



# SUORITUSTASOILMOITUS

Nro: DoP-170EKD [FI]

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## Tuotetyypin yksilöllinen tunniste:

Lyöntiankkuri ESSVE EKD / EKD-K

## Valmistaja:

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Eurooppalainen tekninen arviointi (ETA)	Mitat & Materiaali	Tuotenro
ETA-17/0548 (2017-08-10)	M6 to M20 Zinc plated / A4 / HCR	123583, 123585, 123587, 123589, 123591, 123593, 123595, 123597, 123599, 123601, 123603, 123605, 123607, 123609, 123611, 123613, 123615, 123617
ETA-17/0567 (2017-08-10)	M6 to M16 Zinc plated / A4 / HCR	123583, 123585, 123587, 123589, 123591, 123595, 123597, 123599, 123601, 123603, 123605, 123609, 123611, 123613, 123615, 123617

Eurooppalainen tekninen arviointi (ETA)	Aiottu käyttötarkoitus (aiotut käyttötarkoitukset)	Betonin laatu
ETA-17/0548 (2017-08-10)	Anchor(s) for use in structural applications under static or quasi-static actions in non-cracked concrete.	Reinforced or unreinforced normal weight concrete according to EN 206-1:2000. <ul style="list-style-type: none"><li>• Strength classes C20/25 to C50/60 according to EN 206-1:2000</li></ul>
ETA-17/0567 (2017-08-10)	Anchors (multiple use) for use in non-structural applications under static or quasi-static actions, in redundant systems, in cracked or non-cracked concrete.	Reinforced or unreinforced normal weight concrete according to EN 206-1:2000. <ul style="list-style-type: none"><li>• Solid concrete C20/25 to C50/60</li><li>• Precast pre-stressed hollow core slabs C30/37 to C50/60</li></ul>



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Nro: DoP-170EKD [FI]

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Eurooppalainen tekninen arviointi (ETA)	Suoritustason pysyvyyden arvioinnissa ja varmentamisessa käytetty järjestelmä/käytetyt järjestelmät (AVCP)	Eurooppalainen arviointiasiakirja	Teknisestä arvioinnista vastaava laitos (TAB)	Ilmoitettu laitos/ilmoitetut laitokset (NB)
ETA-17/0548 (2017-08-10)	1	EAD 330232-00-0601, (2016-10)	DEUTSCHES INSTITUT FÜR BAUTECHNIK (DiBt)	1343 (FPC)
ETA-17/0567 (2017-08-10)	2+	ETAG 001 Part 6, (2011-01)	DEUTSCHES INSTITUT FÜR BAUTECHNIK (DiBt)	1343 (FPC)

Eurooppalainen tekninen arviointi (ETA)	Mitat & Materiaali	Perusominaisuudet	Suoritustaso
ETA-17/0548 (2017-08-10)	M6 to M20 Zinc plated / A4 / HCR	Characteristic resistance for tension and shear loads as well as bending moments in concrete	ETA 17/0548 Table C1 to C4
		Edge distances and spacing	ETA 17/0548 Table C1 & C2
		Displacements under tension and shear loads	ETA 17/0548 Table C5 & C6
		Reaction to fire	Class A1
		Resistance to fire	No Performance Declared (NPD)
ETA-17/0567 (2017-08-10)	M6 to M16 Zinc plated / A4 / HCR	Characteristic values for static and quasi- static actions	ETA-17/0567 Table C1 to C3
		Reaction to fire	Class A1
		Resistance to fire	ETA-17/0567 Table C4 & C5

Edellä yksilöidyn tuotteen suoritustaso on ilmoitettujen suoritustasojen joukon mukainen. Tämä suoritustasoilmoitus on asetuksen (EU) N:o 305/2011 mukaisesti annettu edellä ilmoitetun valmistajan yksinomaisella vastuulla.

Valmistajan puolesta allekirjoittanut:

Viktor Bukowski  
Product Developer/Technical expert – Fasteners

Kista 2017-08-17



# SUORITUSTASOILMOITUS

Nro: DoP-170EKD [FI]

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ETA 17/0548 Table C1 - Characteristic values for tension loads, zinc plated steel

Anchor size			M6x30 <sup>1)</sup>	M8x30 <sup>1)</sup>	M8x40	M10x30 <sup>1)</sup>	M10x40	M12x50	M12x80	M16x65 / M16x80	M20x80
Installation safety factor	$\gamma_{inst}$	[-]	1,2								
<b>Steel failure</b>											
Characteristic resistance Steel 4.6	$N_{Rk,s}$	[kN]	8,0	14,6	23,2		33,7		62,8	98,0	
Partial safety factor	$\gamma_{Ms}$	[-]	2,0								
Characteristic resistance Steel 5.6	$N_{Rk,s}$	[kN]	10,0	18,3	18,0	20,2	42,1		78,3	122,4	
Partial safety factor	$\gamma_{Ms}$	[-]	2,0		1,5		2,0				
Characteristic resistance Steel 5.8	$N_{Rk,s}$	[kN]	10,0	17,6	18,3	18,0	20,2	40,2	42,1	67,1	106,4
Partial safety factor	$\gamma_{Ms}$	[-]	1,5						1,6		
Characteristic resistance Steel 8.8	$N_{Rk,s}$	[kN]	15,0	17,6	19,9	18,0	20,2	40,2	43,0	67,1	106,4
Partial safety factor	$\gamma_{Ms}$	[-]	1,5						1,6		
<b>Pull-out failure</b>											
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	2)	2)	9	2)	2)	2)	2)	2)	2)
<b>Splitting</b>											
Characteristic resistance in concrete C20/25	$N^0_{Rk,sp}$	[kN]	8,1	8,1	9,0	8,1	12,4	17,4	25,8	35,2	
Edge distance	$c_{cr,sp}$	[mm]	95	95	95	115	135	165	200	260	
Increasing factor for $N_{Rk,p}$ and $N^0_{Rk,sp}$	$\psi_C$	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,3}$								
<b>Concrete cone failure</b>											
Effective anchorage depth	$h_{ef}$	[mm]	30	30	40	30	40	50	65	80	
Edge distance	$c_{cr,N}$	[mm]	1,5 $h_{ef}$								
Factor for $k_1$	$k_{ucr,N}$	[-]	11,0								

<sup>1)</sup> Use restricted to anchoring of structural components statically indeterminate

<sup>2)</sup> Pull-out is not decisive.



# SUORITUSTASOILMOITUS

Nro: DoP-170EKD [FI]

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ETA 17/0548 Table C2 - Characteristic values for tension loads, stainless steel A4, HCR

Anchor size		M6x30 <sup>1)</sup>	M8x30 <sup>1)</sup>	M8x40	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
Installation safety factor	$\gamma_{inst}$	[-]		1,0				
<b>Steel failure</b>								
Characteristic resistance (property class 70)	$N_{Rk,s}$	[kN]	14,1	23,3	29,4	50,2	83,8	133,0
Characteristic resistance (property class 80)	$N_{Rk,s}$	[kN]	17,5	23,3	29,4	50,2	83,8	133,0
Partial safety factor	$\gamma_{Ms}$	[-]		1,87				
<b>Pull-out failure</b>								
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	2)	2)	9	2)	2)	2)
<b>Splitting failure</b>								
Characteristic resistance in concrete C20/25	$N^0_{Rk,sp}$	[kN]	8,1	8,1	9,0	12,4	17,4	25,8
Edge distance	$c_{cr,sp}$	[mm]	80	95	95	135	165	200
Increasing factor for $N_{Rk,p}$ and $N^0_{Rk,sp}$	$\psi_C$	[-]		$\left(\frac{f_{ck}}{20}\right)^{0,5}$				
<b>Concrete cone failure</b>								
Effective anchorage depth	$h_{ef}$	[mm]	30 <sup>3)</sup>	30	40	40	50	65
Edge distance	$c_{cr,N}$	[mm]	1,5 $h_{ef}$					
Factor for $k_1$	$k_{ucr,N}$	[-]		11,0				

<sup>1)</sup> Use restricted to anchoring of structural components statically indeterminate

<sup>2)</sup> Pull-out is not decisive.



ETA 17/0548 Table C3 - Characteristic values for *shear loads, zinc plated steel*

Anchor size		M6x30 <sup>1)</sup>	M8x30 <sup>1)</sup>	M8x40	M10x30 <sup>1)</sup>	M10x40	M12x50	M12x80	M16x65 M16x80	M20x80	
<b>Steel failure without lever arm</b>											
Characteristic resistance Steel 4.6	$V_{Rk,s}$	[kN]	4,0	7,3	11,6	9,6	16,8		31,3	49,0	
Partial safety factor	$\gamma_{Ms}$	[-]	1,67								
Characteristic resistance Steel 5.6	$V_{Rk,s}$	[kN]	5,0	9,1	10,1	9,6	21,1		39,2	61,2	
Partial safety factor	$\gamma_{Ms}$	[-]	1,67		1,25	1,67					
Characteristic resistance Steel 5.8	$V_{Rk,s}$	[kN]	5,0	6,9	10,1	7,2	19,4	21,1	33,5	53,2	
Partial safety factor	$\gamma_{Ms}$	[-]	1,25						1,33		
Characteristic resistance Steel 8.8	$V_{Rk,s}$	[kN]	5,0	6,9	10,1	7,2	19,4	21,5	33,5	53,2	
Partial safety factor	$\gamma_{Ms}$	[-]	1,25						1,33		
Factor of ductility	$k_7$	[-]	1,0								
<i>Steel failure with lever arm</i>											
Characteristic resistance Steel 4.6	$M^0_{Rk,s}$	[Nm]	6,1	15	30	30	52		133	259	
Partial safety factor	$\gamma_{Ms}$	[-]	1,67								
Characteristic resistance Steel 5.6	$M^0_{Rk,s}$	[Nm]	7,6	19	37	37	65		166	324	
Partial safety factor	$\gamma_{Ms}$	[-]	1,67								
Characteristic resistance Steel 5.8	$M^0_{Rk,s}$	[Nm]	7,6	19	37	37	65		166	324	
Partial safety factor	$\gamma_{Ms}$	[-]	1,25								
Characteristic resistance Steel 8.8	$M^0_{Rk,s}$	[Nm]	12	30	59	60	105		266	519	
Partial safety factor	$\gamma_{Ms}$	[-]	1,25								
Factor of ductility	$k_7$	[-]	1,0								
<b>Concrete pry-out failure</b>											
Factor	$k_8$	[-]	1,0				1,5		2,0		
<b>Concrete edge failure</b>											
Effective length of anchor under shear loading	$l_f$	[mm]	30	30	40	30	40	50		65	80
Outside diameter of anchor	$d_{nom}$	[mm]	8	10	10	12	12	15		20	25

<sup>1)</sup> Use restricted to anchoring of structural components statically indeterminate



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Nro: DoP-170EKD [FI]

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ETA 17/0548 Table C4 - Characteristic values for *shear loads, stainless steel A4, HCR*

Anchor size			M6x30 <sup>1)</sup>	M8x30 <sup>1)</sup>	M8x40	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
<b>Steel failure without lever arm</b>									
Characteristic resistance (property class 70)	$V_{Rk,s}$	[kN]	7,0	10,6		13,4	25,1	41,9	66,5
Characteristic resistance (property class 80)	$V_{Rk,s}$	[kN]	8,7	10,6		13,4	25,1	41,9	66,5
Partial safety factor	$\gamma_{Ms}$	[-]	1,56						
Factor of ductility	$k_7$	[-]	1,0						
<b>Steel failure with lever arm</b>									
Characteristic resistance (property class 70)	$M^0_{Rk,s}$	[Nm]	11	26		52	92	233	454
Partial safety factor	$\gamma_{Ms}$	[-]	1,56						
Characteristic resistance (property class 80)	$M^0_{Rk,s}$	[Nm]	12	30		60	105	266	519
Partial safety factor	$\gamma_{Ms}$	[-]	1,33						
Factor of ductility	$k_7$	[-]	1,0						
<b>Concrete pry-out failure</b>									
Factor	$k_8$	[-]	1,0	1,7		1,7		2,0	
<b>Concrete edge failure</b>									
Effective length of anchor under shear loading	$l_f$	[mm]	30	30	40	40	50	65	80
Outside diameter of anchor	$d_{nom}$	[mm]	8	10	10	12	15	20	25

<sup>1)</sup> Use restricted to anchoring of structural components statically indeterminate



# SUORITUSTASOILMOITUS

Nro: DoP-170EKD [FI]

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ETA 17/0548 Table C5 - Displacements under tension loads

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
<b>Steel zinc plated</b>										
Tension load in non-cracked concrete	N	[kN]	3	3	3,6	3,3	4,8	6,4	10	14,8
Displacement	$\delta_{N0}$	[mm]	0,24							
	$\delta_{N\infty}$	[mm]	0,36							
<b>Stainless steel A4 / HCR</b>										
Tension load in non-cracked concrete	N	[kN]	4	4	4,3	-	6,1	8,5	12,6	17,2
Displacement	$\delta_{N0}$	[mm]	0,12							
	$\delta_{N\infty}$	[mm]	0,24							

ETA 17/0548 Table C6 - Displacements under shear loads

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
<b>Steel zinc plated</b>										
Shear load in non-cracked concrete	V	[kN]	2	4	4	5,7	4,0	11,3	18,8	32,2
Displacement	$\delta_{V0}$	[mm]	0,9	0,9	1,0	1,5	0,6	1,2	1,2	1,6
	$\delta_{V\infty}$	[mm]	1,3	1,3	1,5	2,3	0,9	1,9	1,9	2,4
<b>Stainless steel A4 / HCR</b>										
Shear load in non-cracked concrete	V	[kN]	3,5	5,2	5,2	-	6,5	11,5	19,2	30,4
Displacement	$\delta_{V0}$	[mm]	1,9	1,1	0,7	-	1,0	1,7	2,4	2,6
	$\delta_{V\infty}$	[mm]	2,8	1,6	1,0	-	1,5	2,6	3,6	3,8



# SUORITUSTASOILMOITUS

Nro: DoP-170EKD [FI]

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ETA 17/0567 Table C1 - Characteristic resistance for  $h_{ef} \geq 30$  mm in solid concrete slabs

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M16x65
<b>Load in any direction</b>									
Characteristic resistance in concrete <b>C20/25 to C50/60</b>	$F_{Rk}^0$	[kN]	3	5	6	6	6	6	16
Partial safety factor	$\gamma_M$	[-]	1,8	2,16		2,1	2,16	1,8	1,8
Spacing	$s_{cr}$	[mm]	130	180	210	230	170	170	400
Edge distance	$c_{cr}$	[mm]	65	90	105	115	85	85	200
<b>Shear load with lever arm, Steel zinc plated</b>									
Characteristic resistance <b>(Steel 4.6)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	6,1	15	15	30	30	52	133
Partial safety factor	$\gamma_{Ms}$	[-]	1,67						
Characteristic resistance <b>(Steel 4.8)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	6,1	15	15	30	30	52	133
Partial safety factor	$\gamma_{Ms}$	[-]	1,25						
Characteristic resistance <b>(Steel 5.6)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	7,6	19	19	37	37	65	166
Partial safety factor	$\gamma_{Ms}$	[-]	1,67						
Characteristic resistance <b>(Steel 5.8)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	7,6	19	19	37	37	65	166
Partial safety factor	$\gamma_{Ms}$	[-]	1,25						
Characteristic resistance <b>(Steel 8.8)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	12	30	30	59	60	105	266
Partial safety factor	$\gamma_{Ms}$	[-]	1,25						
<b>Shear load with lever arm, Stainless steel A4 / HCR</b>									
Characteristic resistance <b>(Property class 70)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	11	26	26	-	52	92	233
Partial safety factor	$\gamma_{Ms}$	[-]	1,56						
Characteristic resistance <b>(Property class 80)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	12	30	30	-	60	105	266
Partial safety factor	$\gamma_{Ms}$	[-]	1,33						

<sup>1)</sup> Characteristic bending moment  $M_{Rk,s}^0$  for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4





# SUORITUSTASOILMOITUS

Nro: DoP-170EKD [FI]



ETA 17/0567 Table C2 - Characteristic resistance for  $h_{ef} = 25$  mm in solid concrete slabs

Anchor size			M6x25	M8x25	M10x25	M12x25
<b>Load in any direction</b>						
Characteristic resistance in concrete <b>C12/15 and C16/20</b>	$F_{Rk}^0$	[kN]	2,5	2,5	3,5	3,5
Characteristic resistance in concrete <b>C20/25 to C50/60</b>	$F_{Rk}^0$	[kN]	3,5	4,0	4,5	4,5
Partial safety factor	$\gamma_M$	[-]	1,5			
Spacing	$s_{cr}$	[mm]	75	75	75	75
Edge distance	$c_{cr}$	[mm]	38	38	38	38
<b>Shear load with lever arm</b>						
Characteristic resistance <b>(Steel 4.6)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	6,1	15	30	52
Partial safety factor	$\gamma_{Ms}$	[-]	1,67			
Characteristic resistance <b>(Steel 4.8)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	6,1	15	30	52
Partial safety factor	$\gamma_{Ms}$	[-]	1,25			
Characteristic resistance <b>(Steel 5.6)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	7,6	19	37	65
Partial safety factor	$\gamma_{Ms}$	[-]	1,67			
Characteristic resistance <b>(Steel 5.8)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	7,6	19	37	65
Partial safety factor	$\gamma_{Ms}$	[-]	1,25			
Characteristic resistance <b>(Steel 8.8)</b>	$M_{Rk,s}^0$ <sup>1)</sup>	[Nm]	12	30	60	105
Partial safety factor	$\gamma_{Ms}$	[-]	1,25			

<sup>1)</sup> Characteristic bending moment  $M_{Rk,s}^0$  for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4



# SUORITUSTASOILMOITUS

Nro: DoP-170EKD [FI]



ETA 17/0567 Table C3 - Characteristic resistance for  $h_{ef} = 25$  mm in precast pre-stressed hollow core slabs

Anchor size			M6x25	M8x25	M10x25	M12x25
<b>Load in any direction</b>						
Flange thickness	$d_b$	[mm]	$\geq 35$ (30) <sup>1)</sup>			
Characteristic resistance in precast pre-stressed hollow core slabs <b>C30/37 to C50/60</b>	$F_{Rk}$	[kN]	3,5	4,0	4,5	4,5
Partial safety factor	$\gamma_M$	[-]	1,5			
Spacing	$s_{cr}$	[mm]	200			
Edge distance	$c_{cr}$	[mm]	150			
<b>Shear load with lever arm</b>						
Characteristic resistance <b>(Steel 4.6)</b>	$M_{Rk,s}^{0,2)}$	[Nm]	6,1	15	30	52
Partial safety factor	$\gamma_{Ms}$	[-]	1,67			
Characteristic resistance <b>(Steel 4.8)</b>	$M_{Rk,s}^{0,2)}$	[Nm]	6,1	15	30	52
Partial safety factor	$\gamma_{Ms}$	[-]	1,25			
Characteristic resistance <b>(Steel 5.6)</b>	$M_{Rk,s}^{0,2)}$	[Nm]	7,6	19	37	65
Partial safety factor	$\gamma_{Ms}$	[-]	1,67			
Characteristic resistance <b>(Steel 5.8)</b>	$M_{Rk,s}^{0,2)}$	[Nm]	7,6	19	37	65
Partial safety factor	$\gamma_{Ms}$	[-]	1,25			
Characteristic resistance <b>(Steel 8.8)</b>	$M_{Rk,s}^{0,2)}$	[Nm]	12	30	60	105
Partial safety factor	$\gamma_{Ms}$	[-]	1,25			

<sup>1)</sup> The anchor may be set in a flange thickness of 30 mm with identical characteristic loads, if the borehole cuts no hollow core.

<sup>2)</sup> Characteristic bending moment  $M_{Rk,s}^{0,2)}$  for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4



ETA 17/0567 Table C4 - Characteristic values under fire exposure in solid concrete slabs C20/25 to C50/60 for  $h_{ef} \geq 30$  mm

Anchor size				M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M16x65	
Fire resistance class		Load in any direction									
Steel 4.6	R 30	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,4	0,6	0,6	0,9	0,9	1,5	3,1
	R 60			[kN]	0,35	0,6	0,6	0,8	0,8	1,3	2,4
	R 90			[kN]	0,30	0,6	0,6	0,6	0,6	1,1	2,0
	R 120			[kN]	0,25	0,5	0,5	0,5	0,5	0,8	1,6
Steel 4.8	R 30	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,4	0,9	1,1	0,9	1,5	1,5	4,0
	R 60			[kN]	0,35	0,9	0,9	0,9	1,5	1,5	4,0
	R 90			[kN]	0,3	0,6	0,6	0,9	1,1	1,5	3,0
	R 120			[kN]	0,3	0,5	0,5	0,7	0,9	1,2	2,4
Steel $\geq 5.6$	R 30	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,8	0,9	1,5	0,9	1,5	1,5	4,0
	R 60			[kN]	0,8	0,9	1,5	0,9	1,5	1,5	4,0
	R 90			[kN]	0,4	0,9	0,9	0,9	1,5	1,5	3,7
	R 120			[kN]	0,3	0,5	0,5	0,7	1,0	1,2	2,4
A4 / HCR	R 30	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,8	0,9	1,5	-	1,5	1,5	4,0
	R 60			[kN]	0,8	0,9	1,5	-	1,5	1,5	4,0
	R 90			[kN]	0,4	0,9	0,9	-	1,5	1,5	3,7
	R 120			[kN]	0,3	0,5	0,5	-	1,0	1,2	2,4
Partial safety factor $\gamma_{M,fi}$			[-]	1,0							
<b>Steel zinc plated</b>											
R 30 – R 120	Spacing $S_{cr,fi}$		[mm]	130	180	210	170	170	200	400	
	Edge distance $C_{cr,fi}$		[mm]	65	90	105	85	85	100	200	
	If the fire attack is from more than one side, the edge distance shall be $\geq 300$ mm.										
<b>Stainless steel A4, HCR</b>											
R 30 – R 120	Spacing $S_{cr,fi}$		[mm]	130	180	210	-	170	200	400	
	Edge distance $C_{cr,fi}$		[mm]	65	90	105	-	85	100	200	
	If the fire attack is from more than one side, the edge distance shall be $\geq 300$ mm.										

ETA 17/0567 Table C5 - Characteristic values under fire exposure in solid concrete slabs C20/25 to C50/60 for  $h_{ef} = 25$  mm

Anchor size				M6x25	M8x25	M10x25	M12x25	
Fire resistance class		Load in any direction						
Steel $\geq 4.6$	R 30	Characteristic resistance	$F_{Rk,fi}^0$	[kN]	0,4	0,6	0,6	0,6
	R 60			[kN]	0,35	0,6	0,6	0,6
	R 90			[kN]	0,30	0,6	0,6	0,6
	R 120			[kN]	0,25	0,5	0,5	0,5
Partial safety factor $\gamma_{M,fi}$			[-]	1,0				
R 30 – R 120	Spacing $S_{cr,fi}$		[mm]	100	100	100	100	
	Edge distance $C_{cr,fi}$		[mm]	50	50	50	50	
	If the fire attack is from more than one side, the edge distance shall be $\geq 300$ mm.							