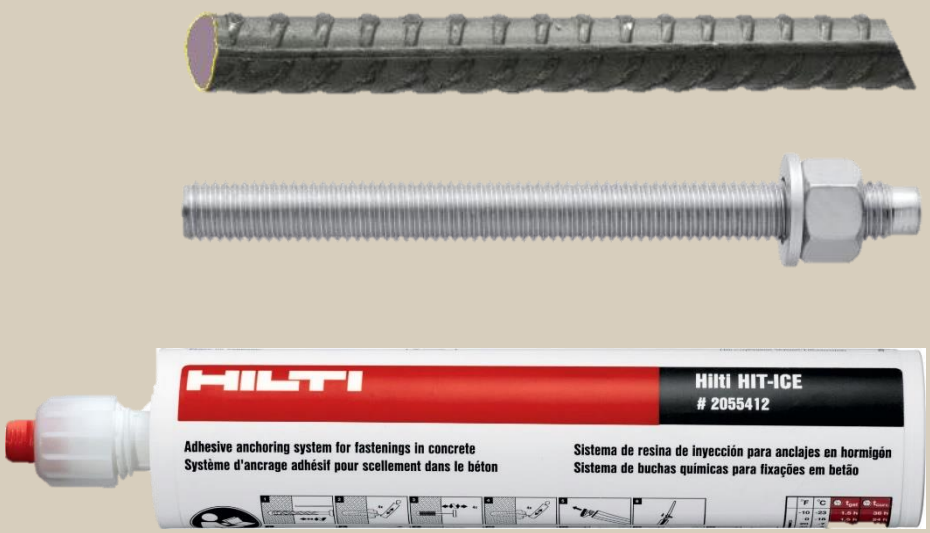
HIT-ICE
INJECTION MORTAR

Technical Datasheet

Update: Jan-23



HIT-ICE injection mortar

Anchor design (EN 1992-4) / Rods and Sleeves / Concrete

Injection mortar system

Hilti HIT-ICE

296 ml cartridge

Anchor rods:
HAS-U
HAS-U HDG
HAS-U A4
HAS-U HCR
(M8-M24)

Internally threaded sleeve:
HIS-N
HIS-R-N sleeves
(M8-M20)

Benefits

- Suitable for cracked [a] and non-cracked concrete C 20/25 to C 50/60
- High loading capacity
- Suitable for dry and water saturated concrete
- High corrosion [a] / corrosion resistant
- Odourless resin
- Low installation temperature

Base material

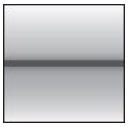
Concrete (non-cracked)

Concrete [a] (cracked)

Dry concrete

Wet concrete

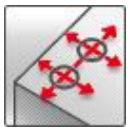
Load conditions



Static/ quasi-static

Installation conditions

Hammer drilled holes



Small edge distance and spacing

Variable embedment depth

Other information

PROFIS Engineering design Software

Corrosion resistance

High corrosion resistance [a]

a) Applications only for HAS-U rods.

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
Hilti Technical Data [a]	Hilti	2017-11-28

a) All data given in this section according to Hilti Technical Data.

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
- Embedment depth as specified in the table
- Anchor material as specified in the tables
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- In-service temperature range I
  (min. base material temperature -40°C, max. long/short term base material temperature: +24°C/+40°C)

Embedment depth [a] and base material thickness

Anchor size			M8	M10	M12	M16	M20	M24
HIT-V								
Embedmbent depth	h_{ef}	[mm]	80	90	110	125	170	210
Base material thickness	h	[mm]	110	120	140	165	220	270
HIS-N								
Embedmbent depth	h_{ef}	[mm]	90	110	125	170	205	-
Base material thickness	h	[mm]	120	150	170	230	270	-

a) The allowed range of embedment depth is shown in the setting details

Characteristic resistance

Anchor size				M8	M10	M12	M16	M20	M24
Non-cracked concrete									
Tension	HAS-U 5.8	N_{Rk}	[kN]	18,3	29,0	42,2	65,9	96,1	142,4
	HAS-U 8.8			21,1	29,7	43,5	65,9	96,1	142,4
	HAS-U A4			21,1	29,7	43,5	65,9	96,1	142,4
	HAS-U HCR			21,1	29,7	43,5	65,9	96,1	142,4
	HIS-N 8.8			25,0	42,8	56,4	88,2	88,9	-
Shear	HAS-U 5.8	V_{Rk}	[kN]	9,2	14,5	21,1	39,3	61,3	88,3
	HAS-U 8.8			14,6	23,2	33,7	62,8	98,0	141,2
	HAS-U A4			12,8	20,3	29,5	55,0	85,8	123,6
	HAS-U HCR			14,6	23,2	33,7	62,8	98,0	123,6
	HIS-N 8.8			13,0	23,0	34,0	63,0	58,0	-
Cracked concrete									
Tension	HAS-U 5.8	N_{Rk}	[kN]	-	-	20,7	25,1	32,0	-
	HAS-U 8.8			-	-	20,7	25,1	32,0	-
	HAS-U A4			-	-	20,7	25,1	32,0	-
	HAS-U HCR			-	-	20,7	25,1	32,0	-
Shear	HAS-U 5.8	V_{Rk}	[kN]	-	-	21,1	39,3	61,3	-
	HAS-U 8.8			-	-	33,7	50,2	64,1	-
	HAS-U A4			-	-	29,5	50,2	64,1	-
	HAS-U HCR			-	-	33,7	50,2	64,1	-

Design resistance

Anchor size				M8	M10	M12	M16	M20	M24
Non-cracked concrete									
Tension	HAS-U 5.8	N_{Rd}	[kN]	11,7	16,5	24,2	36,6	53,4	79,1
	HAS-U 8.8			11,7	16,5	24,2	36,6	53,4	79,1
	HAS-U A4			11,7	16,5	24,2	36,6	53,4	79,1
	HAS-U HCR			11,7	16,5	24,2	36,6	53,4	79,1
	HIS-N 8.8			16,7	28,5	37,6	58,8	59,3	-
Shear	HAS-U 5.8	V_{Rd}	[kN]	7,3	11,6	16,9	31,4	49,0	70,6
	HAS-U 8.8			11,7	18,6	27,0	50,2	78,4	113,0
	HAS-U A4			8,2	13,0	18,9	35,2	55,0	79,2
	HAS-U HCR			11,7	18,6	27,0	50,2	78,4	70,6
	HIS-N 8.8			10,4	18,4	27,2	50,4	46,4	-
Cracked concrete									
Tension	HAS-U 5.8	N_{Rd}	[kN]	-	-	11,5	14,0	17,8	-
	HAS-U 8.8			-	-	11,5	14,0	17,8	-
	HAS-U A4			-	-	11,5	14,0	17,8	-
	HAS-U HCR			-	-	11,5	14,0	17,8	-
Shear	HAS-U 5.8	V_{Rd}	[kN]	-	-	16,9	31,4	42,7	-
	HAS-U 8.8			-	-	27,0	33,5	42,7	-
	HAS-U A4			-	-	18,9	33,5	42,7	-
	HAS-U HCR			-	-	27,0	33,5	42,7	-

Recommended loads

Anchor size				M8	M10	M12	M16	M20	M24
Non-cracked concrete									
Tension	HAS-U 5.8	N_{Rec}	[kN]	8,4	11,8	17,3	26,2	38,1	56,5
	HAS-U 8.8			8,4	11,8	17,3	26,2	38,1	56,5
	HAS-U A4			8,4	11,8	17,3	26,2	38,1	56,5
	HAS-U HCR			8,4	11,8	17,3	26,2	38,1	56,5
	HIS-N 8.8			11,9	20,4	26,8	42,0	42,3	-
Shear	HAS-U 5.8	V_{Rec}	[kN]	5,2	8,3	12,0	22,4	35,0	50,4
	HAS-U 8.8			8,4	13,3	19,3	35,9	56,0	80,7
	HAS-U A4			5,9	9,3	13,5	25,2	39,3	56,6
	HAS-U HCR			8,4	13,3	19,3	35,9	56,0	50,4
	HIS-N 8.8			7,4	13,1	19,4	36,0	33,1	-
Cracked concrete									
Tension	HAS-U 5.8	N_{Rec}	[kN]	-	-	8,2	10,0	12,7	-
	HAS-U 8.8			-	-	8,2	10,0	12,7	-
	HAS-U A4			-	-	8,2	10,0	12,7	-
	HAS-U HCR			-	-	8,2	10,0	12,7	-
Shear	HAS-U 5.8	V_{Rec}	[kN]	-	-	12,0	22,4	30,5	-
	HAS-U 8.8			-	-	19,3	23,9	30,5	-
	HAS-U A4			-	-	13,5	23,9	30,5	-
	HAS-U HCR			-	-	19,3	23,9	30,5	-

a) 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.

Materials

Mechanical properties for HAS-U

Anchor size				M8	M10	M12	M16
Nominal tensile strength	HAS-U 5.8	f_{uk}	[N/mm²]	500	500	500	500
	HAS-U 8.8			800	800	800	800
	HAS-U-R			700	700	700	700
	HAS-U-HCR			800	800	800	800
Yield strength	HAS-U 5.8	f_{yk}	[N/mm²]	400	400	400	400
	HAS-U 8.8			640	640	640	640
	HAS-U-R			450	450	450	450
	HAS-U-HCR			640	640	640	640
Stressed cross-section	HAS-U	A_s	[mm²]	36,6	58,0	84,3	157
Moment of resistance	HAS-U	W	[mm³]	31,2	62,3	109	277

Material quality for HAS-U

Part	Material
Zinc coated steel	
Threaded rod, HAS-U 5.8 (HDG)	Strength class 5.8; Elongation at fracture A5 > 8% ductile Electroplated zinc coated ≥ 5μm; (HDG) hot dip galvanized ≥ 45 μm
Threaded rod, HAS-U 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
Stainless Steel	
Threaded rod, HAS-U A4	Strength class 70 for M8-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, HAS-U HCR	Strength class 80 for M8-M20 and class 70 for M24 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

Mechanical properties for HIS-N

Anchor size				M8	M10	M12	M16	M20
Nominal tensile strength	HIS-N	f_{uk}	[N/mm²]	490	460	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	HIS-N	f_{yk}	[N/mm²]	410	375	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	HIS-(R)N	A_s	[mm²]	51,5	237,6	169	256	237,6
	Screw			36,6	245	84,3	157	245
Moment of resistance	HIS-(R)N	W	[mm³]	145	1543	840	1595	1543
	Screw			31,2	541	109	277	541

Material quality for HIS-N

Part		Material
HIS-N	Internal threaded sleeve	C-steel 1.0718; Steel galvanized ≥ 5 µm
	Screw 8.8	Strength class 8.8, A5 > 8 % Ductile; Steel galvanized ≥ 5 µm
HIS-RN	Internal 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

Setting information

Installation temperature range:
-23°C to +32°C

In service temperature range
Hilti HIT-ICE 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 in 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 + 54 °C	+ 43 °C	+ 54°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.

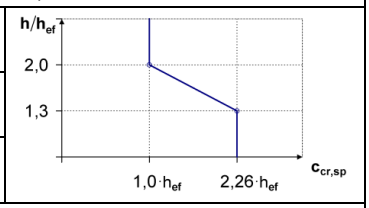
Maximum long term base material temperature
Long term elevated base material temperatures are roughly constant over significant periods of time.

Working time and curing time [a)]

Temperature of the base material	Maximum working time	Minimum curing time
T_{BM}	t_{work}	t_{cure}
-23 °C	1,5 h	36 h
-18 °C	1,5 h	24 h
-7 °C	1 h	6 h
4 °C	15 min	1,5 h
16 °C	5 min	1 h
21 °C	2,5 min	45 min
32 °C	1 min	35 min

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

Setting details

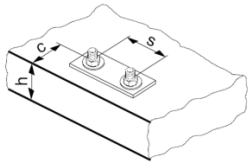
Anchor size			M8	M10	M12	M16	M20	M24
Nominal diameter of element	d	[mm]	8	10	12	16	20	24
Nominal diameter of drill bit	d_0	[mm]	10	12	14	18	24	28
Maximum diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22	26
Effective anchorage depth (= drill hole depth)	$h_{ef,min} = h_0$	[mm]	60	60	70	80	90	96
	$h_{ef,max} = h_0$	[mm]	160	200	240	320	400	480
Minimum base material thickness a)	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + $2d_0$		
Maximum torque moment	T_{max}		10	20	40	80	150	200
Minimum spacing	s_{min}	[mm]	40	50	60	80	100	120
Minimum edge distance	c_{min}	[mm]	40	45	45	50	55	60
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 · h_{ef}** for h / h_{ef} ≥ 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} ≤ 1,3					
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	2 $c_{cr,N}$					
Critical edge distance for concrete cone failure b)	$c_{cr,N}$	[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: base material thickness (h ≥ h_{min})

b) 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.

c) This is the maximum recommended torque moment to avoid splitting failure during installation for anchors with minimum spacing and / or edge distance.



Installation equipment

Anchor size		M8	M10	M12	M16	M20	M24
Rotary hammer	HAS-U	TE 2 – TE 30			TE 40 – TE 70		
	HIS-N	TE 2 – TE 30		TE 40 – TE 70			-
Other tools		Blow out pump ($h_{ef} \leq 10 \cdot d$), Compressed air gun, Set of cleaning brushes, dispenser, piston plug					

Parameters of cleaning and setting tools

HAS-U	HIS-N	Drilling and cleaning		Installation
		Hammer drill (HD)	Brush HIT-RB	Piston plug HIT-SZ
		d_0 [mm]	size [mm]	size [mm]
				
M8	**-**	10	10	10
M10	**-**	12	12	12
M12	**M8**	14	14	14
M16	**M10**	18	18	18
-	**M12**	22	22	22
M20	**-**	24	24	24
M24	**M16**	28	28	28
-	**M20**	32	32	32

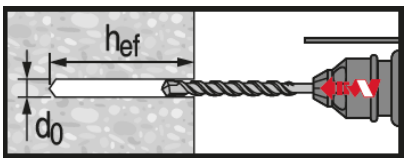
Setting instructions

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

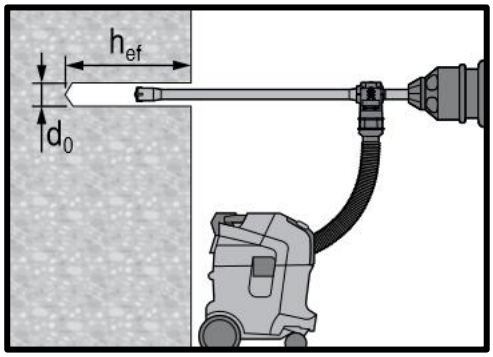
Safety regulations.

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-ICE.

Drilling



Hammer drilled hole (HD)

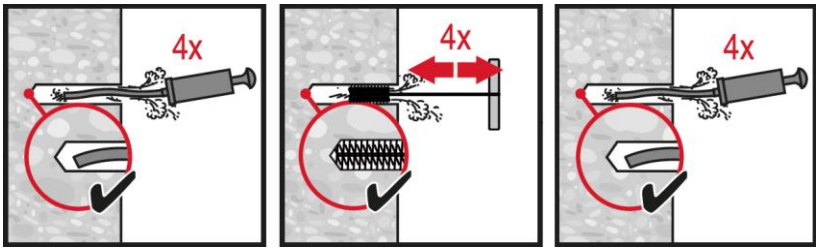


Hammer drilled hole with Hollow Drilled Bit (HDB)

No cleaning required.

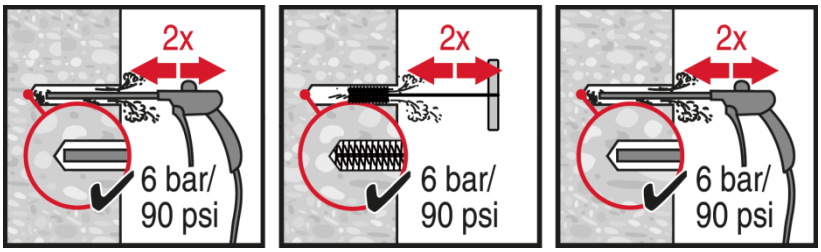
For dry and wet concrete, only.

Cleaning



Hammer Drilling:

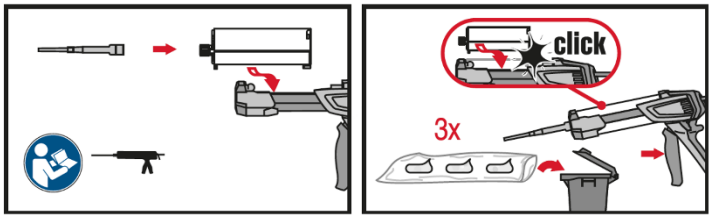
Manual cleaning (MC)
for drill diameters $d_0 \leq 16$ mm and drill hole depth $h_0 \leq 10 \cdot d$.



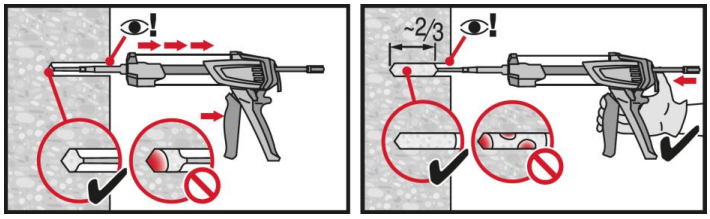
Hammer Drilling:

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

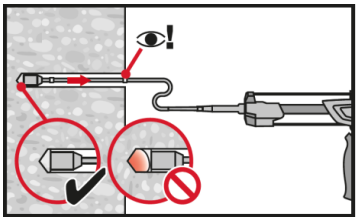
Injection system

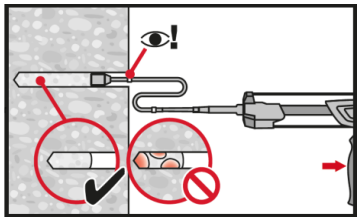


Injection system preparation.

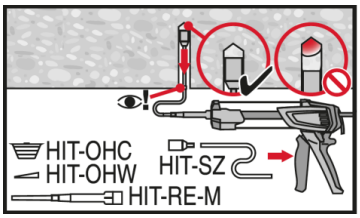


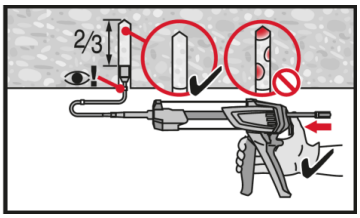
Injection method for drill hole depth $h_{ef} \leq 250$ mm.





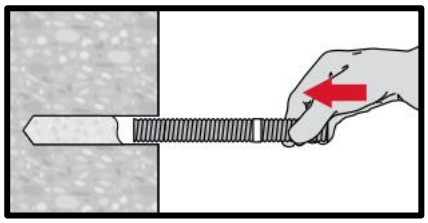
Injection method for drill hole depth h_{ef} > 250mm.



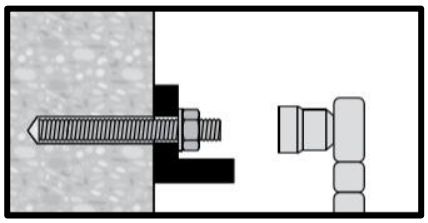


Injection method for overhead application.

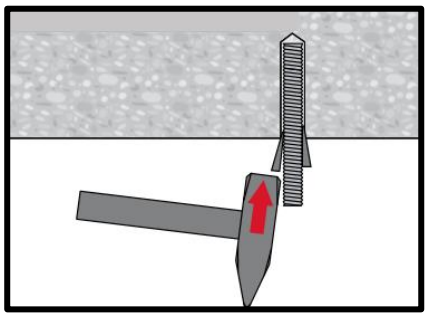
Setting the element



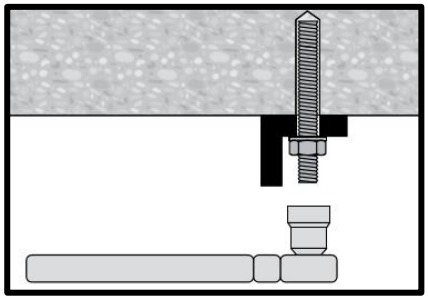
Setting element, observe working time "t_{work}".



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



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

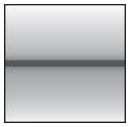


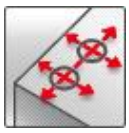
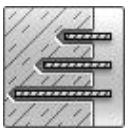
Loading the anchor after required curing time t_{cure} the anchor can be loaded.

HIT-ICE injection mortar

Anchor design (EN 1992-4) / Rebar elements / Concrete

Injection mortar system		Benefits
	Hilti HIT-ICE 296 ml cartridge	- Suitable for non-cracked concrete C20/25 to C50/60 - Suitable for dry and water saturated concrete - High loading capacity - High corrosion resistant - Odourless resin - Low installation temperature
	Rebar B500 B (ϕ8 - ϕ25)	

Base material			Load condition
			
Concrete (non-cracked)	Dry concrete	Wet concrete	Static/ quasi-static

Installation conditions			Other information
			
Hammer drilling	Small edge distance and spacing	Variable embedment depth	PROFIS Engineering design Software

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
Hilti Technical Data [a)]	Hilti	2017-11-28

a) All data given in this section according to Hilti Technical Data.

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

All data in this section applies to

- Correct setting
- No edge distance and spacing influence
- Steel failure
- Base material thickness, as specified in the table
- Embedment depth, as specified in the table
- Anchor material, as specified in the tables
- Concrete C20/25, $f_{ck,cube}$ = 25 N/mm²
- In-service temperature range I
  (min. base material temperature -40°C, max. long/short term base material temperature: +24°C/+40°C)

Embedment depth and base material thickness

Anchor- size			ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25
Embedment depth	h_{ef}	[mm]	80	90	110	125	125	170	210
Base material thickness	h	[mm]	110	120	145	165	165	220	275

Characteristic resistance

Anchor size				ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25
Tensile	Rebar B500B	N_{Rk}	[kN]	17,1	24,0	35,2	46,7	53,4	85,5	131,9
Shear	Rebar B500B	V_{Rk}		14,0	22,0	31,0	42,0	55,0	86,0	135,0

Design resistance

Anchor size				ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25
Tensile	Rebar B500B	N_{Rd}	[kN]	9,5	13,4	19,6	26,0	29,7	47,5	73,3
Shear	Rebar B500B	V_{Rd}		9,3	14,7	20,7	28,0	36,7	57,3	90,0

Recommended loads [a)]

Anchor size				ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25
Tensile	Rebar B500B	N_{Rec}	[kN]	6,8	9,5	14,0	18,5	21,2	33,9	52,4
Shear	Rebar B500B	V_{Rec}		6,7	10,5	14,8	20,0	26,2	41,0	64,3

a) 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.

Materials

Mechanical properties for rebar B500 B

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

Material quality

Part	Material
Rebar B500 B	Geometry and mechanical properties according to DIN 488-2:1986 or DIN 488-2

Setting information

Installation temperature range:
-23°C to +32°C

Service temperature range

Hilti HIT-ICE 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 + 40 °C	+ 24 °C	+ 40 °C
Temperature range II	-40 °C to + 40 °C	+ 43 °C	+ 54 °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.

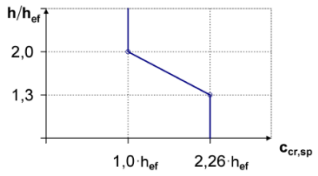
Working time and curing time [a)]

Temperature of the base material	Maximum working time	Minimum curing time
T_{BM}	t_{work}	t_{cure} [a)]
-23 °C	1,5 h	36 h
-18 °C	1,5 h	24 h
-7 °C	1 h	6 h
4 °C	15 min	1,5 h
16 °C	5 min	1 h
21 °C	2,5 min	45 min
32 °C	1 min	35 min

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

Setting details

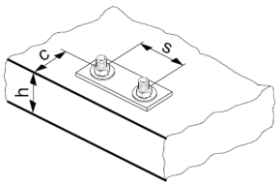
Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Nominal diameter of element	d	[mm]	8	10	12	14	16	20	25
Nominal diameter of drill bit	d_0	[mm]	12	14	16	18	20	25	32
Effective anchorage depth (= drill hole depth)	$h_{ef,min} = h_0$	[mm]	60	60	70	75	80	90	100
	$h_{ef,max} = h_0$	[mm]	160	200	240	280	320	400	500
Minimum base material thickness a)	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
Minimum edge distance	c_{min}	[mm]	40	50	60	70	80	100	125
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 · h_{ef}** for h / h_{ef} ≥ 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} ≤ 1,3						
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	2 $c_{cr,N}$						
Critical edge distance for concrete cone failure	$c_{cr,N}$	[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: base material thickness (h ≥ h_{min})

b) 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.



Installation equipment

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Rotary hammer	TE 2 – TE 16					TE 40 – TE 80	
Other tools	Blow out pump (h_{ef} ≤ 10·d), Compressed air gun, Set of cleaning brushes, dispenser, piston plug						

Parameters of cleaning and setting tools

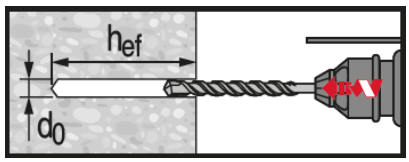
Rebar size	Drilling and cleaning		Installation
	Hammer drilling	Brush HIT-RB	Piston plug HIT-SZ
	d_0 [mm]	size [mm]	size [mm]
			
Ø8	12	12	12
Ø10	14	14	14
Ø12	16	16	16
Ø14	18	18	18
Ø16	20	20	20
Ø20	25	25	25
Ø25	32	32	32

Setting instructions

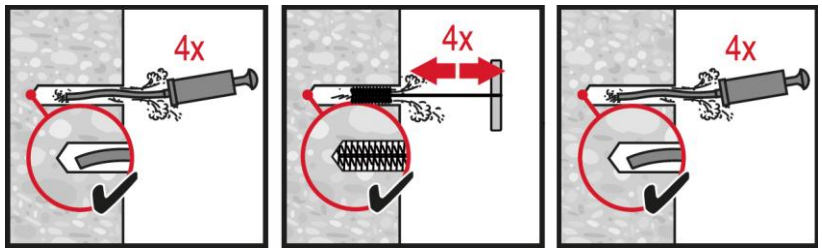
***For detailed information on installation see instruction for use given with the package of the product.**

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-ICE



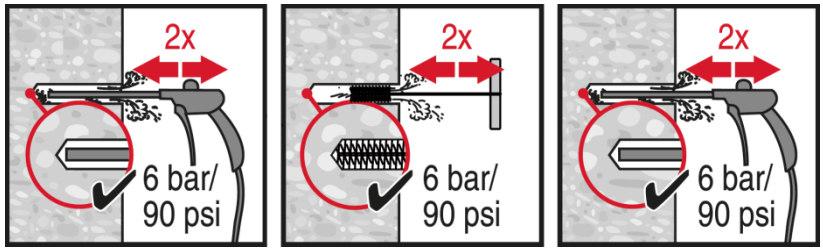
Hammer drilled hole (HD)



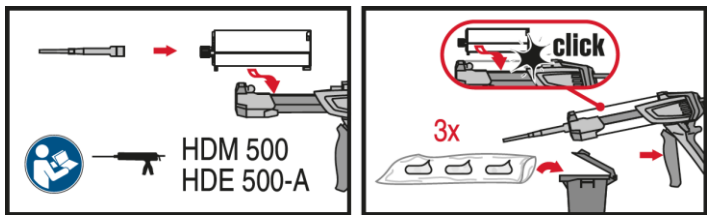
Manual cleaning (MC)

For element sizes d ≤ 16mm and embedment depth h_{ef} ≤ 10d only.

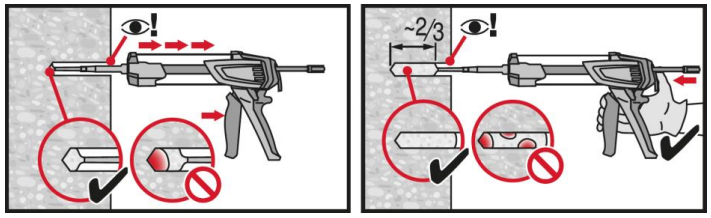
Brush bore hole with required steel brush HIT-RB.



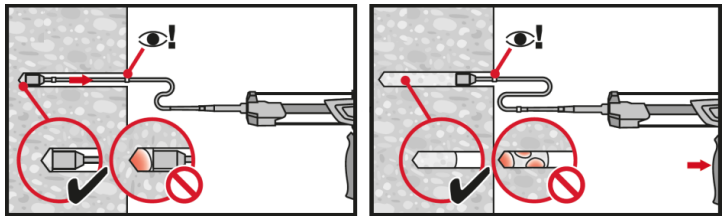
Compressed air cleaning (CAC)



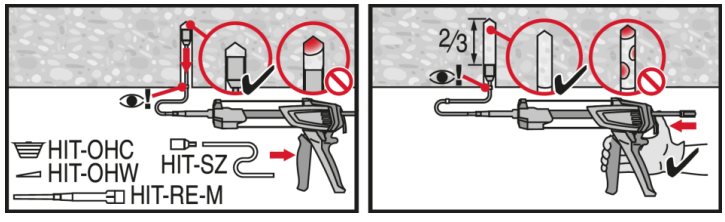
Injection system preparation.



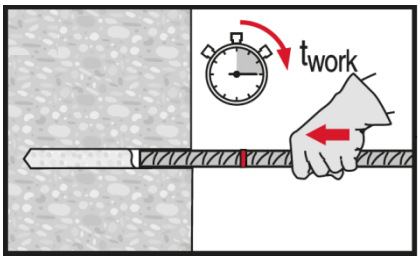
Injection method for drill hole depth h_{ef} ≤ 250mm

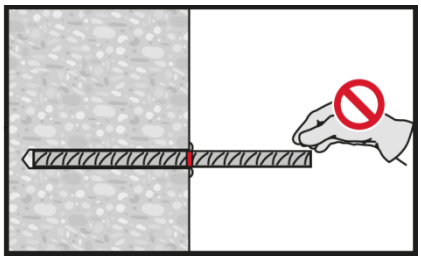


Injection method for drill hole depth h_{ef} > 250mm.

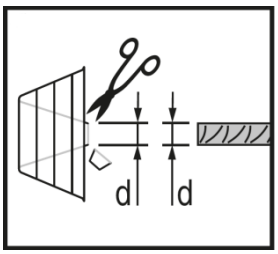


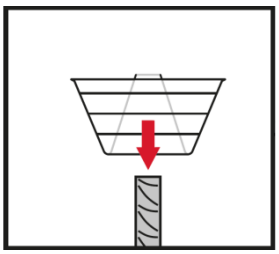
Injection method for overhead application.

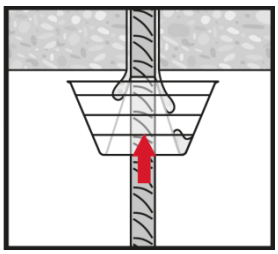


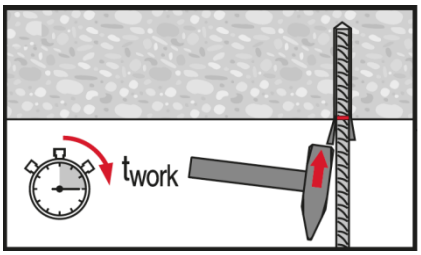


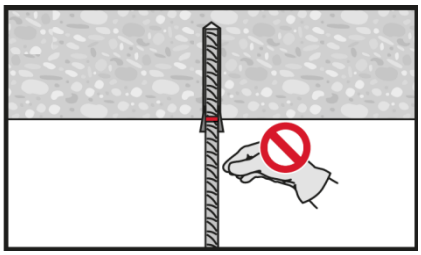
Setting element, observe working time "t_{work}".











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