... eine starke Verbindung

DECLARACIÓN DE PRESTACIONES

DoP no **MKT-132** - es

✧ **Código de identificación única del producto tipo:** **Ancla de impacto MKT E / ES**

✧ **Usos previstos:** Anclaje de expansión para uso como fijación múltiple de sistemas no estructurales en concreto, ver Anexo / Annex B

✧ **Fabricante:** MKT Metall-Kunststoff-Technik GmbH & Co.KG
Auf dem Immel 2
67685 Weilerbach

Sistemas de evaluación y verificación de la constancia de las prestaciones (EVCP): 2+

✧ **Documento de evaluación europeo:** **ETAG 001-6**
valuación técnica europea: **ETA-05/0116, 04.01.2017**
Organismo de evaluación técnica: DIBt, Berlin
Organismos notificados: NB 1343 – MPA, Darmstadt

✧ **Prestaciones declaradas:**

Características esenciales	Prestaciones
Seguridad en caso de incendio (BWR2)	
El comportamiento del fuego	Clase A1
Resistencia al fuego	Anexo/Annex C4 – C5
Seguridad durante el uso (BWR4)	
Resistencia característica para todas las direcciones de carga	Anexo/Annex C1 – C3

Las prestaciones del producto identificado anteriormente son conformes con el conjunto de prestaciones declaradas. La presente declaración de prestaciones se emite, de conformidad con el Reglamento (UE) no 305/2011, bajo la sola responsabilidad del fabricante arriba identificado.

Firmado por y en nombre del fabricante por:

Stefan Weustenhagen
(Director general)
Weilerbach, 04.01.2017

p.p

Dipl.-Ing. Detlef Bigalke
(Director de Desarrollo de Productos)

El original de esta declaración de rendimiento fue escrito en alemán. En caso de desviaciones en la traducción, la versión alemana es.

Specifications of intended use

Drop-in Anchor							
Anchorage depth h_{ef} ≥ 30 mm	**M6x30**	**M8x30**	**M8x40**	**M10x30**	**M10x40**	**M12x50**	**M16x65**
Steel, zinc plated	✓			✓			
Stainless steel A4 and high corrosion resistant steel HCR		✓		-		✓	
Static and quasi-static loads	✓			✓			
Fire exposure	✓			✓			
Cracked and uncracked concrete	✓			✓			
Solid concrete **C20/25 to C50/60**	✓			✓			

Anchorage depth h_{ef} = 25 mm	**M6x25**	**M8x25**	**M10x25**	**M12x25**
Steel, zinc plated	✓			
Stainless steel A4 and high corrosion resistant steel HCR	-			
Static and quasi-static loads	✓			
Fire exposure (solid concrete, C20/25 to C50/60)	✓			
Cracked and uncracked concrete	✓			
Solid concrete **C12/15 to C50/60**	✓			
Precast pre-stressed hollow core slabs (C30/37 to C50/60)	✓			

Base materials:

- reinforced or unreinforced normal weight concrete according to EN 206-1:2000

Use conditions:

- Structures subject to dry internal conditions
  (zinc plated steel, stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure (including industrial and marine environment) or exposure to permanently damp internal condition, if no particular aggressive conditions exist
  (stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions
  (high corrosion resistant steel).

  Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used.)

Specifications of intended use

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- The strength class and the length of the fastening screw or threaded rod shall be defined by the designing engineer
- Anchorages under static or quasi-static actions for multiple use for non-structural applications are designed in accordance with:
  - ETAG 001, Annex C, design method B, Edition August 2010 or
  - CEN/TS 1992-4:2009, design method B
- Anchorages under static or quasi-static actions for precast pre-stressed hollow core slabs:
  - ETAG 001, Annex C, design method C, Edition August 2010.
  - CEN/TS 1992-4:2009, design method C
- Anchorages under fire exposure are designed in accordance with:
  - ETAG 001, Annex C, design method B, Edition August 2010 and EOTA Technical Report TR 020, Edition May 2004 or
  - CEN/TS 1992-4:2009, Annex D
  - It must be ensured that local spalling of the concrete cover does not occur.

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools,
- Drill hole by hammer drilling only (use of vacuum drill bits is admissible),
- Positioning of the drill holes without damaging the reinforcement.

Table B1: Installation parameters for $h_{ef} \geq 30$ mm

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M16x65
Depth of drill hole	h_0 =	[mm]	30	30	40	30	40	50	65
Drill hole diameter	d_0 =	[mm]	8	10	10	12	12	15	20
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45	10,45	12,5	12,5	15,5	20,55
Max. recommended installation torque	$T_{inst} \leq$	[Nm]	4	8	8	15	15	35	60
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	9	12	12	14	18
Available thread length	L_{th}	[mm]	13	13	20	12	15	18	23
Minimum screw-in depth	L_{sdmin}	[mm]	7	9	9	10	11	13	18
Steel, zinc plated									
Minimum thickness of member	h_{min}	[mm]	100	100	100	120	120	130	160
Minimum spacing	s_{min}	[mm]	55	60	80	100	100	120	150
Minimum distance	c_{min}	[mm]	95	95	95	115	135	165	200
Stainless steel A4, HCR									
Minimum thickness of member	h_{min}	[mm]	100	100	100	-	130	140	160
Minimum spacing	s_{min}	[mm]	50	60	80	-	100	120	150
Minimum distance	c_{min}	[mm]	80	95	95	-	135	165	200

Table B2: Installation parameters for $h_{ef} = 25$ mm

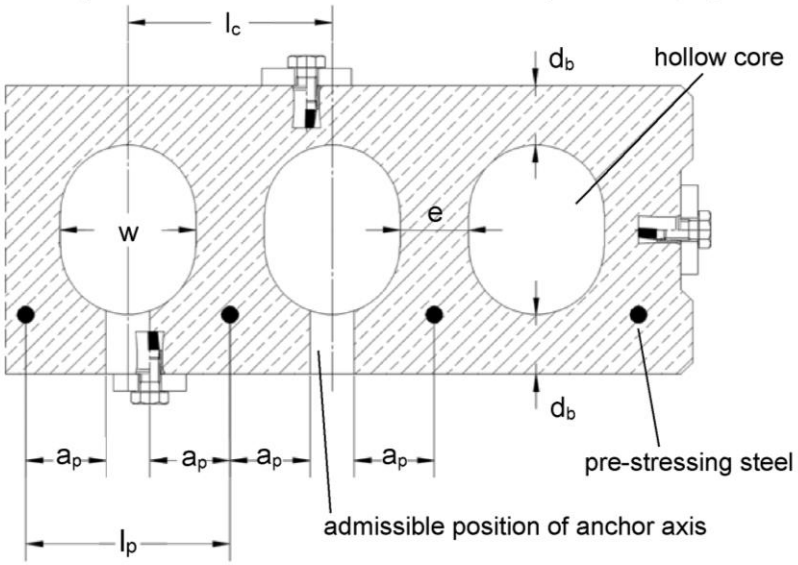
Anchor size			M6x25	M8x25	M10x25	M12x25
Depth of drill hole	h_0 =	[mm]	25	25	25	25
Drill hole diameter	d_0 =	[mm]	8	10	12	15
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45	12,5	15,5
Max. recommended installation torque	$T_{inst} \leq$	[Nm]	4	8	15	35
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	12	14
Available thread length	L_{th}	[mm]	12	12	12	12
Minimum screw-in depth	L_{sdmin}	[mm]	6	8	10	12
Minimum thickness of member	$\mathbf{h_{min,1}}$	[mm]	**80**			
Minimum spacing	s_{min}	[mm]	30	70	70	100
Minimum edge distance	c_{min}	[mm]	60	100	100	130
Standard thickness of member	$\mathbf{h_{min,2}}$	[mm]	**100**			
Minimum spacing	s_{min}	[mm]	30	50	60	100
Minimum edge distance	c_{min}	[mm]	60	100	100	110
Installation in precast pre-stressed hollow core slabs C30/37 to C50/60						
Spacing	s_{min}	[mm]	200			
Edge distance	c_{min}	[mm]	150			

Admissible anchor positions in precast pre-stressed hollow core slabs (w / e ≤ 4,2)

core distance:
$l_c \geq 100$ mm

pre-stressing steel distance:
$l_p \geq 100$ mm

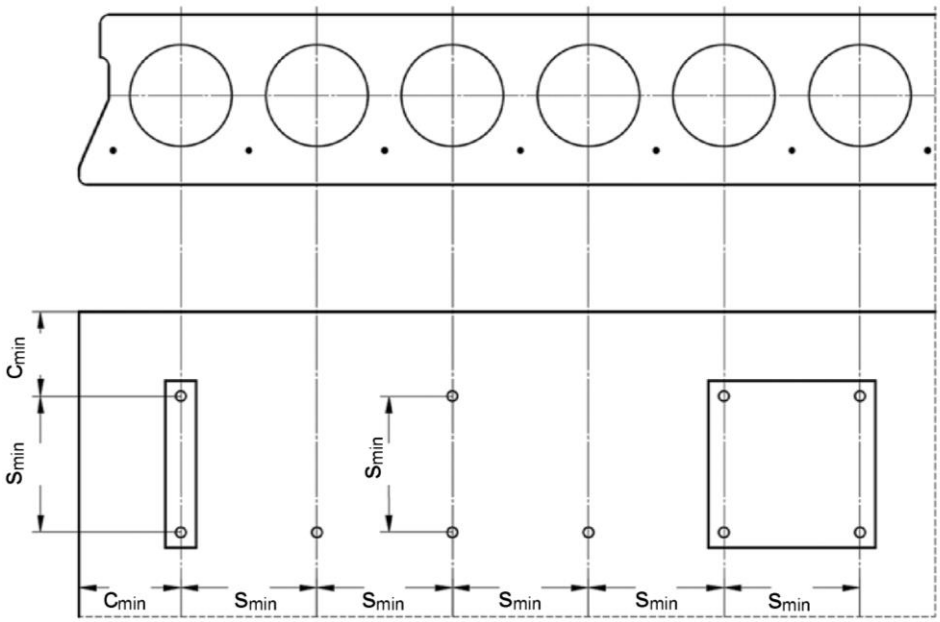
distance between anchor position and pre-stressing steel:
$a_p \geq 50$ mm



Minimum spacing and edge distance of anchors and distance between anchor groups in precast pre-stressed hollow core slabs

Minimum edge distance
$c_{min} \geq 150$ mm

Minimum anchor spacing
$s_{min} \geq 200$ mm

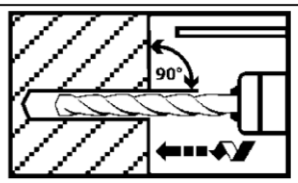
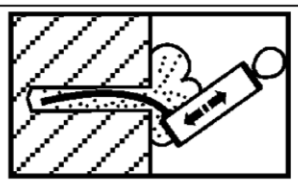
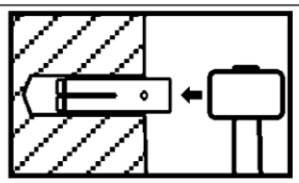
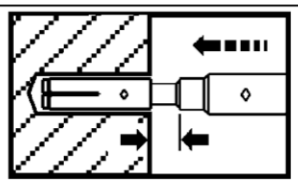
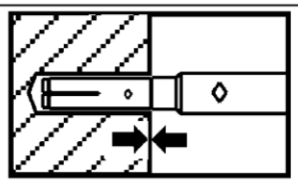
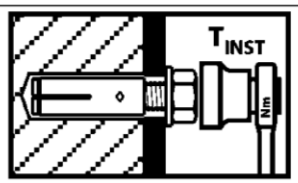


Drop-in Anchor E / ES

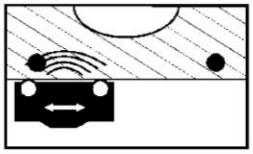
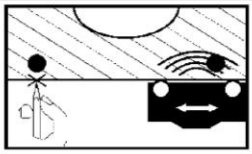
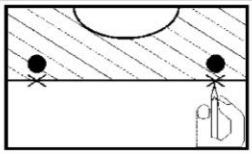
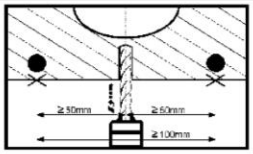
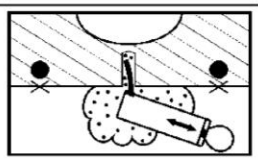
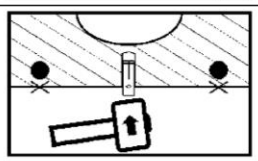
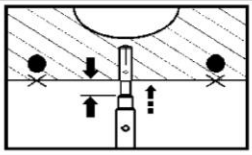
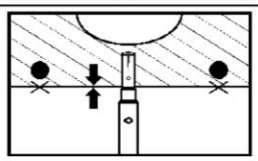
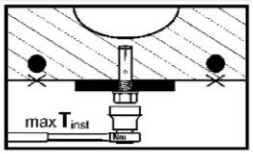
Intended use
Installation in precast pre-stressed hollow core slabs

Annex B4

Installation instructions for solid concrete slabs

1		Drill hole perpendicular to concrete surface. When using vacuum drill bit proceed with step 3.
2		Blow out dust. Alternatively vacuum-clean down to the bottom of the hole.
3		Drive in anchor.
4		Drive in cone by using setting tool.
5		Shoulder of setting tool must fit on anchor rim.
6		Apply installation torque T_{inst} by using calibrated torque wrench.

Installation instructions for precast pre-stressed hollow core slabs

1		Search for the position of the reinforcement.
2		Mark the position of the reinforcement and search for the other position of the reinforcement
3		Mark the positions of reinforcement.
4		Drill hole while maintaining the required distances.
5		Blow out dust. Alternatively vacuum clean down to the bottom of the hole.
6		Drive in anchor.
7		Drive in cone by using setting tool.
8		Shoulder of setting tool must fit on anchor rim.
9		Apply installation torque T_{inst} by using calibrated torque wrench.

Drop-in Anchor E / ES

Intended use
Installation instructions for precast pre-stressed hollow core slabs

Annex B6

Table C1: Characteristic resistance for $h_{ef} \geq 30$ mm in **solid concrete slabs**

Anchor size			**M6x30**	**M8x30**	**M8x40**	**M10x30**	**M10x40**	**M12x50**	**M16x65**
Load in any direction									
Characteristic resistance in concrete **C20/25 to C50/60**	F^0_{Rk}	[kN]	3	5	6	6	6	6	16
Partial safety factor	γ_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
Shear load with lever arm, Steel zinc plated									
Characteristic resistance **(Steel 4.6)**	$M^0_{Rk,s}$ 1)	[Nm]	6,1	15	15	30	30	52	133
Partial safety factor	γ_{Ms}	[-]	1,67						
Characteristic resistance **(Steel 4.8)**	$M^0_{Rk,s}$ 1)	[Nm]	6,1	15	15	30	30	52	133
Partial safety factor	γ_{Ms}	[-]	1,25						
Characteristic resistance **(Steel 5.6)**	$M^0_{Rk,s}$ 1)	[Nm]	7,6	19	19	37	37	65	166
Partial safety factor	γ_{Ms}	[-]	1,67						
Characteristic resistance **(Steel 5.8)**	$M^0_{Rk,s}$ 1)	[Nm]	7,6	19	19	37	37	65	166
Partial safety factor	γ_{Ms}	[-]	1,25						
Characteristic resistance **(Steel 8.8)**	$M^0_{Rk,s}$ 1)	[Nm]	12	30	30	59	60	105	266
Partial safety factor	γ_{Ms}	[-]	1,25						
Shear load with lever arm, Stainless steel A4 / HCR									
Characteristic resistance **(Property class 70)**	$M^0_{Rk,s}$ 1)	[Nm]	11	26	26	-	52	92	233
Partial safety factor	γ_{Ms}	[-]	1,56						
Characteristic resistance **(Property class 80)**	$M^0_{Rk,s}$ 1)	[Nm]	12	30	30	-	60	105	266
Partial safety factor	γ_{Ms}	[-]	1,33						

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

Table C2: Characteristic resistance for h_{ef} **= 25 mm** in **solid concrete slabs**

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

[1)] Characteristic bending moment $M^0_{Rk,s}$ for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4

Table C3: Characteristic resistance for h_{ef} **= 25 mm** in **precast pre-stressed hollow core slabs**

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

[1] The anchor may be set in a flange thickness of 30 mm with identical characteristic loads, if the borehole cuts no hollow core.

[2] Characteristic bending moment $M^0_{Rk,s}$ for equation (5.5) in ETAG 001, Annex C or for equation (14) in CEN/TS 1992-4-4

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	$F^0_{Rk,fi}$	[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	$F^0_{Rk,fi}$	[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 ≥ 5.6	R 30	Characteristic resistance	$F^0_{Rk,fi}$	[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	$F^0_{Rk,fi}$	[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						
Steel zinc plated											
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 ≥ 300 mm.									
Stainless steel A4, HCR											
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 ≥ 300 mm.									

Table C5: Characteristic values under **fire exposure** in **solid concrete slabs** C20/25 to C50/60 for $\mathbf{h_{ef}}$ **= 25 mm**

Anchor size				**M6x25**	**M8x25**	**M10x25**	**M12x25**
Fire resistance class		**Load in any direction**					
Steel ≥ 4.6	R 30	Characteristic resistance $F^0_{Rk,fi}$	[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 ≥ 300 mm.					