

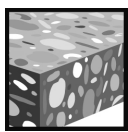


## HVU with HIS-(R)N adhesive anchor

Mortar system		Benefits
 <p>Hilti HVU foil capsule</p>		<ul style="list-style-type: none"> <li>- suitable for non-cracked concrete C 20/25 to C 50/60</li> <li>- high loading capacity</li> <li>- suitable for dry and water saturated concrete</li> </ul>
 <p>HIS-(R)N sleeve</p>		



Concrete



Small edge distance and spacing



Fire resistance



Corrosion resistance



European Technical Approval



CE conformity



PROFIS Anchor design software

### Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical approval <sup>a)</sup>	DIBt, Berlin	ETA-05/0255 / 2011-06-23
Fire test report	IBMB, Braunschweig	UB-3333/0891-1 / 2004-03-26
Assessment report (fire)	warringtonfire	WF 166402 / 2007-10-26

a) All data given in this section according to ETA-05/0255, issue 2011-06-23.

### Basic loading data (for a single anchor)

All data in this section applies to

For details see Simplified design method

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Steel failure
- Screw strength class 8.8
- 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,  $f_{ck,cube} = 25 \text{ N/mm}^2$
- Temperate range I  
(min. base material temperature  $-40^\circ\text{C}$ , max. long term/short term base material temperature:  $+24^\circ\text{C}/40^\circ\text{C}$ )
- Installation temperature range  $-5^\circ\text{C}$  to  $+40^\circ\text{C}$

### Embedment depth and base material thickness for the basic loading data.

Mean ultimate resistance, characteristic resistance, design resistance, recommended loads.

Anchor size	M8	M10	M12	M16	M20
Embedment depth [mm]	90	110	125	170	205
Base material thickness [mm]	120	150	180	250	350

**Mean ultimate resistance: concrete C 20/25 –  $f_{ck,cube} = 25 \text{ N/mm}^2$ , anchor HIS-N**

Data according ETA-05/0255, issue 2011-06-23							
Anchor size			M8	M10	M12	M16	M20
Tensile $N_{Ru,m}$	HIS-N	[kN]	26,3	48,3	70,4	123,9	114,5
Shear $V_{Ru,m}$	HIS-N	[kN]	13,7	24,2	41,0	62,0	57,8

**Characteristic resistance: concrete C 20/25 –  $f_{ck,cube} = 25 \text{ N/mm}^2$ , anchor HIS-N**

Data according ETA-05/0255, issue 2011-06-23							
Anchor size			M8	M10	M12	M16	M20
Tensile $N_{Rk}$	HIS-N	[kN]	25,0	40,0	60,0	95,0	109,0
Shear $V_{Rk}$	HIS-N	[kN]	13,0	23,0	39,0	59,0	55,0

**Design resistance: concrete C 20/25 –  $f_{ck,cube} = 25 \text{ N/mm}^2$ , anchor HIS-N**

Data according ETA-05/0255, issue 2011-06-23							
Anchor size			M8	M10	M12	M16	M20
Tensile $N_{Rd}$	HIS-N	[kN]	16,7	26,7	40,0	63,3	74,1
Shear $V_{Rd}$	HIS-N	[kN]	10,4	18,4	26,0	39,3	36,7

**Recommended loads <sup>a)</sup>: concrete C 20/25 –  $f_{ck,cube} = 25 \text{ N/mm}^2$ , anchor HIS-N**

Data according ETA-05/0255, issue 2011-06-23							
Anchor size			M8	M10	M12	M16	M20
Tensile $N_{rec}$	HIS-N	[kN]	11,9	19,0	28,6	45,2	53,0
Shear $V_{rec}$	HIS-N	[kN]	7,4	13,1	18,6	28,1	26,2

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

**Service temperature range**

Hilti HVU adhesive 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 HIS-(R)N

			Data according ETA-05/0255, issue 2011-06-23				
Anchor size			M8	M10	M12	M16	M20
Nominal tensile strength $f_{uk}$	HIS-N	[N/mm <sup>2</sup> ]	490	490	460	460	460
	Screw 8.8	[N/mm <sup>2</sup> ]	800	800	800	800	800
	HIS-RN	[N/mm <sup>2</sup> ]	700	700	700	700	700
	Screw A4-70	[N/mm <sup>2</sup> ]	700	700	700	700	700
Yield strength $f_{yk}$	HIS-N	[N/mm <sup>2</sup> ]	410	410	375	375	375
	Screw 8.8	[N/mm <sup>2</sup> ]	640	640	640	640	640
	HIS-RN	[N/mm <sup>2</sup> ]	350	350	350	350	350
	Screw A4-70	[N/mm <sup>2</sup> ]	450	450	450	450	450
Stressed cross-section $A_s$	HIS-(R)N	[mm <sup>2</sup> ]	51,5	108,0	169,1	256,1	237,6
	Screw	[mm <sup>2</sup> ]	36,6	58	84,3	157	245
Moment of resistance $W$	HIS-(R)N	[mm <sup>3</sup> ]	145	430	840	1595	1543
	Screw	[mm <sup>3</sup> ]	31,2	62,3	109	277	541

### Material quality

Part	Material
internally threaded sleeves <sup>a)</sup> HIS-N	C-steel 1.0718, steel galvanized $\geq 5\mu\text{m}$
internally threaded sleeves <sup>b)</sup> HIS-RN	stainless steel 1.4401 and 1.4571

a) related fastening screw: strength class 8.8, A5 > 8% Ductile steel galvanized  $\geq 5\mu\text{m}$

b) related fastening screw: strength class 70, A5 > 8% Ductile stainless steel 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362

### Anchor dimensions

Anchor size	M8	M10	M12	M16	M20
Internal sleeve HIS-(R)N	M8x90	M10x110	M12x125	M16x170	M20x205
Anchor embedment depth [mm]	90	110	125	170	205

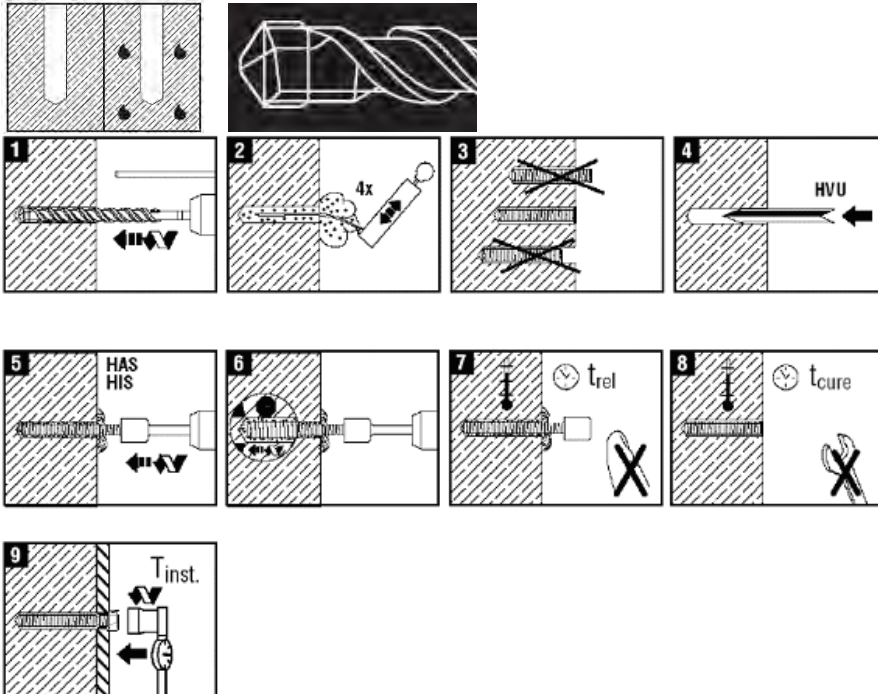
## Setting

### installation equipment

Anchor size	M8	M10	M12	M16	M20
Rotary hammer	TE2 – TE16		TE40 – TE70		
Other tools	blow out pump or compressed air gun, setting tools				

### Setting instruction

Dry and water-saturated concrete, hammer drilling



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

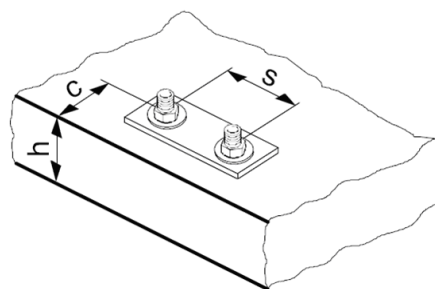
For technical data for anchors in diamond drilled holes please contact the Hilti Technical advisory service.

### Curing time for general conditions

Data according ETA-05/0255, issue 2011-06-23	
Temperature of the base material	Curing time before anchor can be fully loaded $t_{cure}$
20 °C to 40 °C	20 min
10 °C to 19 °C	30 min
0 °C to 9 °C	1 h
-5 °C to -1 °C	5 h

## Setting details

		Data according ETA-05/0255, issue 2011-06-23				
Anchor size	Sleeve HIS-(R)N foil capsule	M8x90 M10x90	M10x110 M12x110	M12x125 M16x125	M16x170 M20x170	M20x205 M24x210
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]	40	45	60	80	125
Minimum edge distance	$c_{min}$ [mm]	40	45	60	80	125
Critical spacing for splitting failure	$s_{cr,sp}$	$2 c_{cr,sp}$				
Critical edge distance for splitting failure <sup>a)</sup>	$c_{cr,sp}$ [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	$s_{cr,N}$	$2 c_{cr,N}$				
Critical edge distance for concrete cone failure	$c_{cr,N}$	$1,5 h_{ef}$				
Torque moment <sup>b)</sup>	$T_{max}$ [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)  $h$ : base material thickness ( $h \geq h_{min}$ )

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

## Simplified design method

Simplified version of the design method according EOTA Technical Report TR 029. Design resistance according data given in ETA-05/0255, issue 2011-06-23.

- 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 same side: They will be lower than the exact values according EOTA Technical Report 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)

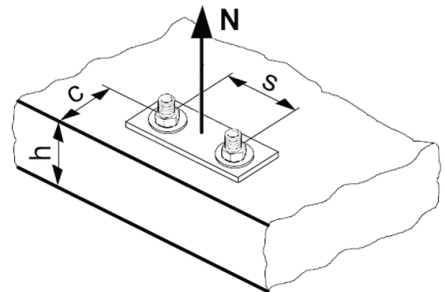
The values are valid for one anchor.

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



## Basic design tensile resistance

Design steel resistance  $N_{Rd,s}$

		Data according ETA-05/0255, issue 2011-06-23				
Anchor size		M8	M10	M12	M16	M20
$N_{Rd,s}$	HIS-N [kN]	17,5	30,7	44,7	80,3	74,1
	HIS-RN [kN]	13,9	21,9	31,6	58,8	69,2

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

		Data according ETA-05/0255, issue 2011-06-23				
Anchor size		M8	M10	M12	M16	M20
Embedment depth $h_{ef}$ [mm]		90	110	125	170	205
$N_{Rd,p}^0$	Temperature range I [kN]	16,7	26,7	40,0	63,3	93,3
$N_{Rd,p}^0$	Temperature range II [kN]	13,3	23,3	33,3	50,0	63,3
$N_{Rd,p}^0$	Temperature range III [kN]	6,0	10,7	13,3	26,7	33,3

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

Design splitting resistance <sup>a)</sup>  $N_{Rd,sp} = N_{Rd,c}^0 \cdot f_B \cdot f_{h,N} \cdot f_{1,sp} \cdot f_{2,sp} \cdot f_{3,sp} \cdot f_{re,N}$

		Data according ETA-05/0255, issue 2011-06-23				
Anchor size		M8	M10	M12	M16	M20
$N_{Rd,c}^0$	[kN]	28,7	38,8	47,1	74,6	98,8

a) Splitting resistance must only be considered for non-cracked concrete

## 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
$f_{B,p} = (f_{ck,cube}/25N/mm^2)^{0,28}$ <sup>a)</sup>	1	1,05	1,12	1,18	1,21	1,25	1,28

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

$f_{h,p} = 1$
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### 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
$f_B = (f_{ck,cube}/25N/mm^2)^{1/2}$ <sup>a)</sup>	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 <sup>a)</sup>

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

a) The the edge distance shall not be smaller than the minimum edge distance  $c_{min}$  given in the table with the setting details. These influencing factors must be considered for every edge distance smaller than the critical edge distance.

### Influence of anchor spacing <sup>a)</sup>

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

a) The anchor spacing shall not be smaller than the minimum anchor spacing  $s_{min}$  given in the table with the setting details. This influencing factor must be considered for every anchor spacing.

### Influence of embedment depth on concrete cone resistance

$f_{h,N} = 1$
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### Influence of reinforcement

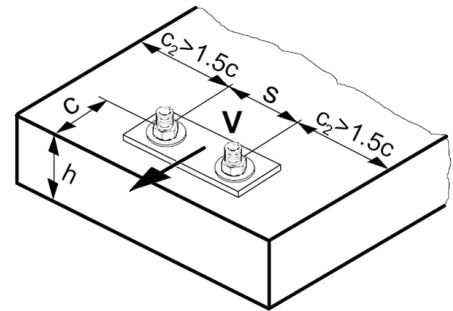
$h_{ef}$ [mm]	80	90	$\geq 100$
$f_{re,N} = 0,5 + h_{ef}/200mm \leq 1$	0,9 <sup>a)</sup>	0,95 <sup>a)</sup>	1

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

### Shear loading

The design shear resistance is the lower value of

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



### Basic design shear resistance

#### Design steel resistance $V_{Rd,s}$

		Data according ETA-05/0255, issue 2011-06-23				
Anchor size		M8	M10	M12	M16	M20
$V_{Rd,s}$	HIS-N [kN]	10,4	18,4	26,0	39,3	36,7
	HIS-RN [kN]	8,3	12,8	19,2	35,3	41,5

#### Design concrete pryout resistance $V_{Rd,cp} = k \cdot N_{Rd,c}^{a)}$

Anchor size	M8	M10	M12	M16	M20
k	2				

a)  $N_{Rd,c}$ : Design concrete cone resistance

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

Anchor size	M8	M10	M12	M16	M20
$V_{Rd,c}^0$ [kN]	12,4	19,8	28,4	40,7	46,8

a) For anchor groups only the anchors close to the edge must be considered.

### 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 $\beta$	0°	10°	20°	30°	40°	50°	60°	70°	80°	≥ 90°
$f_\beta = \frac{1}{\sqrt{(\cos \alpha_v)^2 + \left(\frac{\sin \alpha_v}{2,5}\right)^2}}$	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 <sup>a)</sup> for concrete edge resistance: $f_4$

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

c/h <sub>ef</sub>	Single anchor	Group of two anchors s/h <sub>ef</sub>														
		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

Anchor size	M8	M10	M12	M16	M20
$f_{hef} = 0,05 \cdot (h_{ef} / d)^{1,68}$	1,38	1,21	1,04	1,22	1,45

### Influence of edge distance <sup>a)</sup>

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  $c_{min}$ .

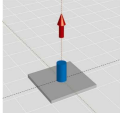
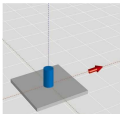
## Combined tension and shear loading

For combined tension and shear loading see section "Anchor Design".

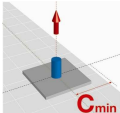
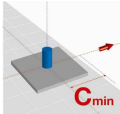
### Precalculated values

Recommended loads can be calculated by dividing the design resistance by an overall partial safety factor for action  $\gamma = 1,4$ . The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

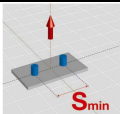
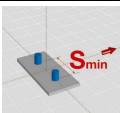
Design resistance: concrete C 20/25 –  $f_{ck,cube} = 25 \text{ N/mm}^2$

		Data according ETA-05/0255, issue 2011-06-23				
Anchor size		M8	M10	M12	M16	M20
Embedment depth	$h_{ef} = [\text{mm}]$	90	110	125	170	205
Base material thickness	$h_{min} = [\text{mm}]$	120	150	170	230	270
	<b>Tensile <math>N_{Rd}</math>: single anchor, no edge effects</b>					
	HIS-N [kN]	16,7	26,7	40,0	63,3	74,1
	HIS-RN [kN]	13,9	21,9	31,6	58,8	69,2
	<b>Shear <math>V_{Rd}</math>: single anchor, no edge effects, without lever arm</b>					
	HIS-N [kN]	10,4	18,4	26,0	39,3	36,7
	HIS-RN [kN]	8,3	12,8	19,2	35,3	41,5

Design resistance: concrete C 20/25 –  $f_{ck,cube} = 25 \text{ N/mm}^2$

		Data according ETA-05/0255, issue 2011-06-23				
Anchor size		M8	M10	M12	M16	M20
Embedment depth	$h_{ef} = [\text{mm}]$	90	110	125	170	205
Base material thickness	$h_{min} = [\text{mm}]$	120	150	170	230	270
Edge distance	$c = c_{min} = [\text{mm}]$	40	45	60	80	125
	<b>Tensile <math>N_{Rd}</math>: single anchor, min. edge distance (<math>c = c_{min}</math>)</b>					
	HIS-(R)N [kN]	8,9	13,4	21,0	33,5	49,2
	<b>Shear <math>V_{Rd}</math>: single anchor, min. edge distance (<math>c = c_{min}</math>), without lever arm</b>					
	HIS-(R)N [kN]	4,2	5,5	8,5	13,8	25,3

Design resistance: concrete C 20/25 –  $f_{ck,cube} = 25 \text{ N/mm}^2$   
(load values are valid for single anchor)

		Data according ETA-05/0255, issue 2011-06-23				
Anchor size		M8	M10	M12	M16	M20
Embedment depth	$h_{ef} = [\text{mm}]$	90	110	125	170	205
Base material thickness	$h_{min} = [\text{mm}]$	120	150	170	230	270
Spacing	$s = s_{min} = [\text{mm}]$	40	45	60	80	125
	<b>Tensile <math>N_{Rd}</math>: double anchor, no edge effects, min. spacing (<math>s = s_{min}</math>)</b>					
	HIS-(R)N [kN]	11,0	16,9	24,4	38,8	56,2
	<b>Shear <math>V_{Rd}</math>: double anchor, no edge effects, min. spacing (<math>s = s_{min}</math>), without lever arm</b>					
	HIS-N [kN]	10,4	18,4	26,0	39,3	36,7
	HIS-RN [kN]	8,3	12,8	19,2	35,3	41,5