HKD Push-in anchor

	Anchor version	Benefits
	HKD Carbon steel with lip HKD-SR stainless steel with lip HKD-ER stainless steel without lip	- simple and well proven - approved, tested and confirmed by everyday jobsite experience - reliable setting thanks to simple visual check - versatile - for medium-duty fastening with bolts or threaded rods - available in various materials and sizes for maximized coverage of possible applications

Concrete

Corrosion resistance

European Technical Approval

CE conformity

PROFIS Anchor design software

Fire resistance

Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical approval [a)]	DIBt, Berlin	ETA-02/0032 / 2012-10-18 ETA-06/0047 / 2010-04-22 Refer HKD (Redundant)

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
- Concrete as specified in the table
- *Steel* failure
- Minimum base material thickness
- Concrete C 20/25, $f_{ck,cube}$ = 25 N/mm²
- screw or rod with steel grade 5.8 (carbon steel) and/or A4-70 (stainless steel)

Mean Ultimate Resistance

Anchor size		M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Tensile $N_{Ru,m}$							
HKD	[kN]	8,4	11,0	17,0	23,8	32,9	48,1
HKD-SR, HKD-ER	[kN]	8,2	10,8	16,6	23,3	34,5	47,1
Shear $V_{Ru,m}$							
HKD	[kN]	5,5	9,4	12,2	20,1	37,1	53,9
HKD-SR, HKD-ER	[kN]	8,3	10,9	13,7	24,3	41,7	66,3

Characteristic Resistance

Anchor size		M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Tensile N_{Rk}							
HKD	[kN]	6,3	8,3	12,8	17,8	26,4	36,1
HKD-SR, HKD-ER	[kN]	6,3	8,3	12,8	17,8	26,4	36,1
Shear V_{Rk}							
HKD	[kN]	5,0	8,6	11,0	18,3	33,8	49,0
HKD-SR, HKD-ER	[kN]	6,2	8,4	10,5	18,7	32,1	51,0

Design Resistance

Anchor size		M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Tensile N_{Rd}							
HKD	[kN]	4,2	5,5	8,5	11,9	17,6	24,0
HKD-SR, HKD-ER	[kN]	3,0	4,6	7,1	9,9	17,6	24,0
Shear V_{Rd}							
HKD	[kN]	4,0	6,9	8,8	14,6	27,0	39,4
HKD-SR, HKD-ER	[kN]	4,1	5,5	6,9	12,3	21,1	33,6

Recommended load

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Tensile N_{rec} a)								
	HKD	[kN]	2,1	2,8	4,3	5,9	8,8	12,0
	HKD-SR, HKD-ER	[kN]	2,1	2,8	4,3	5,9	8,8	12,0
Shear V_{rec} a)								
	HKD	[kN]	1,7	2,9	3,7	6,1	11,3	16,3
	HKD-SR, HKD-ER	[kN]	2,1	2,8	3,5	6,2	10,7	17,0

a) With overall global safety factor γ = 3. The recommended loads vary according to the safety factor requirement from national regulations.

Materials

Mechanical properties of HKD, HKD-SR and HKD-ER

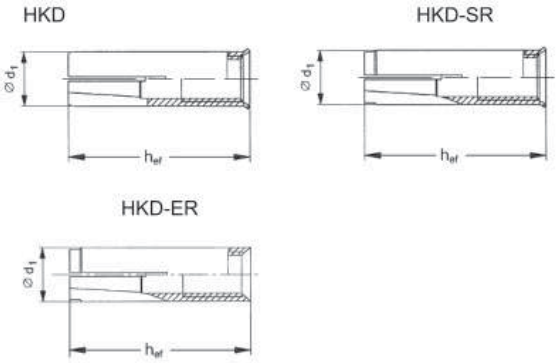
Anchor size			M6	M8	M10	M12	M16	M20
Nominal tensile strength f_{uk}	HKD	[N/mm²]	570	570	570	570	640	590
	HKD-SR HKD-ER	[N/mm²]	540	540	540	540	-	540
Yield strength f_{yk}	HKD	[N/mm²]	460	460	460	480	510	470
	HKD-SR HKD-ER	[N/mm²]	355	355	355	355	-	355
Stressed cross-section A_s	HKD	[mm²]	20,7	26,7	32,7	60,1	105	167
	HKD-S (R) HKD-E (R)	[mm²]	20,9	26,1	28,8	58,7	-	163
Moment of resistance W	HKD	[mm³]	32,3	54,6	82,9	184	431	850
	HKD-S (R) HKD-E (R)	[mm³]	50	79	110	264	602	1191
Char. bending resistance for rod or bolt $M^0_{Rk,s}$	With 5.8 Gr. Steel	[Nm]	7,6	18,7	37,4	65,5	167	325
	HKD-SR HKD-ER with A4-70	[Nm]	11	26	52	92	187	454

Material quality

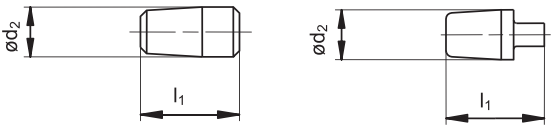
Part		Material
Anchor Body	HKD	Steel Fe/Zn5 galvanised to min. 5 µm
	HKD-SR HKD-ER	Stainless steel, 1.4401, 1.4404, 1.4571
Tapered expansion plug	HKD	Steel material
	HKD-SR HKD-ER	Stainless steel, 1.4401, 1.4404, 1.4571

Anchor size **Anchor version** HKD HKD-SR HKD-ER			**M6x25** (1/4" x 25)	**M8x30** (5/16" x 30)	**M10x40** (3/8" x 40)	**M12x50** (1/2" x 50)	**M16x65** (5/8" x 65)	**M20x80**
Effective anchorage depth	h_{ef}	[mm]	25	30	40	50	60	80
Anchor diameter	d_1	[mm]	7,9	9,95	11,95	14,9	19,75	24,75
Plug diameter	d_2	[mm]	5,1	6,5	8,2	10,3	13,8	16,4
Plug length	l_1	[mm]	10	12	16	20	29	30

Anchor body



Expansions plugs

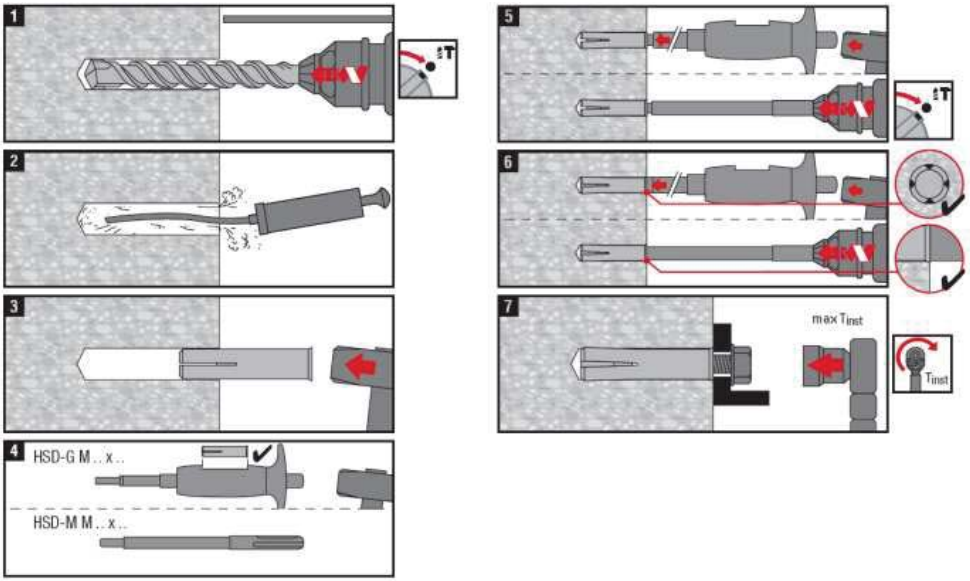


Setting

Installation equipment

Anchor size		M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Rotary hammer		TE 2 – TE 16				TE 40 – 80	
Machine setting tool	HSD-M	6x25/30	8x25/30	10x40	12x25	16x65	20x80
Hand Setting tool	HSD-G						
Other tools		hammer, torque wrench, blow out pump					

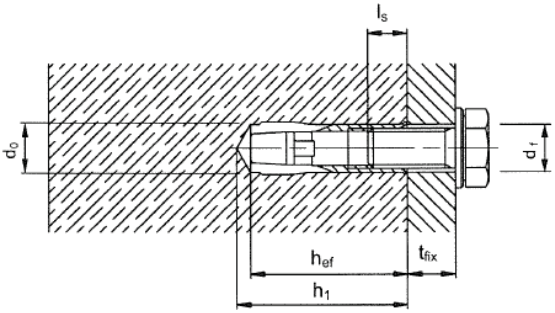
Setting instruction



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.

Setting details: depth of drill hole h_1 and effective anchorage depth h_{ef}

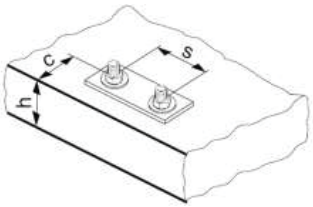


Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
Nominal diameter of drill bit	d_o	[mm]	8	10	12	15/16*	20	25
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,5	12,5	15,5/16,5*	20,5	25,5
Depth of drill hole	$h_1 \geq$	[mm]	27	33	43	54	70	85
Screwing depth	$l_{s,min}$	[mm]	6	8	10	12	16	20
	$l_{s,max}$	[mm]	12	14,5	18	22	30,5	42
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	12	14	18	22
Effective anchorage depth	h_{ef}	[mm]	25	30	40	50	65	80
Max. torque moment	T_{inst}	[Nm]	4	8	15	35	60	120

* Drill bit diameter for HKD ½" x 50 is 16 mm, for HKD M12x 50 is 15mm

Base material thickness, anchor spacing and edge distances

Anchor size				M6x25 (1/4"x25)	M10x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x30)	M20x80
Minimum base material thickness		h_{min}	[mm]	100	100	100	100	130	160
Minimum spacing and minimum edge distance HKD-SR HKD-ER		s_{min}	[mm]	60	60	80	125	130	160
		c_{min}	[mm]	88	105	140	175	230	280
Minimum spacing HKD		s_{min}	[mm]	80	60	80	125	130	160
		for c≥	[mm]	140	105	140	175	230	280
Minimum edge distance HKD		c_{min}	[mm]	100	80	140	175	230	280
		for s≥	[mm]	150	120	80	125	130	160
Critical spacing and edge distance for concrete cone failure HKD HKD-SR HKD-ER		$s_{cr,N}$	[mm]	80	90	120	150	200	240
		$c_{cr,N}$	[mm]	40	45	60	75	100	120
Critical spacing and edge distance for splitting failure	HKD	$s_{cr,sp}$	[mm]	200	210	280	350	455	560
		$c_{cr,sp}$	[mm]	100	105	140	175	227	280
	HKD-SR HKD-ER	$s_{cr,sp}$	[mm]	176	210	280	350	455	560
		$c_{cr,sp}$	[mm]	88	105	140	175	227	280



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

Simplified design method

Simplified version of the design method according ETAG 001, Annex C. Design resistance according data given in ETA-02/0032, issue 2012-10-18.

- 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. 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, Annex C. 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.

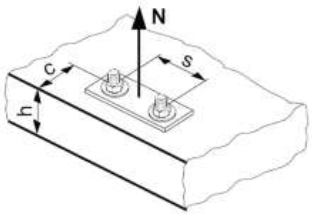
For more complex fastening applications please use the anchor design software PROFIS Anchor.

Tension loading

The design tensile resistance is the lower value of

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

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



Basic design tensile resistance

Design steel resistance $N_{Rd,s}$ for HKD Steel Grade 5.8 and for HKD-ER/SR A4-70

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$N_{Rd,s}$	HKD	[kN]	6,7	11,4	14,7	24,4	45,0	65,3
	HKD-SR, HKD-ER	[kN]	6,9	9,2	11,5	20,4	35,1	55,7

Design pull-out resistance $N_{Rd,p} = N^0_{Rd,p} \cdot f_B$

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$N^0_{Rd,p}$	HKD	[kN]	-	-	-	-	-	-
	HKD-SR, HKD-ER	[kN]	-	-	-	-	-	-

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

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$N^0_{Rd,c}$	HKD	[kN]	4,2	5,5	8,5	11,9	17,6	24,0
	HKD-SR, HKD-ER	[kN]	3,0	4,6	7,1	9,9	17,6	24,0

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

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) b)	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
b) For design data of $f_{ck,cube}$ = 15 and 20, please contact Hilti Technical Advisory Service

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

a) 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.

Influence of anchor spacing [a)]

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

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 base material thickness

h/h_{ef}	2,0	2,2	2,4	2,6	2,8	3,0	3,2	3,4	3,6	≥ 3,68
$f_{h,sp} = [h/(2\cdot h_{ef})]^{2/3}$	1	1,07	1,13	1,19	1,25	1,31	1,37	1,42	1,48	1,5

Influence of reinforcement

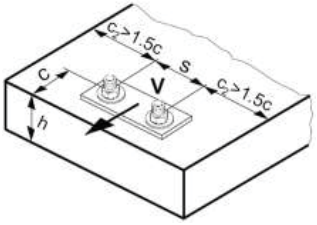
Anchor size	M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$f_{re,N} = 0{,}5 + h_{ef}/200mm \le 1$	0,63[a)]	0,65[a)]	0,7[a)]	0,75[a)]	0,83[a)]	0,9[a)]

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: $V_{Rd,cp} = V^0_{Rd,cp} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{re,N}$
- Concrete edge resistance: $V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_\beta \cdot f_h \cdot f_4$



Basic design shear resistance

Design steel resistance $V_{Rd,s}$ for HKD Steel Grade 5.8 and for HKD-ER/SR A4-70

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$V_{Rd,s}$	HKD	[kN]	4,0	6,9	8,8	14,6	27,0	39,6
	HKD-SR, HKD-ER	[kN]	4,1	5,5	6,9	12,3	21,1	33,6

Design concrete pryout resistance $V_{Rd,cp} = V^0_{Rd,cp} \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{re,N}$

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$V^0_{Rd,cp}$	HKD	[kN]	4,2	11,0	17,0	23,8	35,2	48,1
	HKD-SR, HKD-ER	[kN]	4,2	11,0	17,0	23,8	35,2	48,1

Design concrete edge resistance[a] $V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_{ß} \cdot f_h \cdot f_4$

Anchor size			M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$V^0_{Rd,c}$	HKD	[kN]	0,9	1,4	2,3	3,7	6,2	8,9
	HKD-SR, HKD-ER	[kN]	0,9	1,4	2,3	3,7	6,2	9,5

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) b)	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
b) For design data of $f_{ck,cube}$ = 15 and 20, please contact Hilti Technical Advisory Service

Influence of edge distance [a]

$c/c_{cr,N}$	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
$f_{1,N} = 0,7 + 0,3 \cdot c/c_{cr,N} \le 1$	0,73	0,76	0,79	0,82	0,85	0,88	0,91	0,94	0,97	1
$f_{2,N} = 0,5 \cdot (1 + c/c_{cr,N}) \le 1$	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} given in the table with the setting details. These influencing factors must be considered for every edge distance.

Influence of anchor spacing [a]

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

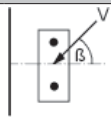
a) The anchor spacing shall not be smaller than the minimum anchor spacing s_{min} given in the table with the setting details. This influencing factor must be considered for every anchor spacing.

Influence of reinforcement

Anchor size	M6x25 (1/4"x25)	M8x30 (5/16"x30)	M10x40 (3/8"x40)	M12x50 (1/2"x50)	M16x65 (5/8"x65)	M20x80
$f_{re,N}$ = 0,5 + h_{ef}/200mm ≤ 1	0,63[a)]	0,65[a)]	0,7[a)]	0,75[a)]	0,83[a)]	0,9[a)]

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.

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

Angle ß	0° - 55°	60°	65°	70°	75°	80°	85°	90° - 180°
$f_ß$ 	1,00	1,07	1,14	1,23	1,35	1,50	1,71	2,00

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 = $\{h/(1,5 \cdot c)\}^{2/3}$ ≤ 1	0,22	0,34	0,45	0,54	0,63	0,71	0,79	0,86	0,93	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}.

Combined tension and shear loading

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