

Declaration of Performance

1343-CPR-M 574-1/06.16

1. Unique identification code of the product-type: Mungo concrete screw MCS and MCSr size 5 and 6 for use in cracked and uncracked concrete

2. Manufacturer: Mungo Befestigungstechnik AG, Bornfeldstrasse 2, CH-4603 Olten/Switzerland

3. System/s of AVCP: System 2+

4. Intended use or use/es:

Product	Intended use
Concrete screw for use in concrete	Used only for multiple use for non structural application acc. to ETAG 001, Part 6 (Anchorsize 5, Anchorsize 6) and used for anchorages in prestressed hollow core slabs (Anchorsize 6)

5. European Assessment Document: ETAG 001 Part 6, August 2010, used as EAD

European Technical Assessment: ETA-16/0319 of 10 May 2016

Technical Assessment Body: DIBt – Deutsches Institut für Bautechnik

Notified body/ies: No. 1343 MPA Darmstadt

6. Declared performance:

Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads as well as bending moments in concrete	See appendix, especially Annex C1 and C2
Edge distance and spacing	See appendix, especially Annex C1

Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	See appendix, especially Annex C3

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Dipl.-Ing. Massimo Pirozzi
Head of Engineering



Olten, 2018-03-09



This DoP Has been prepared in different languages. In case there is a dispute on the interpretation the English version shall always prevail.

The Appendix includes voluntary and complementary information in English language exceeding the (language as neutrally specified) legal requirements.

product and installed condition

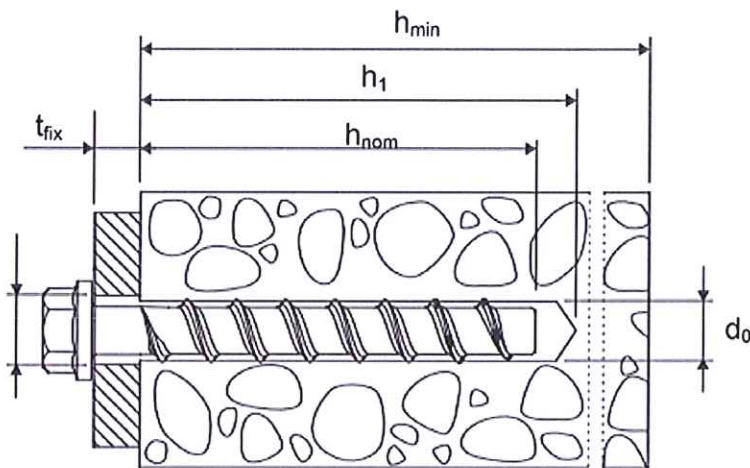
Mungo concrete screw MCS, MCSr and MCShr (5 and 6)



carbon steel MCS



**stainless steel A4 and HCR
MCSr and MCShr**



- d_0 = nominal drill bit diameter
- h_{nom} = nominal anchorage depth
- h_1 = depth of the drill hole
- h_{min} = minimum thickness of member
- t_{fix} = thickness of fixture

Mungo concrete screw MCS, MCSr and MCShr

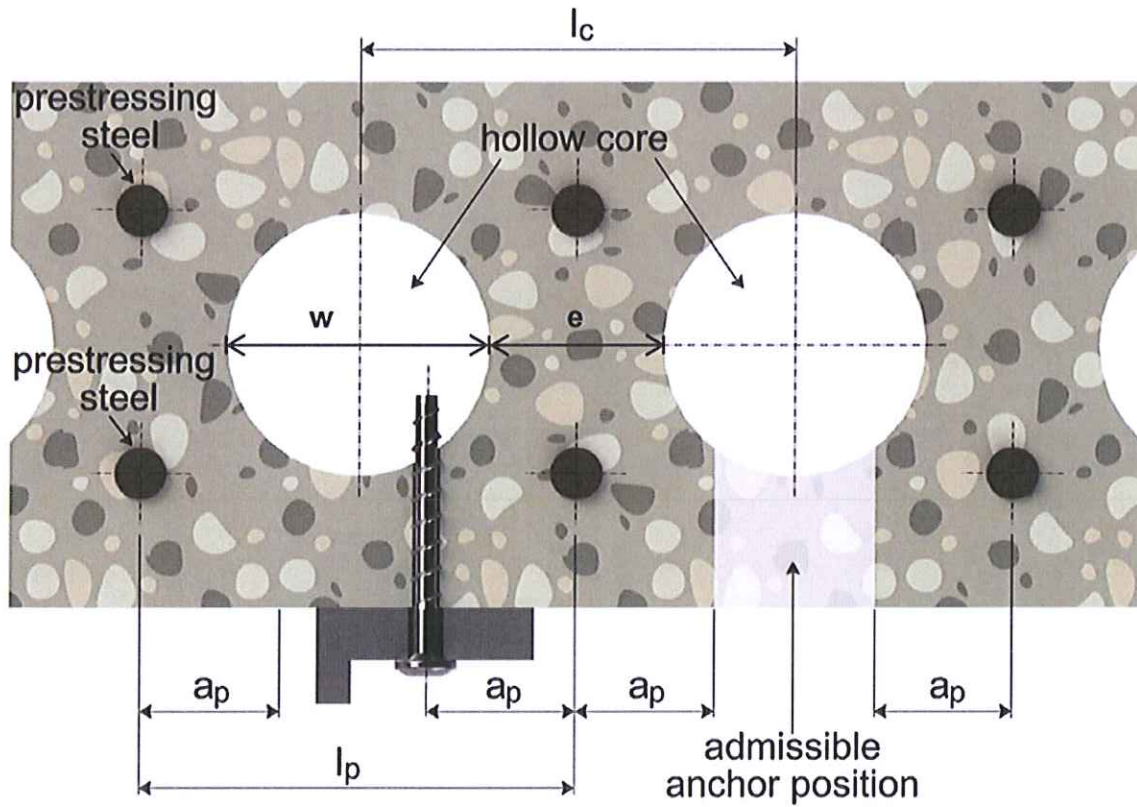
Product description

Installed condition

Annex A 1

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installed condition in precast prestressed hollow core slabs



$$w / e \leq 4,2$$

w core width
e web thickness

core distance	l_c	≥ 100 mm
prestressing steel	l_p	≥ 100 mm
distance between anchor position and prestressing steel	a_p	≥ 50 mm

Mungo concrete screw MCS, MCSr and MCSr

Product description

Installed condition

Annex A 2

Table A1: Materials and variants

part	name	Material		
1, 2, 3, 4,	Concrete screw	MCS	Steel EN 10263-4 galvanized acc. To EN ISO 4042 or zinc flake coating acc. To EN ISO 10683 ($\geq 5\mu\text{m}$)	
		MCSr	1.4401, 1.4404, 1.4571, 1.4578	
		MCSHr	1.4529	
5, 6, 7,				
8, 9, 10, 11		nominal characteristic steel yield strength	f_{yk}	[N/mm ²] 560
		nominal characteristic steel ultimate strength	f_{uk}	[N/mm ²] 700
		elongation at rupture	A_5	[%] ≤ 8



1) Anchor version with connection thread and hexagon socket
e.g. MCS-A 8x105 M10 SW5



2) Anchor version with connection thread and hexagon drive
e.g. MCS-A 8x105 M10 SW7



3) Anchor version with washer, hexagon head and TORX
e.g. MCS-S 8x80 SW13 VZ 40



4) Anchor version with washer and hexagon head
e.g. MCS-S 8x80 SW13



5) Anchor version with washer, hexagon head and OS
e.g. MCS-S 8x80 SW13 OS



6) Anchor version with countersunk head
e.g. MCS-SK 8x80 C VZ 40



7) Anchor version with pan head
e.g. MCS-P 8x80 P VZ 40



8) Anchor version with large pan head
e.g. MCS-PG 8x80 LP VZ 40



9) Anchor version with countersunk head and connection thread
e.g. MCS-ASK 6x55 AG M8



10) Anchor version with hexagon drive and connection thread
e.g. MCS-AS 6x55 M8 SW10



11) Anchor version with internal thread and hexagon drive
e.g. MCS-I 6x55 IM M8/10

Mungo concrete screw MCS, MCSr and MCSHr

Product descriptions
Materials and variants

Annex A 3

Table A2: Dimensions and markings

Anchorsize MCS, MCSr and MCShr			5	6
Length of the anchor	$L \leq$	[mm]	200	
Diameter of shaft	d_k	[mm]	4,0	5,1
Diameter of thread	d_s	[mm]	6,5	7,5



Marking:
MCS
Anchor type: TSM
Anchor size: 10
Length of the anchor: 100



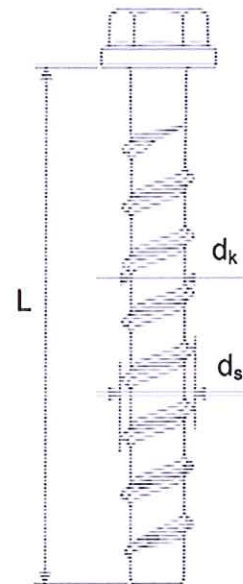
MCSr
Anchor type: TSM
Anchor size: 10
Length of the anchor: 100
Material: A4



MCShr
Anchor type: TSM
Anchor size: 10
Length of the anchor: 100
Material: HCR



Marking "k" or "x" for anchors with connection thread
and $h_{nom} = 35$ mm



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Mungo concrete screw MCS, MCSr and MCShr

Product descriptions
Dimensions and markings

Annex A 4

Intended use

Anchorage subject to:

- static and quasi static loads
- Used only for multiple use for non structural application acc. to ETAG 001, Part 6: Anchorsize 5, Anchorsize 6
- Used for anchorages in prestressed hollow core slabs: Anchorsize 6
- Used for anchorages with requirements related to resistance of fire (not for using in prestressed hollow core slabs): Anchorsize 6

Base materials:

- reinforced and unreinforced concrete according to EN 206-1:2000
- strength classes C20/25 to C50/60 according to EN 206-1:2000
- cracked and uncracked concrete

Use conditions (Environmental conditions):

- The anchor may only be used in dry internal conditions: All screw types
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition no particular aggressive conditions exists: screw types made of stainless steel with marking A4
- Structural subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition if particular aggressive conditions exists: screw types made of stainless steel with marking HCR
Note: Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used)

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.).
- Anchorages under static or quasi-static actions are designed for design method A in accordance with:
 - ETAG 001, Annex C, Edition August 2010
 - CEN/TS 1992-4:2009.
- Anchorages under fire exposure are designed in accordance with
 - EOTA Technical Report TR 020, Edition May 2004
 - CEN/TS 1992-4:2009, Annex D (it must be ensured that local spalling of the concrete cover does not occur).

Installation:

- Hammer drilling only.
- Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matters of the site.
- After installation further turning of the anchor is not possible. The head of the anchor is supported on the fixture and is not damaged.

Mungo concrete screw MCS, MCSr and MCShr

Intended use

Specifications

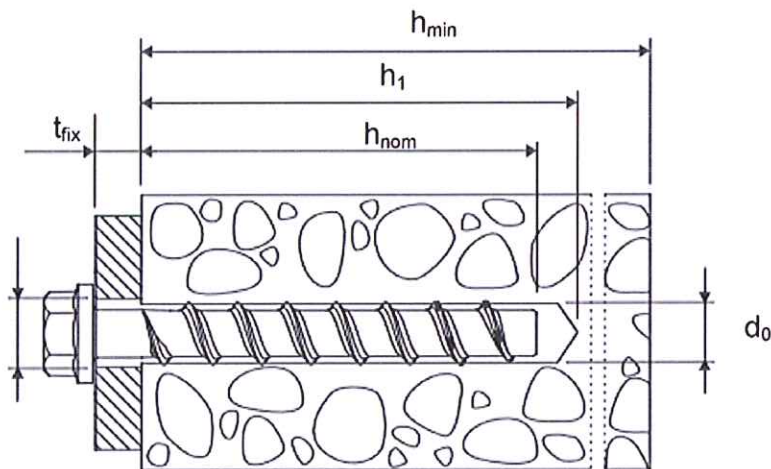
Annex B 1

Table B1: Installation parameters

Anchorsize MCS, MCSr and MCShr			5	6	
Nominal embedment depth			$h_{nom} = 35 \text{ mm}$	$h_{nom} = 35 \text{ mm}$	$h_{nom} = 55 \text{ mm}$
nominal drill bit diameter	d_0	[mm]	5	6	
cutting diameter of drill bit	$d_{cut} \leq$	[mm]	5,40	6,40	
depth of drill hole	$h_1 \geq$	[mm]	40	40	60
nominal embedment depth	$h_{nom} \geq$	[mm]	35	35	55
diameter of clearing hole in the fixture	$d_f \leq$	[mm]	7	8	
Installation torque	$T_{inst} \leq$	[Nm]	8	10	
Maximum nominal torque for installation with an impact screwdriver		[Nm]	120	150	

Table B2: Minimum thickness of member, minimum edge distance and minimum spacing

Anchorsize MCS, MCSr and MCShr			5	6	
Nominal embedment depth			$h_{nom} = 35 \text{ mm}$	$h_{nom} = 35 \text{ mm}$	$h_{nom} = 55 \text{ mm}$
minimum thickness of member	h_{min}	[mm]	80	80	100
minimum edge distance	c_{min}	[mm]	35	35	40
minimum spacing	s_{min}	[mm]	35	35	40



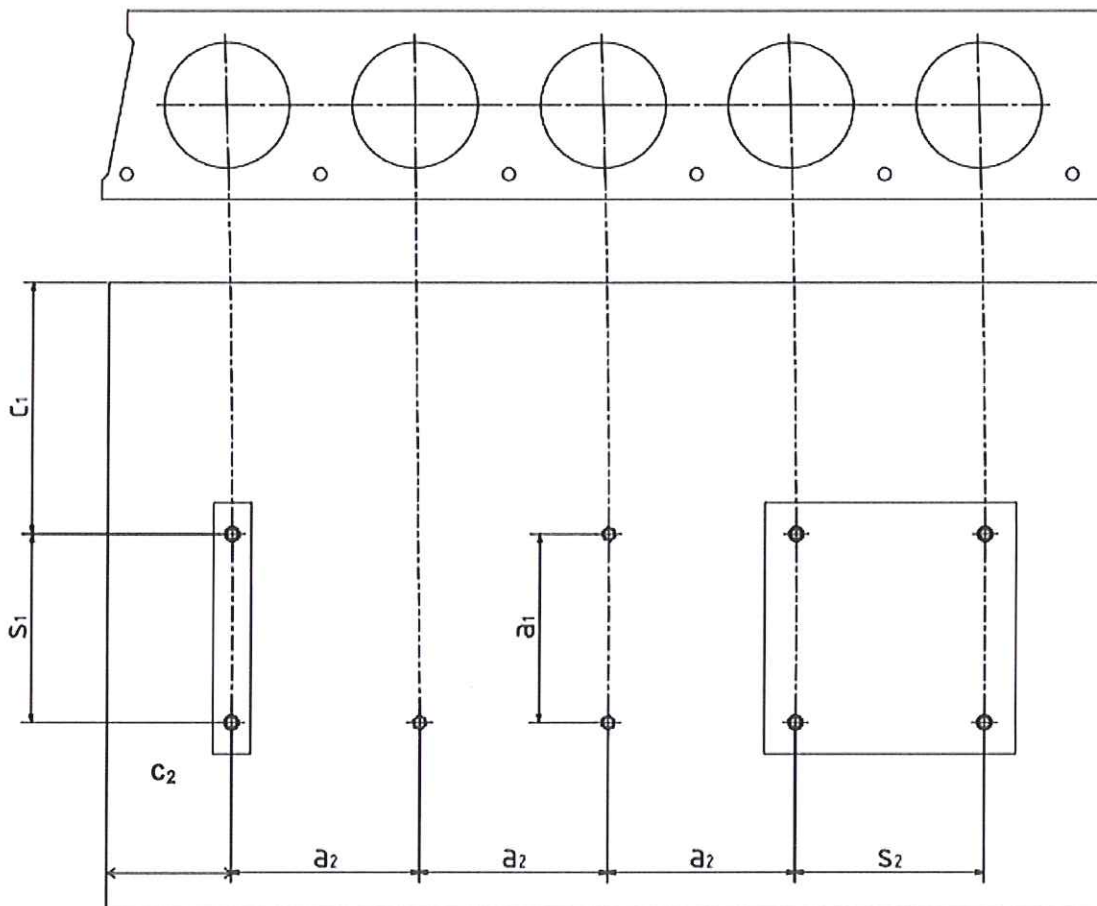
Mungo concrete screw MCS, MCSr and MCShr

Intended use

Installation parameters

Annex B 2

Installation parameters for anchorages in precast prestressed hollow core slabs



C_1, C_2 edge distance
 S_1, S_2 anchor spacing
 a_1, a_2 distance between anchor groups

Minimum edge distance	C_{min}	≥ 100 mm
Minimum anchor spacing	S_{min}	≥ 100 mm
Minimum distance between anchor groups	a_{min}	≥ 100 mm

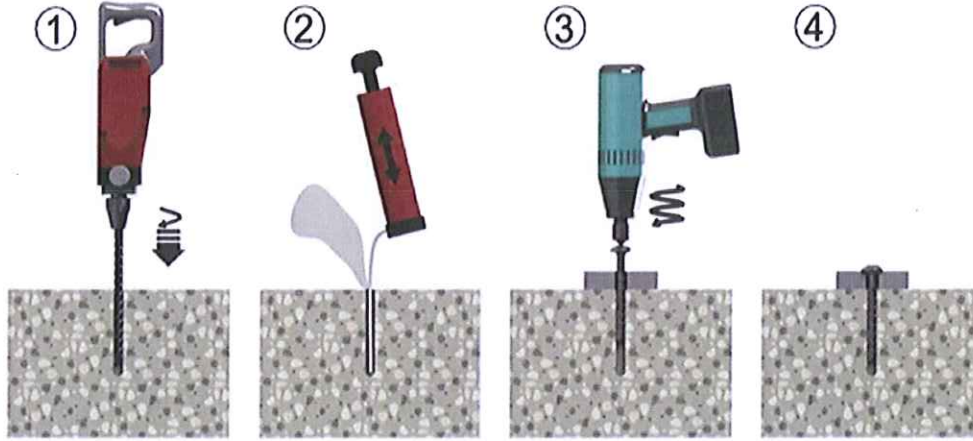
Mungo concrete screw MCS, MCSr and MCShr

Intended use

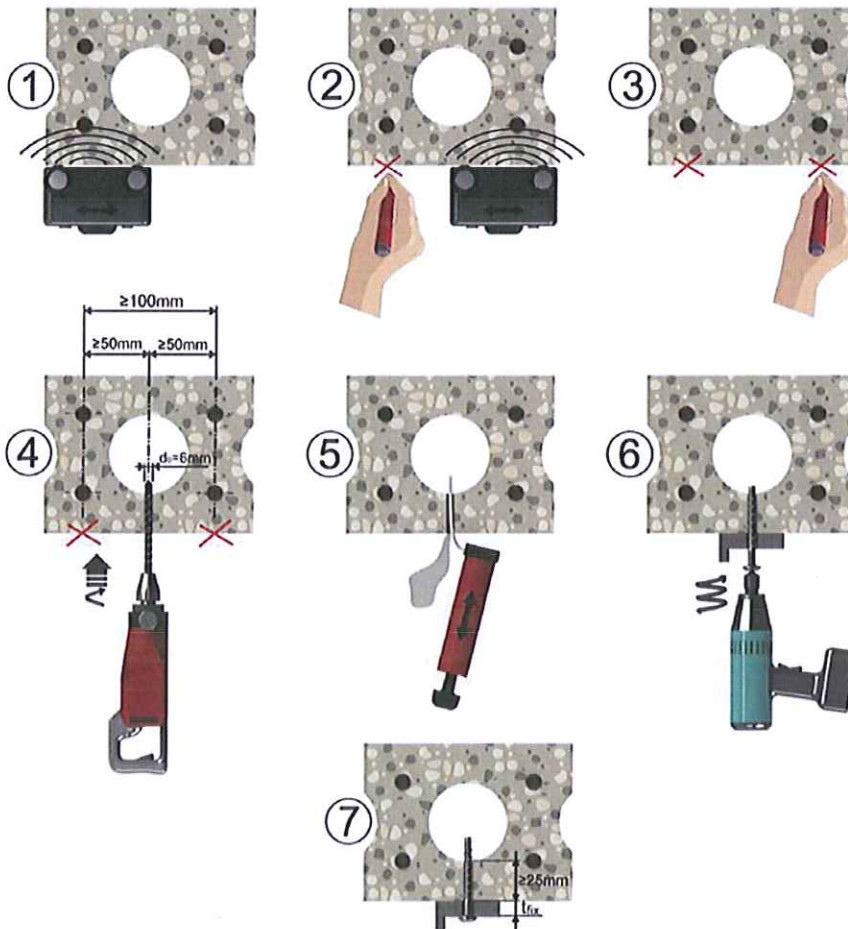
Installation parameters for anchorages in precast prestressed hollow slabs

Annex B 3

Installation instructions



Installation instructions for anchorages in prestressed hollow slabs



Mungo concrete screw MCS, MCSr and MCSr

Intended use

Installation instructions

Annex B 4

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**Table C1: Characteristic values for design method A according to ETAG 001, Annex C
or CEN/TS 1992-4**

Anchorsize MCS, MCSr and MCShr			5	6	
Nominal embedment depth			$h_{nom} = 35 \text{ mm}$	$h_{nom} = 35 \text{ mm}$	$h_{nom} = 55 \text{ mm}$
steel failure for tension- and shear load					
characteristic load	$N_{Rk,s}$	[kN]	8,7	14,0	
	$V_{Rk,s}$	[kN]	4,4	7,0	
	$k_2^{1)}$	[-]	0,8	0,8	
	$M^0_{Rk,s}$	[Nm]	5,3	10,9	
pull-out failure					
characteristic tension load in cracked and uncracked concrete C20/25	$N_{Rk,p}$	[kN]	1,5	1,5	7,5
increasing factor concrete for $N_{Rk,p}$	Ψ_C	C30/37	1,22		
		C40/50	1,41		
		C50/60	1,55		
concrete cone and splitting failure					
effective anchorage depth	h_{ef}	[mm]	27	27	44
factor for	cracked	$k_{cr}^{1)}$	[-]	7,2	
	uncracked	$k_{ucr}^{1)}$	[-]	10,1	
concrete cone failure	spacing	$s_{cr,N}$	[mm]	$3 \times h_{ef}$	
	edge distance	$c_{cr,N}$	[mm]	$1,5 \times h_{ef}$	
splitting failure	spacing	$s_{cr,Sp}$	[mm]	120	120
	edge distance	$c_{cr,Sp}$	[mm]	60	60
installation safety factor	$\gamma_2^{2)} = \gamma_{inst}^{1)}$	[-]	1,2	1,2	1,0
concrete pry out failure (pry-out)					
k-Factor	$k^{2)} = k_3^{1)}$	[-]	1,0		
concrete edge failure					
effective length of anchor	$l_f = h_{ef}$	[mm]	27	27	44
outside diameter of anchor	d_{nom}	[-]	5	6	

¹⁾ Parameter relevant only for design according to CEN/TS 1992-4:2009

²⁾ Parameter relevant only for design according to ETAG 001, Annex C

Mungo concrete screw MCS, MCSr and MCShr

Performances

Characteristic values for design method A

Annex C 1

**Table C2: Characteristic values of resistance in precast prestressed hollow core slabs
C30/37 to C50/60**

Anchorsize MCS, MCSr and MCShr			6		
bottom flange thickness	d_b	[mm]	≥ 25	≥ 30	≥ 35
characteristic resistance	F_{Rk}^0	[kN]	1	2	3
installation safety factor	$\gamma_2^1 = \gamma_{inst}^2$	[-]	1,2		

¹⁾ Parameter relevant only for design according to ETAG 001, Annex C

²⁾ Parameter relevant only for design according to CEN/TS 1992-4:2009

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Mungo concrete screw MCS, MCSr and MCShr

Performances

Characteristic values for anchorages in precast prestressed hollow core slabs

Annex C 2

Table C3: Characteristic values of resistance to fire exposure ¹⁾

Anchorsize MCS, MCSr and MCSHr				6				
				MCS		MCSr and MCSHr		
Nominal embedment depth				$h_{nom} = 35 \text{ mm}$	$h_{nom} = 55 \text{ mm}$	$h_{nom} = 35 \text{ mm}$	$h_{nom} = 55 \text{ mm}$	
Steel failure for tension- and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$)								
Fire resistance class	Characteristic resistance							
R30		$F_{Rk,s,fi30}$	[kN]		0,9		1,2	
R60		$F_{Rk,s,fi60}$	[kN]		0,8		1,2	
R90		$F_{Rk,s,fi90}$	[kN]		0,6		1,2	
R120		$F_{Rk,s,fi120}$	[kN]		0,4		0,8	
R30	Characteristic resistance	$M^0_{Rk,s,fi30}$	[Nm]		0,7		0,9	
R60		$M^0_{Rk,s,fi60}$	[Nm]		0,6		0,9	
R90		$M^0_{Rk,s,fi90}$	[Nm]		0,5		0,9	
R120		$M^0_{Rk,s,fi120}$	[Nm]		0,3		0,6	
Edge distance								
R30 bis R120		$c_{cr, fi}$	[mm]		2 x h_{ef}			
Spacing								
R30 bis R120		$s_{cr, fi}$	[mm]		4 x h_{ef}			

The characteristic resistance for pull-out failure, concrete cone failure, concrete pry-out failure and concrete edge failure shall be calculated according to TR 020 or CEN/TS 1992-4.

¹⁾ Not for using in prestressed hollow core slabs

Mungo concrete screw MCS, MCSr and MCSHr

Performances

Characteristic values under fire exposure

Annex C 3