**	30	-	30	30
-	**-**	**M20**	32	32	32	32
M30	**-**	**-**	35	35	35	35

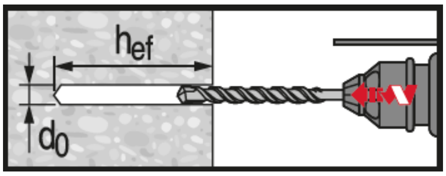
Setting instructions for HIT-V rods and HIS-N internally threaded sleeves

***For detailed information on installation see instruction for use given with the package of the product**

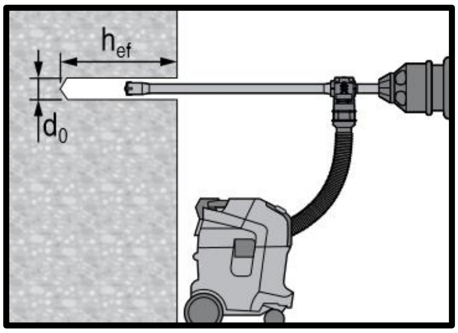
Safety regulations.

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 A (R).

Drilling



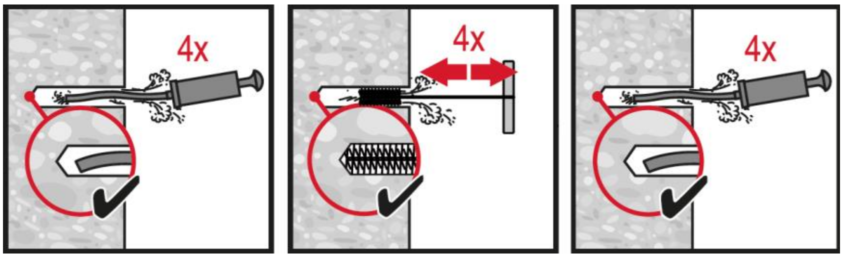
Hammer drilled hole (HD)



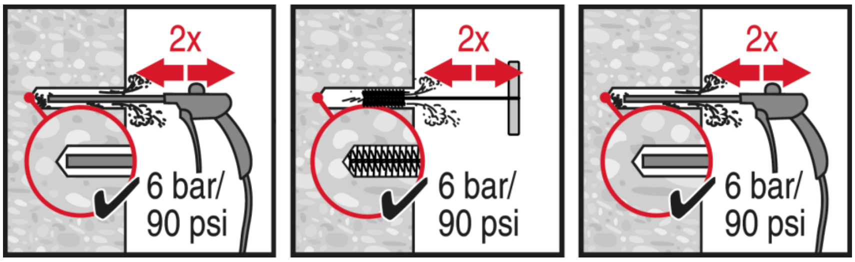
Hammer drilled hole with Hollow Drilled Bit (HDB)

No cleaning required

Cleaning

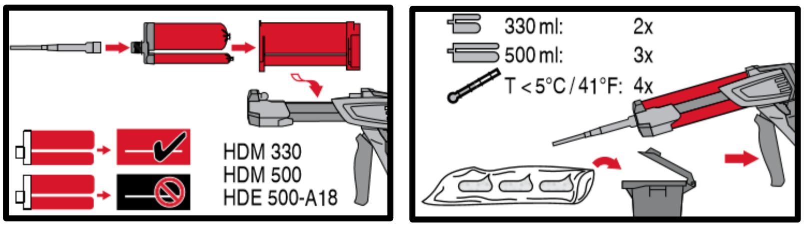


Manual cleaning (MC)
for drill diameters $d_0 \leq 20$ mm and drill hole depth $h_0 \leq 10 \cdot d$.

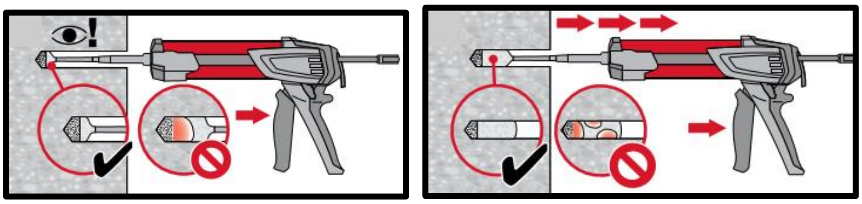


Compressed air cleaning (CAC)
for all drill hole diameters d_0 and drill hole depths $h_0 \leq 20 \cdot d$.

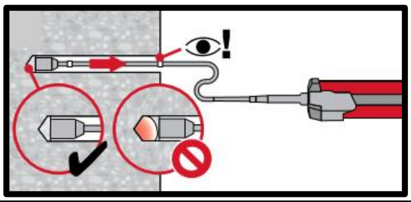
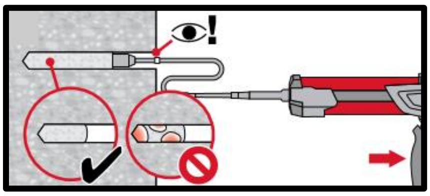
Injection



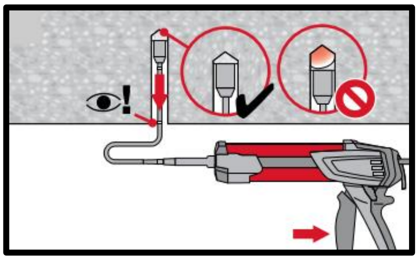
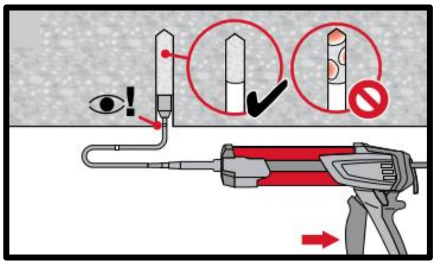
Injection system preparation.



Injection method for drill hole depth $h_{ef} \leq 250$ mm.

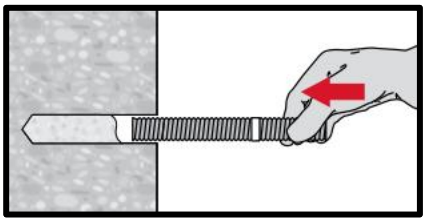



Injection method for drill hole depth h_{ef} > 250mm.

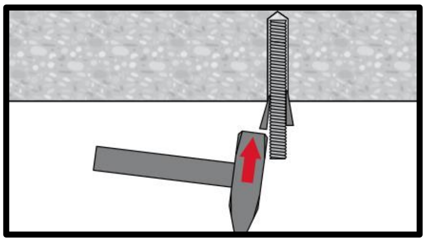



Injection method for overhead application and/or installation with embedment depth > 250 mm.

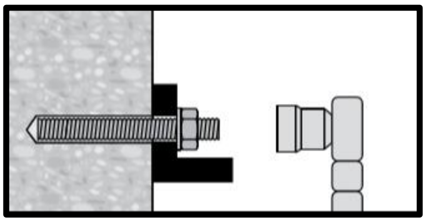
Setting the element



Setting element, observe working time “t_{work}”.



Setting element for overhead applications, observe working time “t_{work}”.



Loading the anchor after required curing time t_{cure}

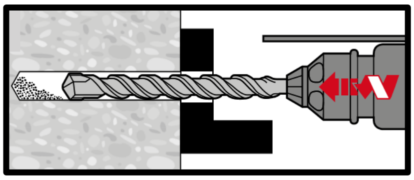
Setting instructions for HIT-Z rods

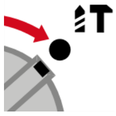
***For detailed information on installation see instruction for use given with the package of the product.**

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 A (R)

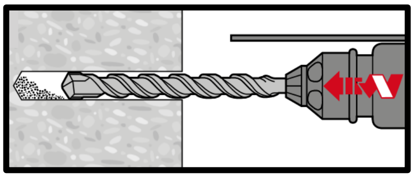
Drilling





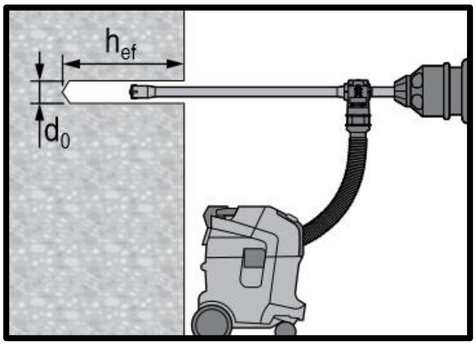
Hammer drilling: Through-setting

No cleaning required



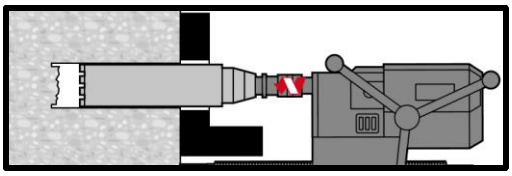
Hammer drilling: Pre-setting

No cleaning required

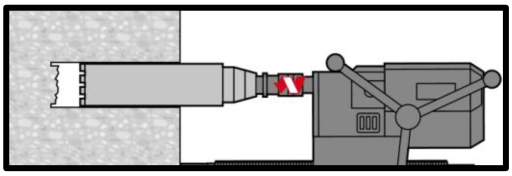


Hammer drilling with hollow drill bit: Through / pre-setting

No cleaning required

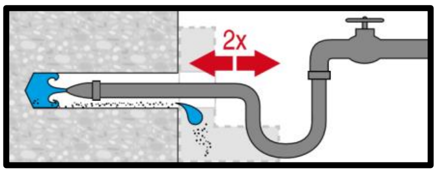


Diamond coring: Through-setting

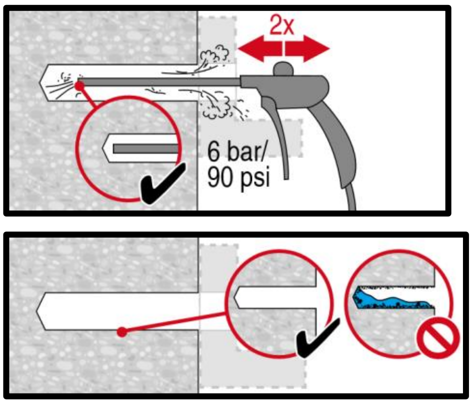


Diamond coring: Pre-setting

Cleaning

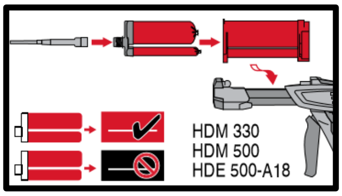


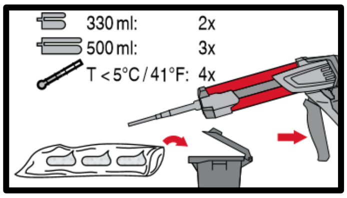
Hole flushing required for wet-drilled diamond cored holes.



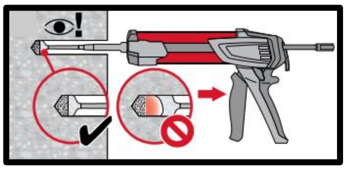
Evacuation required for wet-drilled diamond cored holes.

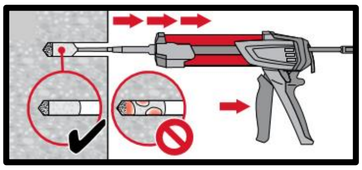
Injection



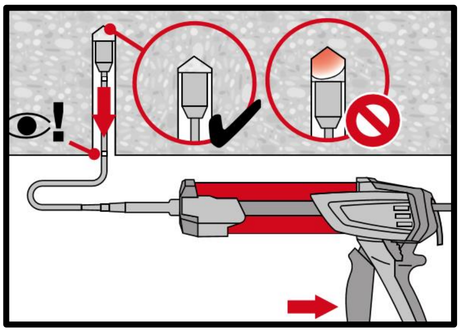


Injection system preparation.

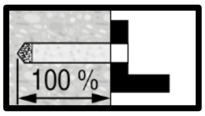




Injection of adhesive from the back of the drill hole without forming air voids.

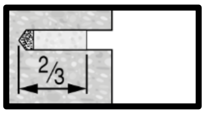


Overhead installation only with the aid of extensions and piston plugs.



Through-setting:

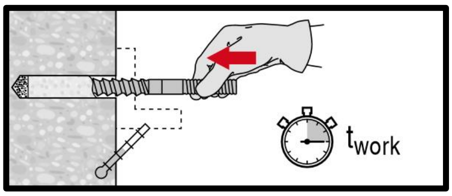
Fill 100% of the drill hole.



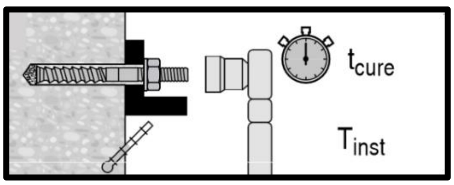
Pre-setting:

Fill approx. 2/3 of the drill hole.

Setting the element



Setting element to the required embedment depth before working time "t_{work}" has elapsed.



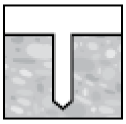
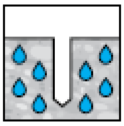
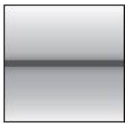
Loading the anchor: After required curing time t_{cure}.

HIT-HY 200 injection mortar

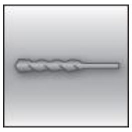
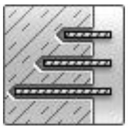
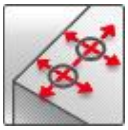
Anchor design (ETAG 001) / Rebar elements / Concrete

Injection mortar system		Benefits
	Hilti HIT - HY 200-A 330 ml foil pack (also available as 500 ml foil pack)	- **SafeSet** technology: drilling and borehole cleaning in one step with Hilti hollow drill bit - ETA seismic approval C1 - Suitable for cracked and non-cracked concrete C 12/15 to C 50/60
	Hilti HIT - HY 200-R 330 ml foil pack (also available as 500 ml foil pack)	- Suitable for dry and water saturated concrete - High loading capacity, excellent handling - Small edge distance and anchor spacing possible - In service temperature range up to 120°C short term / 72°C long term
	Rebar B500 B (ϕ8 - ϕ32)	- Large diameter applications - Two mortar versions: HY 200-R for slow cure applications and HY 200-A for fast cure applications

Base material / **Load conditions**

						
Concrete (non-cracked)	Concrete (cracked)	Dry concrete	Wet concrete	Static/ quasi-static	Seismic, ETA-C1	Fire resistance

Installation conditions / **Other informations**

		SAFESET				
Hammer drilling	Variable embedment depth	Hilti **SafeSet** technology	Small edge distance and spacing	European Technical Assessment	CE conformity	PROFIS Rebar design Software

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical assessment a)	DIBt, Berlin	ETA-11/0493 / 2017-07-28
European technical assessment a)	DIBT, Berlin	ETA-12/0084 / 2017-02-03

a) All data given in this section according to ETA-11/0493 issue 2017-07-28 and to ETA-12/0084 issue 2017-03-12.

Static and quasi-static loading (for a single anchor)

All data in this section applies to
-Correct setting (See setting instruction)
-No edge distance and spacing influence
-*Steel* failure
-Base material thickness, as specified in the table
-One typical embedment depth, as specified in the table
-One anchor material, as specified in the tables
-Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
-Temperate range I
(min. base material temperature -40°C, max. long term/short term base material temperature: +24°C/40°C)

Embedment depth and base material thickness for static and quasi-static loading data

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Typical embedment depth	[mm]	80	90	110	125	145	170	210	230	270	285	300
Base material thickness	[mm]	110	120	145	165	185	220	275	295	340	360	380

Mean ultimate resistance

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Non-cracked concrete												
Tensile $N_{Ru,m}$	[kN]	*29,4*	45,0	*65,1*	87,6	93,7	148,6	204,0	249,3	297,4	297,4	348,4
Shear $V_{Ru,m}$	[kN]	*14,7*	*23,1*	*32,6*	*44,1*	*57,8*	*90,3*	*141,8*	*153,3*	*177,5*	*203,7*	*232,1*
Cracked concrete												
Tensile $N_{Ru,m}$	[kN]	-	18,8	38,5	51,1	58,4	99,3	145,4	177,7	212,0	212,0	248,3
Shear $V_{Ru,m}$	[kN]	-	*23,1*	*32,6*	*44,1*	*57,8*	*90,3*	*141,8*	*153,3*	*177,5*	*203,7*	*232,1*

Characteristic resistance

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Non-cracked concrete												
Tensile N_{Rk}	[kN]	24,1	33,9	49,8	66,0	70,6	111,9	153,7	187,8	224,0	224,0	262,4
Shear V_{Rk}	[kN]	*14,0*	*22,0*	*31,0*	*42,0*	*55,0*	*86,0*	*135,0*	*146,0*	*169,0*	*194,0*	*221,0*
Cracked concrete												
Tensile N_{Rk}	[kN]	-	14,1	29,0	38,5	44,0	74,8	109,6	133,9	159,7	159,7	187,1
Shear V_{Rk}	[kN]	-	*22,0*	*31,0*	*42,0*	*55,0*	*86,0*	*135,0*	*146,0*	*169,0*	*194,0*	*221,0*

Design resistance

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Non-cracked concrete												
Tensile N_{Rd}	[kN]	16,1	22,6	33,2	44,0	47,1	74,6	102,5	125,2	149,4	149,4	174,9
Shear V_{Rd}	[kN]	9,3	14,7	20,7	28,0	36,7	57,3	90,0	97,3	112,7	129,3	147,3
Cracked concrete												
Tensile N_{Rd}	[kN]	-	9,4	19,4	25,7	29,3	49,8	73,0	89,2	106,5	106,5	124,7
Shear V_{Rd}	[kN]	-	14,7	20,7	28,0	36,7	57,3	90,0	97,3	112,7	129,3	147,3

Recommended loads

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Non-cracked concrete												
Tensile N_{Rec}	[kN]	11,5	16,2	23,7	31,4	33,6	53,3	73,2	89,4	106,7	106,7	125,0
Shear V_{Rec}	[kN]	6,7	10,5	14,8	20,0	26,2	41,0	64,3	69,5	80,5	92,4	105,2
Cracked concrete												
Tensile N_{Rec}	[kN]	-	6,7	13,8	18,3	20,9	35,6	52,2	63,7	76,1	76,1	89,1
Shear V_{Rec}	[kN]	-	10,5	14,8	20,0	26,2	41,0	64,3	69,5	80,5	92,4	105,2

With overall partial safety factor for action γ=1,4. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

Seismic loading (for a single anchor)

All data in this section applies to:

- Correct setting (See setting)
- No edge distance and spacing influence
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²

-Temperate range I
(min, base material temperature -40°C, max, long term/short term base material temperature: +24°C/40°C)

- α_{gap} = 1,0

Embedment depth and base material thickness in case of seismic performance category C1

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Typical embedment depth	[mm]	-	90	110	125	145	170	210	230	270	285	300
Base material thickness	[mm]	-	120	145	165	185	220	275	295	340	360	380

Characteristic resistance in case of seismic performance category C1

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Tensile $N_{Rk, seis}$	[kN]	-	12,4	25,3	33,5	38,3	65,2	93,1	113,8	135,8	135,8	159,0
Shear $V_{Rk, seis}$	[kN]	-	*15,0*	*22,0*	*29,0*	*39,0*	*60,0*	*95,0*	*102,0*	*118,0*	*136,0*	*155,0*

Design resistance in case of seismic performance category C1

Anchor- size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Tensile $N_{Rd, seis}$	[kN]	-	8,3	16,9	22,4	25,6	43,4	62,1	75,8	90,5	90,5	106,0
Shear $V_{Rd, seis}$	[kN]	-	10,0	14,7	19,3	26,0	40,0	63,3	68,0	78,7	90,7	103,3

Materials

Mechanical properties

Anchor size		ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Nominal tensile strength f_{uk}	[N/mm²]	550	550	550	550	550	550	550	550	550	550	550
Yield strength f_{yk}	[N/mm²]	500	500	500	500	500	500	500	550	500	550	500
Stressed cross-section A_s	[mm²]	50,3	78,5	113,1	153,9	201,1	314,2	490,9	530,9	615,8	706,9	804,2
Moment of resistance W	[mm³]	50,3	98,2	169,6	269,4	402,1	785,4	1534	1726	2155	2651	3217

Material quality

Part	Material
Rebar EN 1992-1-1:2004 and AC:2010	Bars and de-coiled rods class B or C according to NDP or NCL of EN 1992-1-1/NA:2013

Setting information

Installation temperature range

- 10°C to + 40°C

Service temperature range

Hilti HIT-HY 200 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,

Temperature range	Base material temperature	Max, long term base material temperature	Max, 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

Max, 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,
Max, 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	HIT-HY 200-A		HIT-HY 200-R	
	Maximum working time t_{work}	Minimum curing time t_{cure}	Maximum working time t_{work}	minimum curing time t_{cure}
- 10°C < T_{BM} ≤ - 5°C	1,5 h	7 h	3 h	20 h
- 5°C < T_{BM} ≤ 0°C	50 min	4 h	2 h	8 h
0°C < T_{BM} ≤ 5°C	25 min	2 hour	1 h	4 h
5°C < T_{BM} ≤ 10°C	15 min	75 min	40 min	2,5 h
10°C < T_{BM} ≤ 20°C	7 min	45 min	15 min	1,5 h
20°C < T_{BM} ≤ 30°C	4 min	30 min	9 min	1 h
30°C < T_{BM} ≤ 40°C	3 min	30 min	6 min	1 h

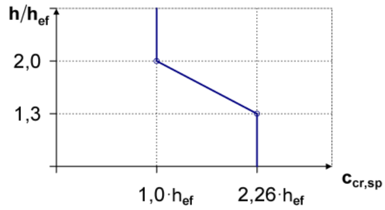
The curing time data are valid for dry base material only, In wet base material the curing times must be doubled,

Installation equipment

Anchor size	ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25	ϕ26	ϕ28	ϕ30	ϕ32
Rotary hammer	TE 2 (-A) – TE 16 (-A)					TE 40 – TE 80					
Other tools	Compressed air gun, blow out pump Set of cleaning brushes, dispenser										

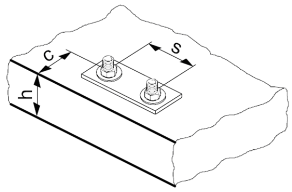
Setting details

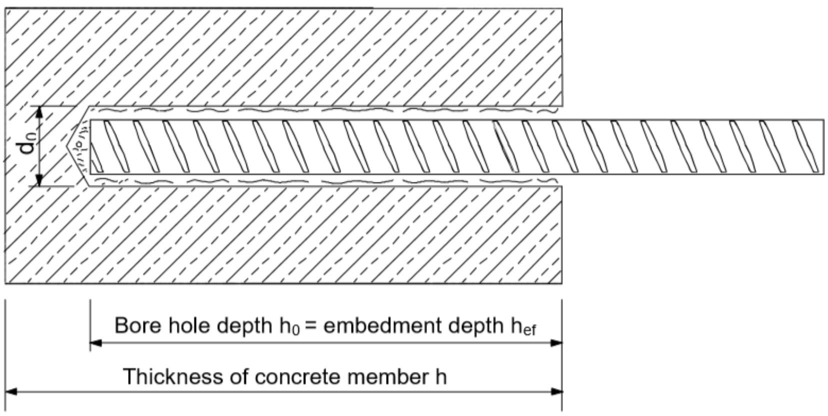
Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø26	Ø28	Ø30	Ø32
Nominal diameter of drill bit	d_0	[mm]	10 / 12 [a)]	12 / 14 [a)]	14 / 16 [a)]	18	20	25	32	32	35	37	40
Effective anchorage and drill hole depth range [b)]	$h_{ef,min}$	[mm]	60	60	70	75	80	90	100	104	112	120	128
	$h_{ef,max}$	[mm]	160	200	240	280	320	400	500	520	560	600	640
Minimum base material thickness	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			$h_{ef} + 2\ d_0$							
Minimum spacing	s_{min}	[mm]	40	50	60	70	80	100	125	130	140	150	160
Minimum edge distance	c_{min}	[mm]	40	45	45	50	50	65	70	75	75	80	80
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	$2\ c_{cr,sp}$										
Critical edge distance for splitting failure [c)]	$c_{cr,sp}$	[mm]	**$1{,}0 \cdot h_{ef}$** for $h / h_{ef} \geq 2{,}0$										
			$4{,}6\ h_{ef} - 1{,}8\ h$ for $2{,}0 > h / h_{ef} > 1{,}3$										
			$2{,}26\ h_{ef}$ for $h / h_{ef} \leq 1{,}3$										
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	$2\ c_{cr,N}$										
Critical edge distance for concrete cone failure [d)]	$c_{cr,N}$	[mm]	$1{,}5\ h_{ef}$										



For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced,

a) Both given values for drill bit diameter can be used
b) $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$ (h_{ef}: embedment depth)
c) h: base material thickness ($h \geq h_{min}$)
d) The critical edge distance for concrete cone failure depends on the embedment depth h_{ef} and the design bond resistance, The simplified formula given in this table is on the save side.





Rebar	Hammer drill (HD)	Hollow Drill Bit (HDB)	Brush HIT-RB
	d_0 [mm]		size [mm]
			
ϕ8	12 / 10 a)	12	12 / 10 a)
ϕ10	14 / 12 a)	14 / 12 a)	14 / 12 a)
ϕ12	16 / 14 a)	16 / 14 a)	16 / 14 a)
ϕ14	18	18	18
ϕ16	20	20	20
ϕ20	25	25	25
ϕ25	32	32	32
ϕ26	32	32	32
ϕ28	35	35	35
ϕ30	37	-	37
ϕ32	40	-	40

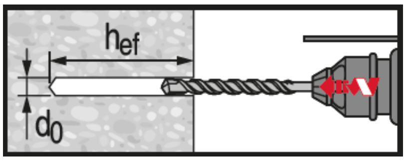
a) Both given values can be used

Setting instructions

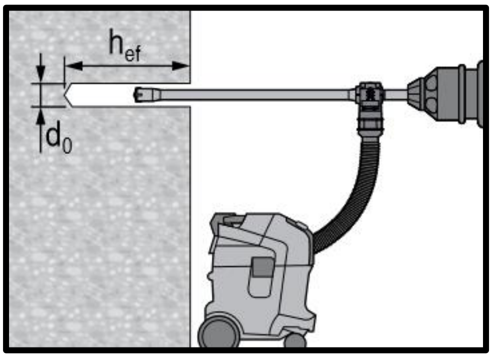
***For detailed information on installation see instruction for use given with the package of the product,**

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.

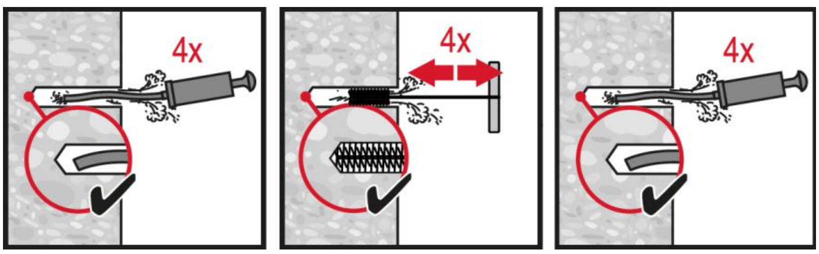


Hammer drilled hole (HD)

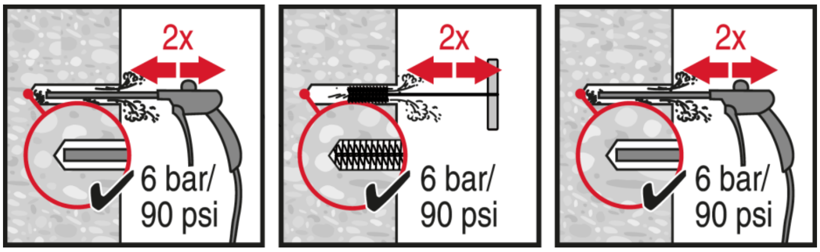


Hammer drilled hole with Hollow Drilled Bit (HDB)

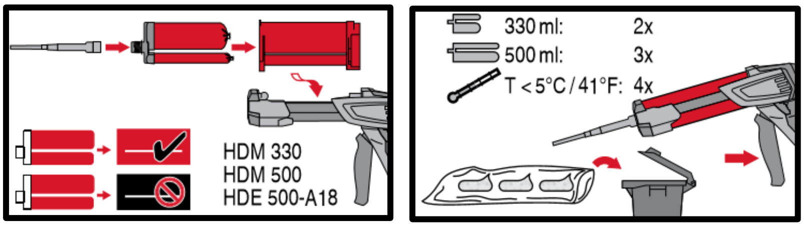
No cleaning required



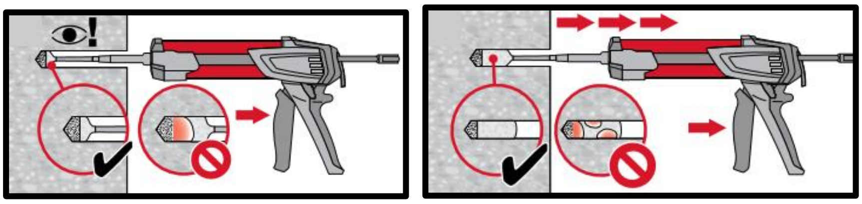
Manual cleaning (MC)
for drill diameters $d_0 \leq 20$ mm and drill hole depth $h_0 \leq 10 \cdot d$.



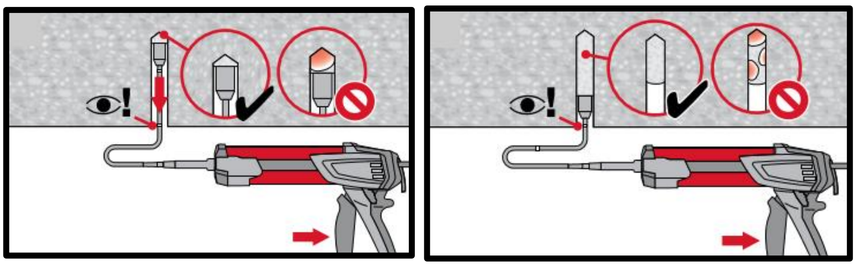
Compressed air cleaning (CAC)
for all drill hole diameters d_0 and drill hole depths $h_0 \leq 20 \cdot d$.



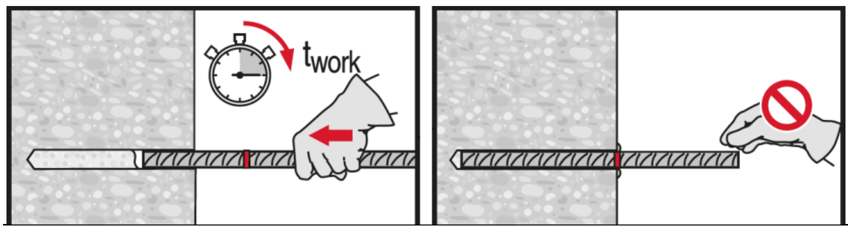
Injection system preparation.



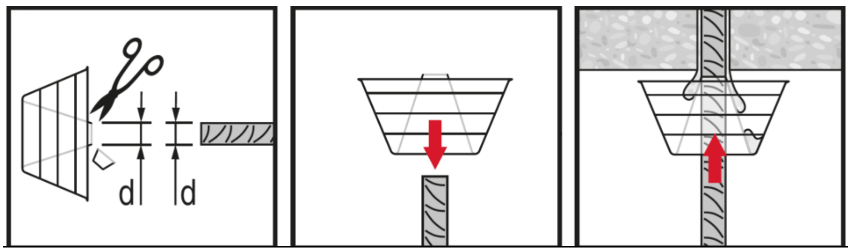
Injection method for drill hole depth $h_{ef} \leq 250$ mm.



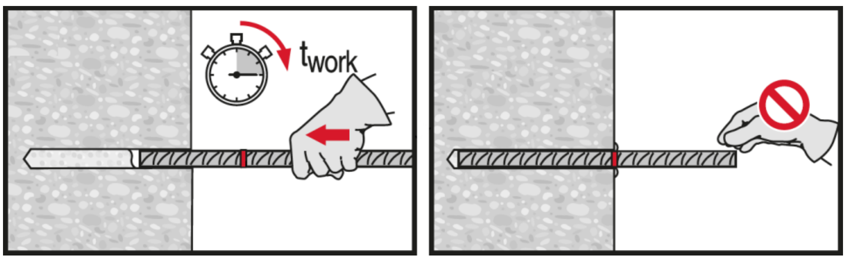
Injection method for overhead application and/or installations with embedment depth $h_{ef} \geq 250$ mm.



Setting element, observe working time "t_{work}".



Setting element for overhead applications, observe working time "t_{work}".



Setting element, observe working time "t_{work}".

HIT-HY 200 injection mortar

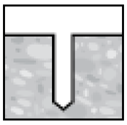
Rebar design (EN 1992-1) / Rebar elements / Concrete

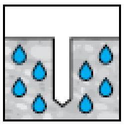
Injection mortar system		Benefits
	Hilti HIT-HY 200-R 330 ml foil pack (also available as 500 ml foil pack)	- **SafeSet** technology: Hilti hollow drill bit for hammer drilling - HY 200-R version is formulated for best handling and cure time specifically for rebar applications - Approved for ETA seismic C1 approval for post-installed-rebar
	Hilti HIT-HY 200-A 330 ml foil pack (also available as 500 ml foil pack)	- Suitable for concrete C 12/15 to C 50/60 - Suitable for dry and water saturated concrete - For rebar diameters up to 32 mm - Non corrosive to rebar elements - Good load capacity at elevated temperatures
	Rebar (ϕ8 - ϕ32)	- Suitable for embedment length up to 1000 mm - Suitable for applications down to -10 °C - Two mortar versions: HY 200-A for slow cure applications and HY 200-R for fast cure applications

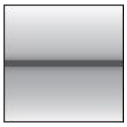
Base material / **Load conditions**


Concrete (non-cracked)


Concrete (cracked)


Dry concrete

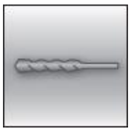

Wet concrete


Static/ quasi-static


Seismic, CSTB[1]/ETA-C1[2]


Fire resistance

Installation conditions / **Other informations**


Hammer drilling

SAFESET
Hilti Safe**Set** technology

European Technical Assessment

CE conformity

PROFIS Rebar design Software

[1]Seismic data only valid for HY 200-A

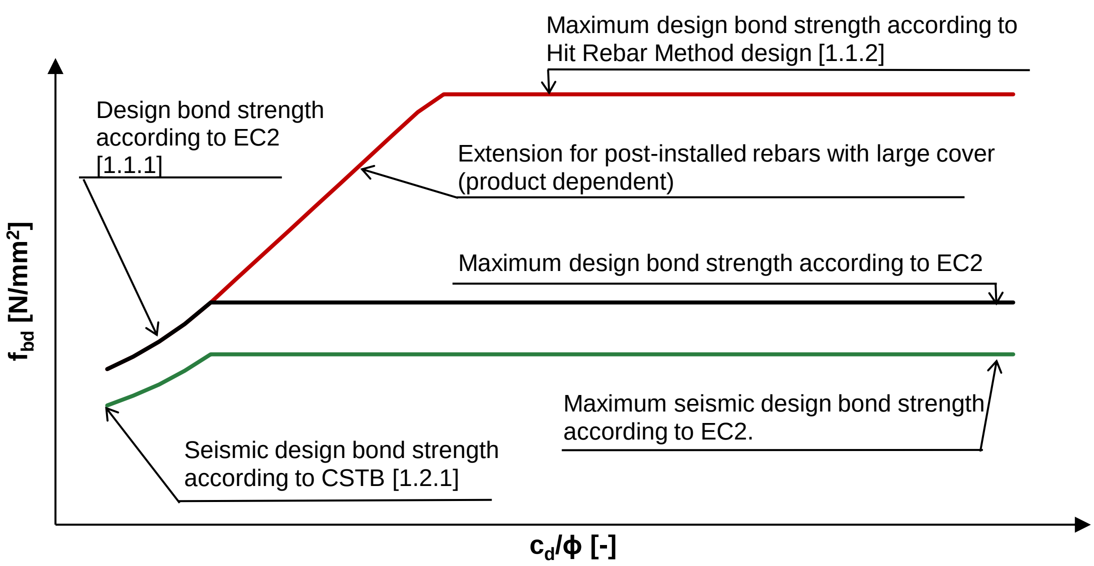
[2]Seismic data only valid for HY 200 R

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical Assessment [a]	DIBt, Berlin	ETA-11/0492/ 2014-06-26 (HY200 A)
European technical Assessment [a]	DIBt, Berlin	ETA-12/0083/ 2018-06-26 (HY200 R)
Assessment (fire)	CSTB, Marne la Vallée	Z-21.8-1948 / 2013-11-14 (HY200 A)
Assessment (fire)	CSTB, Marne la Vallée	Z-21.8-1947 / 2014-07-22 (HY200 R)

[a] All data given in this section according to ETA-11/0492, issue 2014-06-26 and ETA-12/0083, issue 2014-06-26,.

Static and quasi-static loading



Effective limit on bond stress for post-installed rebar using Hilti mortar systems and design bond strength values as provided by the EC2.

Static EC2 design (small concrete cover)

Design bond strength in N/mm² for good bond conditions

All allowed drilling methods									
Rebar - size	Concrete class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
ϕ8 - ϕ32	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3

For poor bond conditions multiply the values by 0,7. Values valid for non-cracked and cracked concrete.

Static Hit Rebar Method design (large concrete cover)

Maximum design bond strength in N/mm² for good bond conditions

Non-cracked concrete, all allowed drilling methods								
Temperature range	Rebar - size	Concrete class						
		C20/25	C25/30	C30/37	C35/45	C40/45	C45/55	C50/60
I: 40°C/24°C	ϕ8 - ϕ32	8	8,2	8,3	8,4	8,6	8,7	8,8
II: 58°C/35°C		6,7	6,8	6,9	7,0	7,1	7,2	7,3
III: 70°C/43°C		5,7	5,8	5,9	6,0	6,1	6,1	6,2
Cracked concrete, all allowed drilling methods								
I: 40°C/24°C	ϕ12 - ϕ32	4,7	4,8	4,8	4,9	5,0	5,1	5,1
II: 58°C/35°C		3,7	3,7	3,8	3,9	3,9	4,0	4,0
III: 70°C/43°C		3,3	3,4	3,5	3,5	3,6	3,6	3,7

For poor bond conditions multiply the values by 0,7. *The reduction factor for rebar diameter equal to 10 mm is 0,72

Additional Hilti Technical Data:

Reduction factor for splitting with large concrete cover: δ = 0,306 (Hilti additional data)

Minimum anchorage length and minimum lap length

The minimum anchorage length $\ell_{b,min}$ and the minimum lap length $\ell_{0,min}$ according to 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 for

All allowed hammer drilling methods									
Rebar - size	Concrete class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
ϕ8 - ϕ32	1,0								

Anchorage length for characteristic steel strength f_{yk}=500 N/mm² for good conditions

All allowed drilling methods									
Rebar-size	Concrete class	Yielding load [kN]	$l_{b,min}$ 1) [mm]	$l_{0,min}$ 1) [mm]	$l_{bd,y}$ (α2=1) 2) [mm]	$l_{bd,y}$ (α2=0.7) 3) [mm]	$l_{bd,y,HRM}$ (α2<0.7) 4) [mm]	l_{max} -10°C ≤ Ct 5) ≤ 0°C [mm]	l_{max} Ct 5) > 0°C [mm]
ϕ8	C20/25	21,9	113	200	378	265	109	700	1000
ϕ8	C50/60	21,9	100	200	202	142	99	700	1000
ϕ10	C20/25	34,1	142	200	473	331	136	700	1000
ϕ10	C50/60	34,1	100	200	253	177	124	700	1000
ϕ12	C20/25	49,2	170	200	567	397	163	700	1000
ϕ12	C50/60	49,2	120	200	303	212	148	700	1000
ϕ14	C20/25	66,9	198	210	662	463	190	700	1000
ϕ14	C50/60	66,9	140	210	354	248	173	700	1000
ϕ16	C20/25	87,4	227	240	756	529	217	700	1000
ϕ16	C50/60	87,4	160	240	404	283	198	700	1000
ϕ18	C20/25	110,6	255	270	851	595	245	700	1000
ϕ18	C50/60	110,6	180	270	455	319	222	700	1000
ϕ20	C20/25	136,6	284	300	945	662	272	700	1000
ϕ20	C50/60	136,6	200	300	506	354	247	700	1000
ϕ22	C20/25	165,3	312	330	1040	728	299	700	1000
ϕ22	C50/60	165,3	220	330	556	389	272	700	1000
ϕ24	C20/25	196,7	340	360	1134	794	326	700	1000
ϕ24	C50/60	196,7	240	360	607	425	296	700	1000
ϕ25	C20/25	213,4	354	375	1181	827	340	700	1000
ϕ25	C50/60	213,4	250	375	632	442	309	700	1000
ϕ26	C20/25	230,8	369	390	1229	860	353	700	1000
ϕ26	C50/60	230,8	260	390	657	460	321	700	1000
ϕ28	C20/25	267,7	397	420	1323	926	380	700	1000
ϕ28	C50/60	267,7	280	420	708	495	346	700	1000
ϕ30	C20/25	307,3	425	450	1418	992	408	700	1000
ϕ30	C50/60	307,3	300	450	758	531	371	700	1000
ϕ32	C20/25	349,7	454	480	1512	1059	435	700	1000
ϕ32	C50/60	349,7	320	480	809	566	395	700	1000

1) According to EC2: EN 1992-1-1:2004 $l_{b,min}$ (8.6) and $l_{0,min}$ (8.11) are calculated for good bond conditions with characteristic yield strength f_{yk} = 500 N/mm², γ_M=1,15 and α_6 = 1,0
2) Embedment depth for yield of the rebar and for c_d/ϕ = 1 (characteristic yield strength f_{yk} = 500 N/mm²)
3) Embedment depth for yield of the rebar and for c_d/ϕ = 3 (characteristic yield strength f_{yk} = 500 N/mm²)
4) Embedment depth according to Hit Rebar design for yield of the rebar and for c_d/ϕ > 8 (Temperature range I,
5) characteristic yield strength f_{yk} = 500 N/mm²)
6) c_t=concrete temperature

Seismic data

Seismic data according to ETA-12/0083 assessment

Seismic reduction factor $k_{b,seis}$ for hammer drilling (HD) and (HDB) and compressed air drilling (CA)

<table>
<tr><th rowspan="3">Rebar - size</th><th></th><th colspan="7">Reduction factor $k_{b,seis}$</th></tr>
<tr><th></th><th colspan="7">Concrete class</th></tr>
<tr><th>C16/20</th><th>C20/25</th><th>C25/30</th><th>C30/37</th><th>C35/45</th><th>C40/50</th><th>C45/55</th><th>C50/60</th></tr>
<tr><td>φ12 - φ18</td><td colspan="4">1,0</td><td>0,90</td><td>0,82</td><td>0,76</td><td>0,71</td></tr>
<tr><td>φ20 - φ30</td><td colspan="6">1,0</td><td>0,92</td><td>0,86</td></tr>
<tr><td>φ32</td><td colspan="8">1,0</td></tr>
</table>

For poor bond conditions multiply the values 0,7.

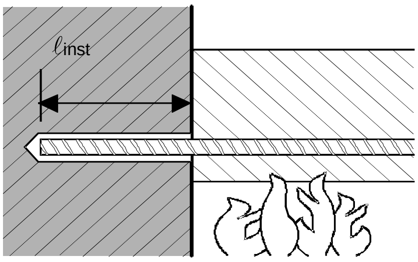
Design values for the ultimate bond resistance $f_{bd,seis}$ 1) in N/mm² for seismic loading for hammer drilling (HD) and (HDB) and compressed air drilling (CA)

<table>
<tr><th rowspan="3">Rebar - size</th><th></th><th colspan="7">Bond resistance $f_{bd,seis}$</th></tr>
<tr><th></th><th colspan="7">Concrete class</th></tr>
<tr><th>C16/20</th><th>C20/25</th><th>C25/30</th><th>C30/37</th><th>C35/45</th><th>C40/50</th><th>C45/55</th><th>C50/60</th></tr>
<tr><td>φ12 - φ18</td><td>2,0</td><td>2,3</td><td>2,7</td><td colspan="5">3,0</td></tr>
<tr><td>φ20 - φ30</td><td>2,0</td><td>2,3</td><td>2,7</td><td>3,0</td><td>3,4</td><td colspan="3">3,7</td></tr>
<tr><td>φ32</td><td>2,0</td><td>2,3</td><td>2,7</td><td>3,0</td><td>3,4</td><td>3,7</td><td>4,0</td><td>4,3</td></tr>
</table>

1) According to EN 1992-1-1:2004 for good bond conditions. For all other bond conditions multiply the values by 0.7.

Fire resistance

a) Anchoring application



Maximum force ($F_{s,T,max}$) in rebar in conjunction with HIT-HY 200 as a function of embedment depth (ℓ_{inst}) for the fire resistance classes F30 to F180 according to EC2.

<table>
<tr><th rowspan="2">Rebar-size</th><th rowspan="2">$F_{s,T,max}$ [kN]</th><th rowspan="2">ℓ_{inst} [mm]</th><th colspan="5">Fire resistance of bar [kN]</th></tr>
<tr><th>R30</th><th>R60</th><th>R90</th><th>R120</th><th>R180</th></tr>
<tr><td rowspan="7">φ8</td><td rowspan="7">16,19</td><td>80</td><td>3,0</td><td>0,7</td><td>0,2</td><td>0,0</td><td>0,0</td></tr>
<tr><td>120</td><td>7,0</td><td>2,2</td><td>1,3</td><td>0,7</td><td>0,2</td></tr>
<tr><td>170</td><td rowspan="5">16,2</td><td>10,2</td><td>9,2</td><td>4,0</td><td>1,7</td></tr>
<tr><td>210</td><td rowspan="4">16,2</td><td rowspan="4">16,2</td><td>11,0</td><td>7,5</td></tr>
<tr><td>230</td><td>14,5</td><td>10,9</td></tr>
<tr><td>250</td><td rowspan="2">16,2</td><td>14,5</td></tr>
<tr><td>300</td><td>16,2</td></tr>
<tr><td rowspan="7">φ10</td><td rowspan="7">25,29</td><td>100</td><td>6,1</td><td>2,0</td><td>1,0</td><td>0,4</td><td>0,0</td></tr>
<tr><td>150</td><td>19,3</td><td>9,3</td><td>7,1</td><td>2,2</td><td>1,0</td></tr>
<tr><td>190</td><td rowspan="5">25,3</td><td>18,0</td><td>15,9</td><td>9,3</td><td>4,9</td></tr>
<tr><td>230</td><td rowspan="4">25,3</td><td>24,7</td><td>18,1</td><td>13,7</td></tr>
<tr><td>260</td><td rowspan="3">25,3</td><td>24,7</td><td>20,3</td></tr>
<tr><td>280</td><td rowspan="2">25,3</td><td>24,7</td></tr>
<tr><td>320</td><td>25,3</td></tr>
</table>

Maximum force ($F_{s,T,max}$) in rebar in conjunction with HIT-HY 200 as a function of embedment depth (ℓ_{inst}) for the fire resistance classes F30 to F180 according to EC2.

Rebar-size	$F_{s,T,max}$ [kN]	ℓ_{inst} [mm]	Fire resistance of bar [kN]				
			R30	R60	R90	R120	R180
ϕ12	36,42	120	15,3	6,0	1,9	1,1	0,3
		180	31,0	19,0	17,8	8,5	7,0
		220	*36,4*	29,6	27,0	19,1	13,8
		260		*36,4*	*36,4*	29,7	24,4
		280				35,0	29,6
		300				*36,4*	34,9
		340					*36,4*
ϕ14	49,58	140	24,0	9,9	6,9	2,6	1,0
		210	45,0	31,4	28,5	25,7	13,0
		240	*49,6*	40,6	37,7	32,8	22,3
		280		*49,6*	*49,6*	40,7	34,6
		300				44,7	40,7
		330				*49,6*	48,1
		360					*49,6*
ϕ16	64,75	160	34,5	18,4	14,9	4,4	2,3
		240	62,6	46,4	43,0	37,7	25,5
		260	*64,8*	53,5	50,0	44,7	32,5
		300		*64,8*	57,0	51,7	49,6
		330			*64,8*	61,3	57,2
		360				*64,8*	62,7
		400					*64,8*
20	101,18	200	60,7	40,0	36,3	29,3	14,3
		250	78,3	62,5	58,3	51,3	36,3
		310	*101,2*	88,9	84,6	77,6	62,6
		350		*101,2*	*101,2*	94,2	80,2
		370				*101,2*	83,5
		390					97,8
		430					*101,2*
ϕ25	158,09	250	97,9	78,1	72,6	64,7	45,3
		280	126,5	94,6	89,4	81,2	61,8
		370	*158,1*	144,0	127,9	119,7	111,2
		410		*158,1*	150,0	141,8	123,2
		430			*158,1*	150,0	144,2
		450				*158,1*	155,2
		500					*158,1*
ϕ32	158,09	250	97,9	78,1	72,6	64,7	45,3
		280	126,5	94,6	89,4	81,2	61,8
		370	*158,1*	144,0	127,9	119,7	111,2
		410		*158,1*	150,0	141,8	123,2
		430			*158,1*	150,0	144,2
		450				*158,1*	155,2
		500					*158,1*

Characteristic yield strength f_{yk} = 500 N/mm²

Steel failure

b) Overlap joint application

Max. bond stress, $f_{bd,FIRE}$, depending on actual clear concrete cover for classifying the fire resistance.

It must be verified that the actual force in the bar during a fire, $F_{s,T}$, can be taken up by the bar connection of the selected length, ℓ_{inst}. Note: Cold design for ULS is mandatory.

$F_{s,T} \leq (\ell_{inst} - c_f) \cdot \phi \cdot \pi \cdot f_{bd,FIRE}$ where: $(\ell_{inst} - c_f) \geq \ell_s$;

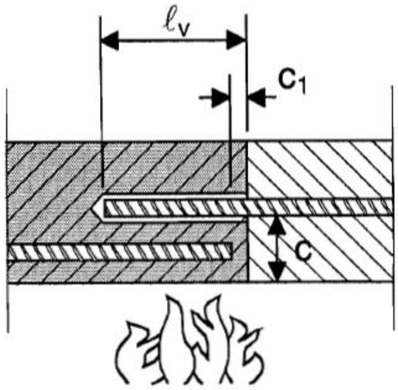
ℓ_s = lap length

ϕ = nominal diameter of bar

$\ell_{inst} - c_f$ = selected overlap joint length; this must be at least ℓ_s,

but may not be assumed to be more than 80 ϕ

$f_{bd,FIRE}$ = bond stress when exposed to fire



Critical temperature-dependent bond stress, τ_c, concerning "overlap joint" for Hilti HIT-HY 200 injection adhesive in relation to fire resistance class and required minimum concrete coverage c.

<table>
<tr><th>Clear concrete cover c</th><th colspan="5">Max. bond stress, τ_c [N/mm²]</th></tr>
<tr><th>[mm]</th><th>R30</th><th>R60</th><th>R90</th><th>R120</th><th>R180</th></tr>
<tr><td>30</td><td>0,6</td><td>0,3</td><td rowspan="2">-</td><td rowspan="5">-</td><td rowspan="9">-</td></tr>
<tr><td>35</td><td>0,7</td><td>0,3</td></tr>
<tr><td>40</td><td>0,9</td><td>0,4</td><td>0,2</td></tr>
<tr><td>45</td><td>1,0</td><td>0,4</td><td>0,2</td></tr>
<tr><td>50</td><td>1,2</td><td>0,5</td><td>0,3</td></tr>
<tr><td>55</td><td>1,5</td><td>0,6</td><td>0,3</td><td>0,2</td></tr>
<tr><td>60</td><td>1,8</td><td>0,8</td><td>0,4</td><td>0,3</td></tr>
<tr><td>65</td><td rowspan="17">2,2</td><td>0,9</td><td>0,5</td><td>0,3</td></tr>
<tr><td>70</td><td>1,0</td><td>0,5</td><td>0,3</td></tr>
<tr><td>75</td><td>1,2</td><td>0,6</td><td>0,4</td><td>0,2</td></tr>
<tr><td>80</td><td>1,5</td><td>0,7</td><td>0,5</td><td>0,3</td></tr>
<tr><td>85</td><td>1,7</td><td>0,8</td><td>0,5</td><td>0,3</td></tr>
<tr><td>90</td><td>2,0</td><td>1,0</td><td>0,6</td><td>0,3</td></tr>
<tr><td>95</td><td rowspan="11">2,2</td><td>1,1</td><td>0,7</td><td>0,4</td></tr>
<tr><td>100</td><td>1,3</td><td>0,8</td><td>0,4</td></tr>
<tr><td>105</td><td>1,5</td><td>0,9</td><td>0,5</td></tr>
<tr><td>110</td><td>1,7</td><td>1,1</td><td>0,5</td></tr>
<tr><td>115</td><td>2,0</td><td>1,2</td><td>0,6</td></tr>
<tr><td>120</td><td rowspan="5">2,2</td><td>1,4</td><td>0,6</td></tr>
<tr><td>125</td><td>1,6</td><td>0,7</td></tr>
<tr><td>130</td><td>1,9</td><td>0,8</td></tr>
<tr><td>135</td><td rowspan="2">2,1</td><td>0,9</td></tr>
<tr><td>200</td><td>2,3</td></tr>
</table>

Materials

Material quality

Part	Material
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 $f_{uk} = f_{tk} = k \cdot f_{yk}$

Fitness for use

Some creep tests have been conducted in accordance with ETAG guideline 001 part 5 and TR 023 in the following conditions: **in dry environment at 50 °C during 90 days**.
These tests show an excellent behaviour of the post-installed connection made with HIT-HY 200: low displacements with long term stability, failure load after exposure above reference load.

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

Temperature

Installation temperature range
-10°C to +40°C

Service temperature range
Hilti HIT-HY 200 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.

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

Max 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.
Max 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	HIT-HY 200-A		HIT-HY 200-R	
	Maximum working time t_{work}	Minimum curing time t_{cure}	Maximum working time t_{work}	minimum curing time t_{cure}
$- 10°C < T_{BM} \leq - 5°C$	1,5 h	7 h	3 h	20 h
$- 5°C < T_{BM} \leq 0°C$	50 min	4 h	2 h	8 h
$0°C < T_{BM} \leq 5°C$	25 min	2 hour	1 h	4 h
$5°C < T_{BM} \leq 10°C$	15 min	75 min	40 min	2,5 h
$10°C < T_{BM} \leq 20°C$	7 min	45 min	15 min	1,5 h
$20°C < T_{BM} \leq 30°C$	4 min	30 min	9 min	1 h
$30°C < T_{BM} \leq 40°C$	3 min	30 min	6 min	1 h

Setting information

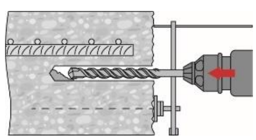
Installation equipment

Rebar – size	ϕ8 - ϕ16	ϕ18 - ϕ32
Rotary hammer	TE 2 (-A)– TE 40(-A)	TE40 – TE80
Other tools	Blow out pump ($h_{ef} \leq 10 \cdot d$)	-
	Compressed air gun[a)] Set of cleaning brushes[b)], dispenser, piston plug	

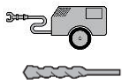
a) Compressed air gun with extension hose for all drill holes deeper than 250 mm (for ϕ 8 to ϕ 12) or deeper than $20 \cdot \phi$ (for ϕ > 12 mm)
b) Automatic brushing with round brush for all drill holes deeper than 250 mm (for ϕ 8 to ϕ 12) or deeper than $20 \cdot \phi$ (for ϕ > 12 mm)

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)**	$\phi < 25$	$50 + 0{,}08 \cdot l_v$	$50 + 0{,}02 \cdot l_v$
	$\phi \geq 25$	$60 + 0{,}08 \cdot l_v \geq 2 \cdot \phi$	$60 + 0{,}02 \cdot l_v \geq 2 \cdot \phi$



Drilling and cleaning diameters

Rebar [mm]	Hammer drill (HD)	Hollow Drill Bit (HDB) [b]	Compressed air drill (CA)	Brush HIT-RB	Air nozzle HIT-RB
	d_0 [mm]			size [mm]	
					
ϕ8	12 / 10 [a]	12	-	12 / 10 [a]	12 / 10 [a]
ϕ10	14 / 12 [a]	14 / 12 [a]	-	14 / 12 [a]	14 / 12 [a]
ϕ12	16 / 14 [a]	16 / 14 [a]	-	16 / 14 [a]	16 / 14 [a]
	-	-	17	18	16
ϕ14	18	18	17	18	18
ϕ16	20	20	-	20	20
	-	-	20	22	20
ϕ18	22	22	22	22	22
ϕ20	25	25	-	25	25
	-	-	26	28	25
ϕ22	28	28	28	28	28
ϕ24	32	32	32	32	32
ϕ25	32	32	32	32	
ϕ26	35	-	35	35	
ϕ28	35	-	35	35	
ϕ30	-	-	35	35	
	37	-	-	37	
ϕ32	40	-	40	40	

a) Maximum installation length l=250 mm.
b) No cleaning required

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

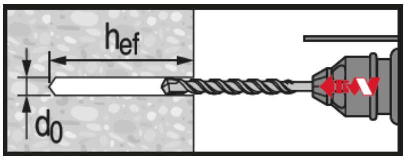
Rebar	Dispenser	
	HDM 330, HDM 500, HDE 500	HDE 500
	Concrete temp. ≥ -10°C	Concrete temp. ≥ 0°C
	$\ell_{v,max}$ [mm]	$\ell_{v,max}$ [mm]
ϕ8 - ϕ32	700	1000

Setting instructions

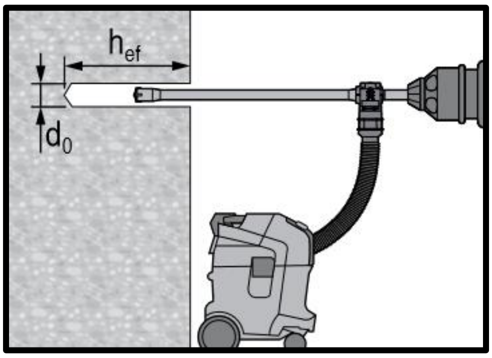
***For detailed information on installation see instruction for use given with the package of the product.**

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.

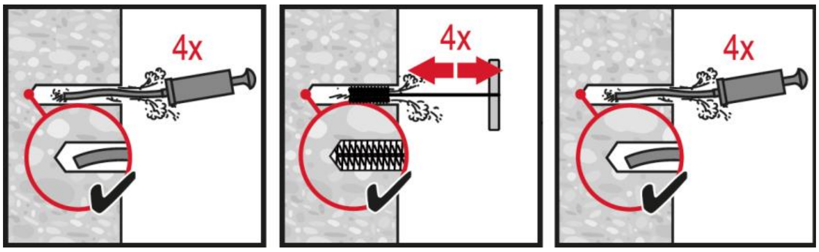


Hammer drilled hole (HD)

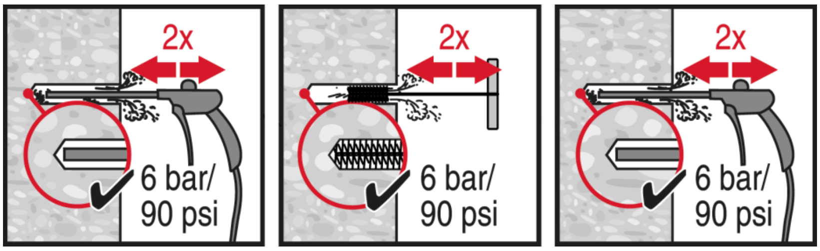


Hammer drilled hole with Hollow Drilled Bit (HDB)

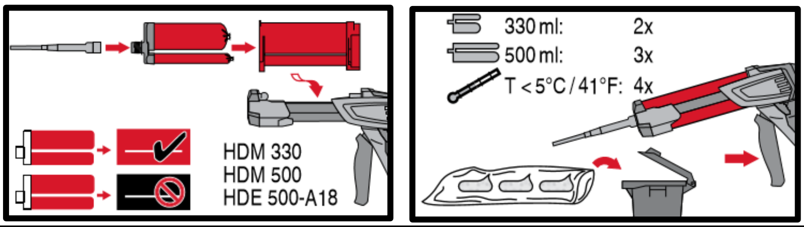
No cleaning required



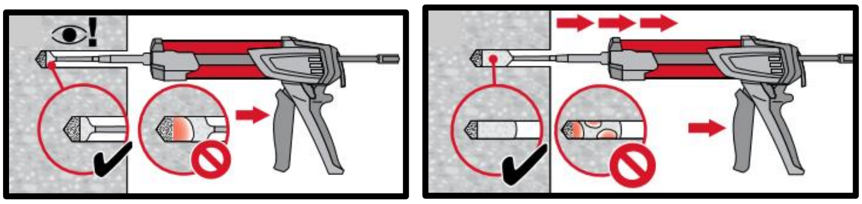
Manual cleaning (MC)
for drill diameters $d_0 \leq 20$ mm and drill hole depth $h_0 \leq 10 \cdot d$.



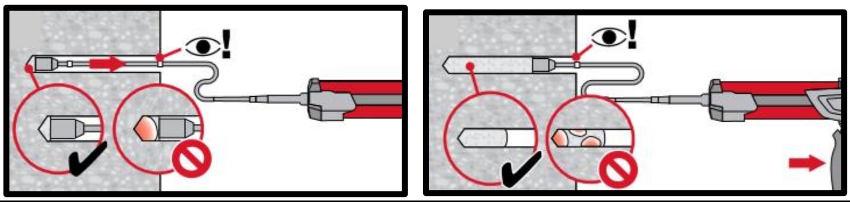
Compressed air cleaning (CAC)
for all drill hole diameters d_0 and drill hole depths $h_0 \leq 20 \cdot d$.



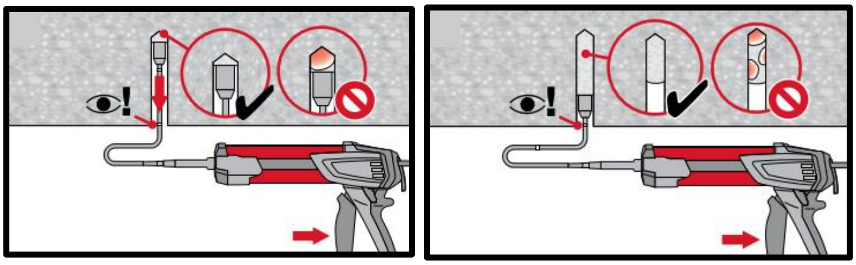
Injection system preparation.



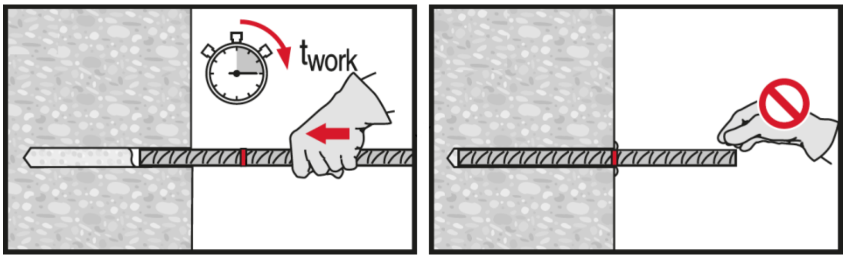
Injection method for drill hole depth $h_{ef} \leq 250$ mm.



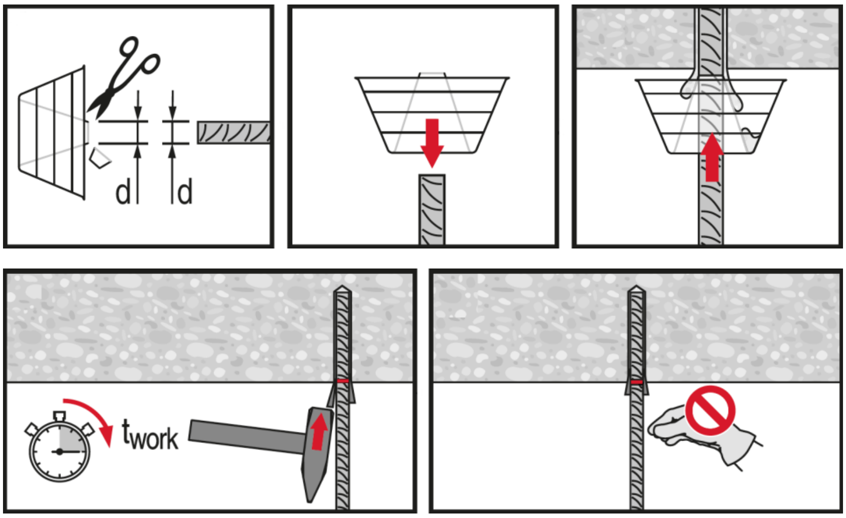
Injection method for drill hole depth h_{ef} > 250mm.



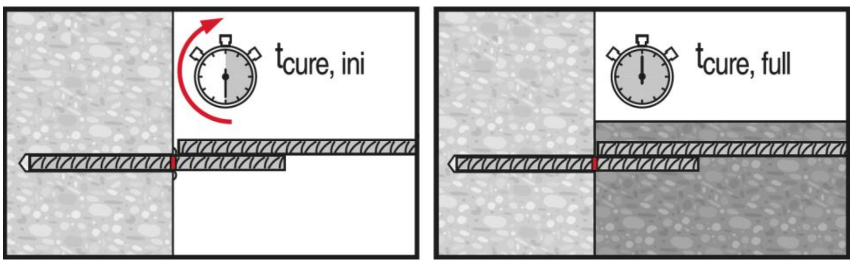
Injection method for overhead application.



Setting element, observe working time "t_{work}".



Setting element for overhead applications, observe working time "t_{work}".



Apply full load only after curing time "t_{cure}".