Hilti HIT-HY 110 with rebar

Injection Mortar System

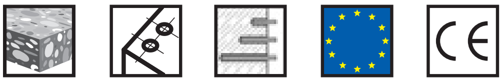
Hilti-HY 110 available in 330ml and 500ml foil packs.

Static mixer HIT M1

Rebar BSt 500 S

Benefits

- suitable for non-cracked concrete C 20/25 to C 50/60
- suitable for dry and water saturated concrete
- small edge distance and anchor spacing possible
- large diameter applications
- high corrosion resistant
- in service temperature range up to 120°C short term/72°C long term
- manual cleaning for drill hole sizes ≤ 18 mm and embedment depth hef ≤ 10d



Concrete | Small edge distance & spacing | Variable embedment depth | European Technical Approval | CE conformity

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical approval a)	DIBt, Berlin	ETA-08/0341 / 2013-03-18

a) All data given in this section according ETA-08/0341 issue 2013-03-18.

Basic loading data (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
- Anchor material: rebar BSt 500 S
- 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)
- Installation temperature range -5°C to +40°C

For details see Simplified design method

Embedment depth [a] and base material thickness for the basic loading data. Mean ultimate resistance, characteristic resistance, design resistance, recommended loads.

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth $h_{ef} = h_{ef,typ}$ [b] [mm]	80	90	110	125	170	210	240
Base material thickness h [mm]	110	120	140	165	220	270	300

a) The allowed range of embedment depth is shown in the setting details. The corresponding load values can be calculated according to the simplified design method.

b) $h_{ef,typ}$: Typical embedment depth

Mean ultimate resistance: non-cracked concrete C 20/25 , anchor BSt 500 S

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Tensile $N_{Ru,m}$	BST 500 S	[kN]	22,8	32,0	47,0	55,0	72,9	106,8	164,9
Shear $V_{Ru,m}$	BST 500 S	[kN]	*14,7*	*23,1*	*32,6*	*44,1*	*57,8*	*90,3*	*141,8*

Characteristic resistance: non-cracked concrete C 20/25 , anchor BSt 500 S

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Tensile N_{Rk}	BST 500 S	[kN]	17,1	24,0	35,2	41,2	54,7	80,1	123,7
Shear V_{Rk}	BST 500 S	[kN]	*14,0*	*22,0*	*31,0*	*42,0*	*55,0*	*86,0*	*135,0*

Design resistance: non-cracked concrete C 20/25 , anchor BSt 500 S

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Tensile N_{Rd}	BST 500 S	[kN]	11,4	13,4	19,6	19,6	26,0	38,1	58,9
Shear V_{Rd}	BST 500 S	[kN]	9,3	14,7	20,7	28,0	36,7	57,3	90,0

Recommended loads [a]: non-cracked concrete C 20/25 , anchor BSt 500 S

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Tensile N_{rec}	BST 500 S	[kN]	8,1	9,5	14,0	14,0	18,6	27,2	42,1
Shear V_{rec}	BST 500 S	[kN]	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.

Service temperature range

Hilti HIT-HY 110 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 +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.

Materials

Mechanical properties of rebar BSt 500S

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Nominal tensile strength f_{uk}	BSt 500 S	[N/mm²]	550						
Yield strength f_{yk}	BSt 500 S	[N/mm²]	500						
Stressed cross-section A_s	BSt 500 S	[mm²]	50,3	78,5	113,1	153,9	201,1	314,2	490,9
Moment of resistance W	BSt 500 S	[mm³]	50,3	98,2	169,6	269,4	402,1	785,4	1534

Material quality

Part	Material
rebar BSt 500 S	Mechanical properties according to DIN 488-1:1984 Geometry according to DIN 488-21:1986

Anchor dimensions

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
rebar BSt 500 S	rebar are available in variable length						

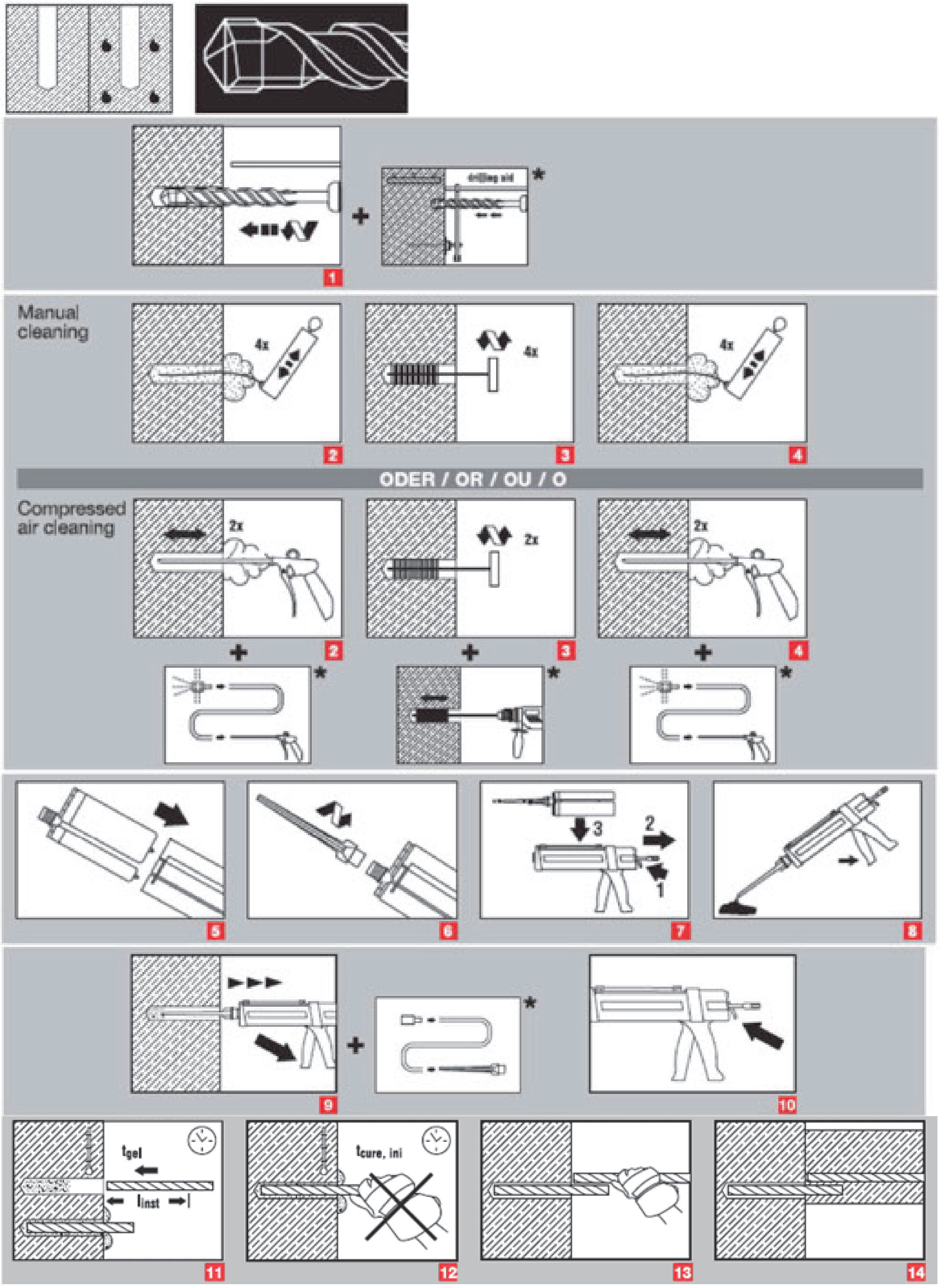
Setting

installation equipment

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Rotary hammer	TE 2 – TE 30					TE 40 – TE 70	
Other tools	compressed air gun or blow out pump, set of cleaning brushes, dispenser						

Setting instruction

Dry and water-saturated concrete, hammer drilling



a)

b)

a) Note: **Manual cleaning for drill hole sizes $d_0 \le$ 18mm and embedment depth $h_{ef} \le$ 10 d only!**
Compressed air cleaning for all bore hole diameters and all bore hole depth
b) Note: **Extension and piston plug needed for overhead installation and/or embedment depth > 250mm!**

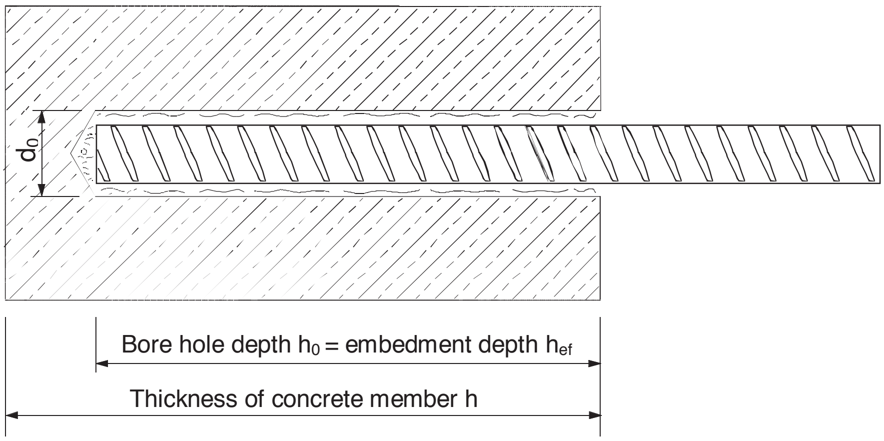
For detailed information on installation see instruction for use given with the package of the product.

Working time, Curing time

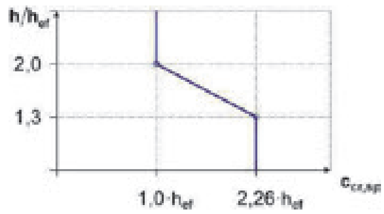
Temperature of the base material T_{BM}	Working time t_{gel}	Curing time t_{cure} a)
-5 °C to -1 °C	90 min	9 h
0 °C to 4 °C	45 min	4,5 h
5 °C to 9 °C	20 min	2 h
10 °C to 19 °C	6 min	90 min
20 °Cto 29 °C	4 min	50 min
30 °C to 40 °C	2 min	40 min

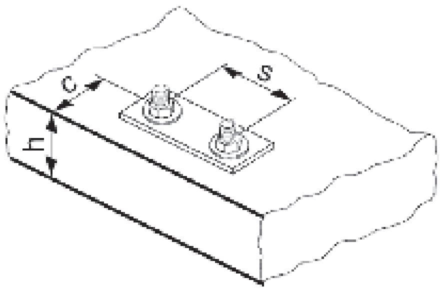
a) The curing time data are valid for dry anchorage base only. For water saturated anchorage bases the curing times must be doubled.

Setting details



Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Nominal diameter of drill bit	d_0	[mm]	12	14	16	18	20	25	32
Effective embedment and drill hole depth range [a]	$h_{ef,min}$	[mm]	60	60	70	75	80	90	100
for rebar BSt 500 S	$h_{ef,max}$	[mm]	160	200	240	280	320	400	500
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	150
Minimum edge distance	c_{min}	[mm]	40	50	60	80	100	120	150
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]	$1{,}5\ h_{ef}$						





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

a) Embedment depth range: $h_{ef,min} \leq h_{ef} \leq h_{ef,max}$

b) h: base material thickness ($h \geq h_{min}$), h_{ef}: embedment depth

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.

Simplified design method

Simplified version of the design method according ETAG 001, TR 029.

- Influence of concrete strength
- Influence of edge distance
- Influence of spacing
- Valid for a group of two anchors. (The method may also be applied for anchor groups with more than two anchors or more than one edge distance. The influencing factors must then be considered for each edge distance and spacing. The calculated design loads are then on the save side: They will be lower than the exact values according ETAG 001, TR 029. To avoid this, it is recommended to use the anchor design software PROFIS anchor)

The design method is based on the following simplification:

- No different loads are acting on individual anchors (no eccentricity)

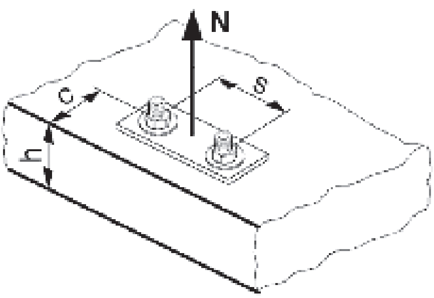
The values are valid for one anchor.

For more complex fastening applications please use the anchor design software PROFIS Anchor.

Tension loading

The design tensile resistance is the lower value of

- Steel resistance: $N_{Rd,s}$
- Combined pull-out and concrete cone resistance:
  $N_{Rd,p} = N^0_{Rd,p} \cdot f_{B,p} \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{h,p} \cdot f_{re,N}$
- Concrete cone resistance: $N_{Rd,c} = N^0_{Rd,c} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{h,N} \cdot f_{re,N}$
- Concrete splitting resistance (only non-cracked concrete):
  $N_{Rd,sp} = N^0_{Rd,c} \cdot f_B \cdot f_{1,sp} \cdot f_{2,sp} \cdot f_{3,sp} \cdot f_{h,N} \cdot f_{re,N}$



Basic design tensile resistance

Design steel resistance $N_{Rd,s}$

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
$N_{Rd,s}$	BSt 500 S	[kN]	20,0	30,7	44,3	60,7	79,3	123,6	192,9

Design combined pull-out and concrete cone resistance
$N_{Rd,p} = N^0_{Rd,p} \cdot f_{B,p} \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{h,p} \cdot f_{re,N}$

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth h_{ef} = Typical embedment depth $h_{ef,typ}$		[mm]	80	90	110	125	145	170	210
$N^0_{Rd,p}$	Temperature range I	[kN]	11,4	13,4	19,6	19,6	26,0	38,1	58,9
$N^0_{Rd,p}$	Temperature range II	[kN]	8,0	9,4	13,8	13,1	17,4	25,4	39,3
$N^0_{Rd,p}$	Temperature range III	[kN]	6,7	7,9	11,5	11,8	15,6	22,9	35,3

Design concrete cone resistance $N_{Rd,c} = N^0_{Rd,c} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{h,N} \cdot f_{re,N}$
Design splitting resistance $N_{Rd,sp} = N^0_{Rd,c} \cdot f_B \cdot f_{1,sp} \cdot f_{2,sp} \cdot f_{3,sp} \cdot f_{h,N} \cdot f_{re,N}$

Anchor size		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
$N^0_{Rd,c}$	[kN]	24,1	24,0	32,4	33,6	42,0	53,3	73,2

Influencing factors

Influence of concrete strength on combined pull-out and concrete cone resistance

Concrete strength designation (ENV 206)	C 20/25	C 25/30	C 30/37	C 35/45	C 40/50	C 45/55	C 50/60
$f_{B,p} = (f_{ck,cube}/25N/mm^2)^{0,15}$ a)	1,00	1,03	1,06	1,09	1,11	1,13	1,14

a) $f_{ck,cube}$ = concrete compressive strength, measured on cubes with 150 mm side length

Influence of embedment depth on combined pull-out and concrete cone resistance

$$f_{h,p} = h_{ef}/h_{ef,typ}$$

Influence of concrete strength on concrete cone resistance

Concrete strength designation (ENV 206)	C 20/25	C 25/30	C 30/37	C 35/45	C 40/50	C 45/55	C 50/60
$f_B = (f_{ck,cube}/25N/mm^2)^{0,5}$ a)	1	1,1	1,22	1,34	1,41	1,48	1,55

a) $f_{ck,cube}$ = concrete compressive strength, measured on cubes with 150 mm side length

Influence of edge distance a)

$c/c_{cr,N}$ $c/c_{cr,sp}$	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
$f_{1,N} = 0,7 + 0,3 \cdot c/c_{cr,N} \leq 1$ $f_{1,sp} = 0,7 + 0,3 \cdot c/c_{cr,sp} \leq 1$	0,73	0,76	0,79	0,82	0,85	0,88	0,91	0,94	0,97	1
$f_{2,N} = 0,5 \cdot (1 + c/c_{cr,N}) \leq 1$ $f_{2,sp} = 0,5 \cdot (1 + c/c_{cr,sp}) \leq 1$	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1

a) The edge distance shall not be smaller than the minimum edge distance c_{min}. These influencing factors must be considered for every edge distance smaller than the critical edge distance.

Influence of anchor spacing a)

$s/s_{cr,N}$ $s/s_{cr,sp}$	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
$f_{3,N} = 0,5 \cdot (1 + s/s_{cr,N}) \leq 1$ $f_{3,sp} = 0,5 \cdot (1 + s/s_{cr,sp}) \leq 1$	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1

a) The anchor spacing shall not be smaller than the minimum anchor spacing s_{min}. This influencing factor must be considered for every anchor spacing.

Influence of embedment depth on concrete cone resistance

$$f_{h,N} = (h_{ef}/h_{ef,typ})^{1,5}$$

Influence of reinforcement

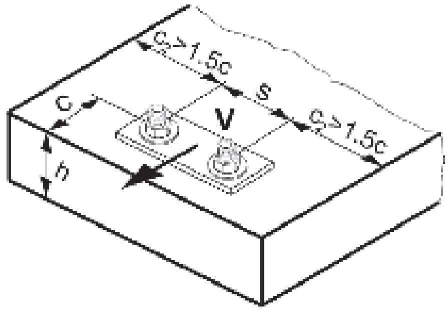
h_{ef} [mm]	40	50	60	70	80	90	≥ 100
$f_{re,N} = 0,5 + h_{ef}/200mm \leq 1$	0,7 a)	0,75 a)	0,8 a)	0,85 a)	0,9 a)	0,95 a)	1

a) This factor applies only for dense reinforcement. If in the area of anchorage there is reinforcement with a spacing ≥ 150 mm (any diameter) or with a diameter ≤ 10 mm and a spacing ≥ 100 mm, then a factor $f_{re,N}$ = 1 may be applied.

Shear loading

The design shear resistance is the lower value of

- Steel resistance: $V_{Rd,s}$
- Concrete pryout resistance: $V_{Rd,cp}$ = k · lower value of $N_{Rd,p}$ and $N_{Rd,c}$
- Concrete edge resistance: $V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_\beta \cdot f_h \cdot f_4 \cdot f_{hef} \cdot f_c$



Basic design shear resistance

Design steel resistance $V_{Rd,s}$

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
$V_{Rd,s}$	Rebar BSt 500 S	[kN]	9,3	14,7	20,7	28,0	36,7	57,3	90,0

Design concrete pryout resistance $V_{Rd,cp}$ = lower value[a)] of k · $N_{Rd,p}$ and k · $N_{Rd,c}$

k = 2 for $h_{ef} \geq 60$ mm

a) $N_{Rd,p}$: Design combined pull-out and concrete cone resistance
$N_{Rd,c}$: Design concrete cone resistance

Design concrete edge resistance $V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_\beta \cdot f_h \cdot f_4 \cdot f_{hef} \cdot f_c$

Anchor size		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Non-cracked concrete								
$V^0_{Rd,c}$	[kN]	5,9	8,6	11,6	15,0	18,7	27,0	39,2

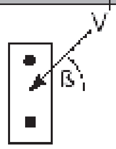
Influencing factors

Influence of concrete strength

Concrete strength designation (ENV 206)	C 20/25	C 25/30	C 30/37	C 35/45	C 40/50	C 45/55	C 50/60
$f_B = (f_{ck,cube}/25N/mm^2)^{1/2}$ a)	1	1,1	1,22	1,34	1,41	1,48	1,55

a) $f_{ck,cube}$ = concrete compressive strength, measured on cubes with 150 mm side length

Influence of angle between load applied and the direction perpendicular to the free edge

Angle ß	0°	10°	20°	30°	40°	50°	60°	70°	80°	≥ 90°
$f_\beta = \sqrt{\frac{1}{(\cos\alpha_V)^2 + \left(\frac{\sin\alpha_V}{2,5}\right)^2}}$ 	1	1,01	1,05	1,13	1,24	1,40	1,64	1,97	2,32	2,50

Influence of base material thickness

h/c	0,15	0,3	0,45	0,6	0,75	0,9	1,05	1,2	1,35	≥ 1,5
$f_h = \{h/(1,5 \cdot c)\}^{1/2} \leq 1$	0,32	0,45	0,55	0,63	0,71	0,77	0,84	0,89	0,95	1,00

Influence of anchor spacing and edge distance a) for concrete edge resistance: f_4

$f_4 = (c/h_{ef})^{1,5} \cdot (1 + s / [3 \cdot c]) \cdot 0,5$

c/h_{ef}	Single anchor	Group of two anchors s/h_{ef}														
		0,75	1,50	2,25	3,00	3,75	4,50	5,25	6,00	6,75	7,50	8,25	9,00	9,75	10,50	11,25
0,50	0,35	0,27	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35
0,75	0,65	0,43	0,54	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65
1,00	1,00	0,63	0,75	0,88	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
1,25	1,40	0,84	0,98	1,12	1,26	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40
1,50	1,84	1,07	1,22	1,38	1,53	1,68	1,84	1,84	1,84	1,84	1,84	1,84	1,84	1,84	1,84	1,84
1,75	2,32	1,32	1,49	1,65	1,82	1,98	2,15	2,32	2,32	2,32	2,32	2,32	2,32	2,32	2,32	2,32
2,00	2,83	1,59	1,77	1,94	2,12	2,30	2,47	2,65	2,83	2,83	2,83	2,83	2,83	2,83	2,83	2,83
2,25	3,38	1,88	2,06	2,25	2,44	2,63	2,81	3,00	3,19	3,38	3,38	3,38	3,38	3,38	3,38	3,38
2,50	3,95	2,17	2,37	2,57	2,77	2,96	3,16	3,36	3,56	3,76	3,95	3,95	3,95	3,95	3,95	3,95
2,75	4,56	2,49	2,69	2,90	3,11	3,32	3,52	3,73	3,94	4,15	4,35	4,56	4,56	4,56	4,56	4,56
3,00	5,20	2,81	3,03	3,25	3,46	3,68	3,90	4,11	4,33	4,55	4,76	4,98	5,20	5,20	5,20	5,20
3,25	5,86	3,15	3,38	3,61	3,83	4,06	4,28	4,51	4,73	4,96	5,18	5,41	5,63	5,86	5,86	5,86
3,50	6,55	3,51	3,74	3,98	4,21	4,44	4,68	4,91	5,14	5,38	5,61	5,85	6,08	6,31	6,55	6,55
3,75	7,26	3,87	4,12	4,36	4,60	4,84	5,08	5,33	5,57	5,81	6,05	6,29	6,54	6,78	7,02	7,26
4,00	8,00	4,25	4,50	4,75	5,00	5,25	5,50	5,75	6,00	6,25	6,50	6,75	7,00	7,25	7,50	7,75
4,25	8,76	4,64	4,90	5,15	5,41	5,67	5,93	6,18	6,44	6,70	6,96	7,22	7,47	7,73	7,99	8,25
4,50	9,55	5,04	5,30	5,57	5,83	6,10	6,36	6,63	6,89	7,16	7,42	7,69	7,95	8,22	8,49	8,75
4,75	10,35	5,45	5,72	5,99	6,27	6,54	6,81	7,08	7,36	7,63	7,90	8,17	8,45	8,72	8,99	9,26
5,00	11,18	5,87	6,15	6,43	6,71	6,99	7,27	7,55	7,83	8,11	8,39	8,66	8,94	9,22	9,50	9,78
5,25	12,03	6,30	6,59	6,87	7,16	7,45	7,73	8,02	8,31	8,59	8,88	9,17	9,45	9,74	10,02	10,31
5,50	12,90	6,74	7,04	7,33	7,62	7,92	8,21	8,50	8,79	9,09	9,38	9,67	9,97	10,26	10,55	10,85

a) The anchor spacing and the edge distance shall not be smaller than the minimum anchor spacing s_{min} and the minimum edge distance c_{min}.

Influence of embedment depth

h_{ef}/d	4	4,5	5	6	7	8	9	10	11
$f_{hef} = 0,05 \cdot (h_{ef} / d)^{1,68}$	0,51	0,63	0,75	1,01	1,31	1,64	2,00	2,39	2,81

h_{ef}/d	12	13	14	15	16	17	18	19	20
$f_{hef} = 0,05 \cdot (h_{ef} / d)^{1,68}$	3,25	3,72	4,21	4,73	5,27	5,84	6,42	7,04	7,67

Influence of edge distance a)

c/d	4	6	8	10	15	20	30	40
$f_c = (d / c)^{0,19}$	0,77	0,71	0,67	0,65	0,60	0,57	0,52	0,50

a) The edge distance shall not be smaller than the minimum edge distance c_{min}.

Combined tension and shear loading

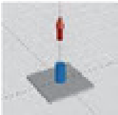
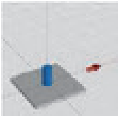
For combined tension and shear loading see section “Anchor Design”.

Precalculated values – design resistance values

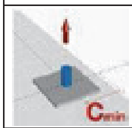
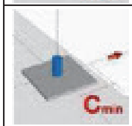
All data applies to:
- non-cracked concrete C 20/25 – $f_{ck,cube}$ =25 N/mm²
- temperature range I (see Service temperature range)
- minimum thickness of base material
- no effects of dense reinforcement

Recommended loads can be calculated by dividing the design resistance by an 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.

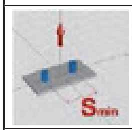
Design resistance: non- cracked concrete C 20/25 - minimum embedment depth

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth $h_{ef} = h_{ef,min}$ [mm]	60	60	70	80	90	100	110
Base material thickness $h = h_{min}$ [mm]	100	100	102	116	130	150	174
 **Tensile N_{Rd}: single anchor, no edge effects**							
BSt 500 S [kN]	8,5	8,9	12,5	12,6	16,2	22,4	27,7
 **Shear V_{Rd}: single anchor, no edge effects, without lever arm**							
BSt 500 S [kN]	9,3	14,7	20,7	25,1	32,3	44,9	55,5

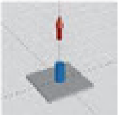
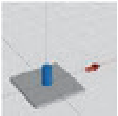
Design resistance: non- cracked concrete C 20/25 - minimum embedment depth

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth $h_{ef} = h_{ef,min}$ [mm]	60	60	70	80	90	100	110
Base material thickness $h = h_{min}$ [mm]	100	100	102	116	130	150	174
Edge distance $c = c_{min}$ [mm]	40	50	60	80	100	120	135
 **Tensile N_{Rd}: single anchor, min. edge distance ($c = c_{min}$)**							
BSt 500 S [kN]	5,3	6,0	8,5	9,4	13,0	17,4	21,5
 **Shear V_{Rd}: single anchor, min. edge distance ($c = c_{min}$), without lever arm**							
BSt 500 S [kN]	3,5	4,9	6,6	10,0	13,2	17,4	21,8

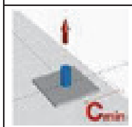
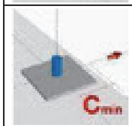
Design resistance: non- cracked concrete C 20/25 - minimum embedment depth
(load values are valid for single anchor)

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth $h_{ef} = h_{ef,min}$ [mm]	60	60	70	80	90	100	110
Base material thickness $h = h_{min}$ [mm]	100	100	100	116	138	156	170
Spacing $s = s_{min}$ [mm]	40	50	60	80	100	120	135
 **Tensile N_{Rd}: double anchor, no edge effects, min. spacing ($s = s_{min}$)**							
BSt 500 S [kN]	5,9	6,2	8,5	8,7	11,1	15,2	19,3
 **Shear V_{Rd}: double anchor, no edge effects, min. spacing ($s = s_{min}$), without lever arm**							
BSt 500 S [kN]	9,3	11,4	16,0	16,2	20,9	29,9	40,4

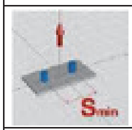
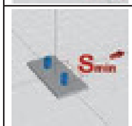
Design resistance: non- cracked concrete C 20/25 - typical embedment depth

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth $h_{ef} = h_{ef,typ}$ [mm]	80	90	110	125	145	170	210
Base material thickness $h = h_{min}$ [mm]	110	120	142	161	185	220	274
 **Tensile N_{Rd}: single anchor, no edge effects**							
BSt 500 S [kN]	11,4	13,4	19,6	19,6	26,0	38,1	58,9
 **Shear V_{Rd}: single anchor, no edge effects, without lever arm**							
BSt 500 S [kN]	9,3	14,7	20,7	28,0	36,7	57,3	90,0

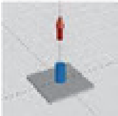
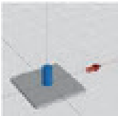
Design resistance: non- cracked concrete C 20/25 - typical embedment depth

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth $h_{ef} = h_{ef,typ}$ [mm]	80	90	110	125	145	170	210
Base material thickness $h = h_{min}$ [mm]	110	120	142	161	185	220	274
Edge distance $c = c_{min}$ [mm]	40	50	60	80	100	120	135
 **Tensile N_{Rd}: single anchor, min. edge distance ($c = c_{min}$)**							
BSt 500 S [kN]	7,0	8,3	12,1	13,4	18,8	26,9	37,0
 **Shear V_{Rd}: single anchor, min. edge distance ($c = c_{min}$), without lever arm**							
BSt 500 S [kN]	3,7	5,3	7,3	11,2	15,8	21,5	27,5

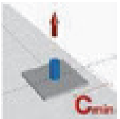
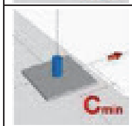
Design resistance: non- cracked concrete C 20/25 - typical embedment depth (load values are valid for single anchor)

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth $h_{ef} = h_{ef,typ}$ [mm]	80	90	110	125	145	170	210
Base material thickness $h = h_{min}$ [mm]	110	120	142	161	185	220	274
Spacing $s = s_{min}$ [mm]	40	50	60	80	100	120	135
 **Tensile N_{Rd}: double anchor, no edge effects, min. spacing ($s = s_{min}$)**							
BSt 500 S [kN]	8,0	9,3	13,4	13,7	18,0	25,8	40,2
 **Shear V_{Rd}: double anchor, no edge effects, min. spacing ($s = s_{min}$), without lever arm**							
BSt 500 S [kN]	9,3	14,7	20,7	23,3	30,8	45,6	72,9

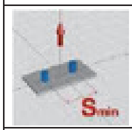
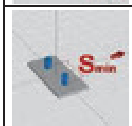
Design resistance: non- cracked concrete C 20/25 - embedment depth = 12 d [a)]

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth h_{ef} = 12 d [a)] [mm]	96	120	144	168	192	240	300
Base material thickness h = h_{min} [mm]	126	150	176	204	232	290	364
 **Tensile N_{Rd}: single anchor, no edge effects**							
BSt 500 S [kN]	13,7	17,8	25,6	26,4	34,5	53,9	84,1
 **Shear V_{Rd}: single anchor, no edge effects, without lever arm**							
BSt 500 S [kN]	9,3	14,7	20,7	28,0	36,7	57,3	90,0

Design resistance: non- cracked concrete C 20/25 - embedment depth = 12 d [a)]

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth h_{ef} = 12 d [a)] [mm]	96	120	144	168	192	240	300
Base material thickness h = h_{min} [mm]	126	150	176	204	232	290	364
Edge distance c = c_{min} [mm]	40	50	60	80	100	120	135
 **Tensile N_{Rd}: single anchor, min. edge distance (c = c_{min})**							
BSt 500 S [kN]	8,4	11,0	15,8	18,1	24,9	37,9	55,9
 **Shear V_{Rd}: single anchor, min. edge distance (c = c_{min}), without lever arm**							
BSt 500 S [kN]	3,9	5,7	7,8	12,0	16,9	23,6	30,5

Design resistance: non- cracked concrete C 20/25 - embedment depth = 12 d [a)]
(load values are valid for single anchor)

Anchor size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth h_{ef} = 12 d [a)] [mm]	96	120	144	168	192	240	300
Base material thickness h = h_{min} [mm]	126	150	176	204	232	290	364
Spacing s = s_{min} [mm]	40	50	60	80	100	120	135
 **Tensile N_{Rd}: double anchor, no edge effects, min. spacing (s = s_{min})**							
BSt 500 S [kN]	9,7	12,5	17,9	18,7	24,2	37,3	59,2
 **Shear V_{Rd}: double anchor, no edge effects, min. spacing (s = s_{min}), without lever arm**							
BSt 500 S [kN]	9,3	14,7	20,7	28,0	36,7	57,3	90,0

a) d = element diameter