



Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments



European Technical Assessment

ETA-20/0132 of 30 January 2024

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:

Trade name of the construction product

Product family to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment contains

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

Deutsches Institut für Bautechnik

MULTI-MONTI-plus

Screw anchor for use in masonry

HECO-Schrauben GmbH & Co. KG Dr.-Kurt-Steim-Straße 28 78713 Schramberg DEUTSCHLAND

HECO-Schraubern GmbH & Co. KG Werk Schramberg

32 pages including 3 annexes which form an integral part of this assessment

EAD 330460-00-0604, Edition 08/2022



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Specific Part

1 Technical description of the product

The Screw anchor MULTI-MONTI-plus is an anchor in size 6, 7.5, 10 and 12 mm made of galvanised. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchors of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to steel failure of a single screw anchor under tension loading	N _{Rk,s} see Annex C1
Characteristic resistance to steel failure of a single screw anchor under shear loading	V _{Rk,s} [kN], M ⁰ _{Rk,s} see Annex C1
Characteristic resistance to pull-out failure or brick breakout failure of a single screw anchor under tension loading	N _{Rk,p} , N _{Rk,b} , N _{Rk,p,c} , N _{Rk,b,c} see Annex B5, B6, C3, C6, C9, C12, C15, C18
	α _{j,N} see Annex C2, C5, C8, C11, C14
Characteristic resistance to local brick failure and brick edge failure of a single screw anchor under shear loading	$\begin{array}{c} V_{Rk,b,II},V_{Rk,b,\perp},V_{Rk,c,II},V_{Rk,c,\perp}\\ \text{see Annex B5, B6, C3, C6, C9, C12,}\\ \text{C15} \end{array}$
	see Annex C2, C5, C8, C11, C14, C17
Characteristic resistance to brick breakout failure of a screw anchor group under tension loading	N_{Rk}^g see Annex B5 and B6
	$\begin{array}{c} \alpha_{g,N} \\ \text{see Annex B5, B6, C2, C5, C8, C11,} \\ \text{C14, C17} \end{array}$



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Essential characteristic	Performance
Characteristic resistance to local brick failure and brick edge failure of a screw anchor group under	$V_{Rk,b,II}^g, V_{Rk,b,\perp}^g, V_{Rk,c,II}^g, V_{Rk,c,\perp}^g$ see Annex B5 and B6
shear loading	$\begin{array}{c} \alpha_{g,\text{VII}},\alpha_{g,\text{V}\perp} \\ \text{see Annex C2, C5, C8, C11, C14, C17} \end{array}$
Edge distances, joint distances, spacing, member thickness	c _{cr} , s _{crII} , s _{cr⊥} see Annex B5, C2, C5, C8, C11, C14, C17
	c _{min} , c _{jII} , c _{j\perp} , s _{minII} , s _{min\perp} see Annex B5, B6, C2, C5, C8, C11, C14, C17
	h _{min}
	see Annex C2, C5, C8, C11, C14, C17
Resistance to combined tension and shear loading (hollow and perforated bricks)	Limit value X for interaction no performance assessed (NPA)
Displacements	δ_{N0} , $\delta_{N\infty}$, δ_{V0} , $\delta_{V\infty}$ see Annex C3, C6, C9, C12, C15, C18

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A 1
Resistance to fire	$\begin{aligned} N_{Rk,s,fi} \;,\; N_{Rk,p,fi} \;,\; N_{Rk,b,fi} \;,\; V_{Rk,s,fi} \;,\; M^0{}_{Rk,s,fi} \;,\\ c_{min,fi} \;,\; c_{j,fi} \\ see\; Annex\; C4,\; C7,\; C10,\; C13 \end{aligned}$
	$N_{Rk,fi}^g$, $S_{min,fi}$, $C_{min,fi}$, $C_{j,fi}$ see Annex C4, C7, C10, C13

3.3 Aspects of durability

Essential characteristic	Performance
Durability	see Annex B1

Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document EAD 330460-00-0604 the applicable European legal act is: 97/177/EC.

The system to be applied is: 1



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5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 30 January 2024 by Deutsches Institut für Bautechnik

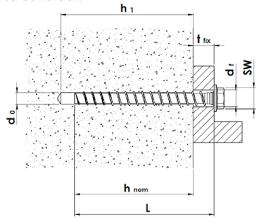
Dipl.-Ing. Beatrix Wittstock

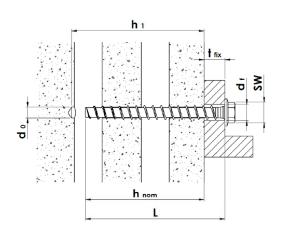
Head of Section

beglaubigt:
Aksünger



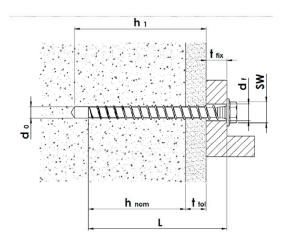
Installed condition





MMS-plus SS in solid brick masonry

MMS-plus SS in hollow brick masonry



MMS-plus SS with render bridge (solid brick masonry or hollow brick masonry)

 d_0 = nominal drill hole diameter h_{nom} = nominal embedment depth

 $egin{array}{lll} h_1 &=& \mbox{borehole depth} \\ t_{\mbox{fix}} &=& \mbox{thickness of fixture} \\ \end{array}$

d_f = diameter of clearance hole in the fixture

SW = size of drive

MULTI-MONTI-plus Product description Product in the installed state Annex A 1



Table		screw types
Type	Marking / Materia	1

	Screw anchor / steel 1)								
	Size MMS-plus			6		7.5	10	12	
All	nominal value of the characteristic yield strength	fyk	[N/mm²]	640		640	640 640 64		
types	nominal value of the characteristic tensile strength	f _{uk}	[N/mm²]	800		800	800	800	
	Elongation at rupture	A 5	[%]			≤	8		
	1) galvanized steel according EN 10.	263-4	4:2001 (mul	ti-layered	coa	ting systems a	are possible)		
		18	2 mc	1)			with and witho gn with cone	ut washer under the head)	(S
		H		2)	Не	xagon head a	and combined	washer (SS)	
			Sint 2	3)		xagon Head v SK)	with combined	d washer and co	ne
			2 NX H	4)	PanHead (P)				
			X O X X X X X X X X X X X X X X X X X X	5)	Fla	ange head-and	chor (MS)		
			ME A SET	6)	Co	untersunk (F))		
V.			ME LE SEL	7)		untersunk, ur ulti-start thread		ead and single- o	or
T)	HIIIIII AIII			8)	mι			read and single- orms ZT, ST, S	
				9)	He	xagon head a	anchor with m	etric stud (ST)	
				10)	Anchor with metric stud for mounting of nuts (pre-assembled with sleeve) (I)				
			0	11)	An	chor with met	ric stud (V)		
				12)	dif	ferent diame ncrete threa	eters compai	der head threa red to the ession possible)	

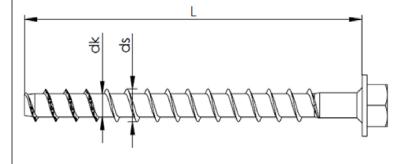
MULTI-MONTI-plus	
Product description Dimensions and screw types	Annex A 2



Table 2: Dimensions and head markings

Size MMS-plus			6	7.5	10	12
Thread diameter	ds	[mm]	6,65	7,75	10,5	12,6
Bolt diameter	dk	[mm]	4,3	5,45	7,3	9,05
Longth	L≥	[mm]	35	35	50	75
Length	L≤	[mm]	500	500	500	600

Head marking

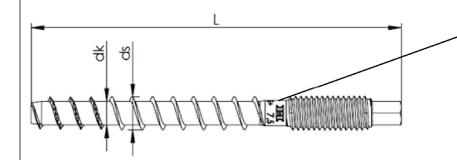




Head marking

Factory signs: H
Anchor type: MMS+
Anchor size: e.g. 7,5
Anchor length: e.g. 80

Bolt marking



Marking

Factory signs: H
Anchor type: MMS+
Anchor size: e.g. 7,5
Anchor length: e.g. 100



MULTI-MONTI-plus

Product descriptionDimensions and marking

Annex A3



Intended Use

Anchorages subject to:

Size MMS-plus			6		7,5		10		12	
Embedment depth	h _{nom}	[mm]	35	45	35	55	50 ¹⁾	65	75	90 ¹⁾
Head shapes		all		all		all		all		
Static and quasi static loads (all directions)		ok		ok		ok		ok		
Non-structural systems		ok		ok		ok		ok		
Fire exposure ²⁾		NPA ³⁾	ok	NPA ³⁾	ok	NPA ³⁾	ok	NPA ³⁾	ok	

¹⁾ Applies only to sand-lime brick XL (Annex 11, 12, 13)

Base Materials:

- Masonry units according to EN 771-1 to 3:2011+A1:2015.
- Solid masonry units see Annex C2-C7, C11-C18
- Hollow masonry units see Annex C8-C10
- In all cases horizontal joints must be filled completely with mortar according to EN 998-2:2016 with strength class at minimum M5.
- In case of fire, all joints must be filled completely with mortar according to EN 998-2:2016 with strength class at minimum M5
- Only dry masonry

Use conditions (Environmental conditions)

- Temperature range of masonry during the working life within the range -40 °C to +80 °C.
- Structures subject to dry internal conditions: All screws.

Design:

- The anchorages are to be designed in accordance with EOTA Technical Report TR 054: 2022-07, design method A under the responsibility of an engineer experienced in anchorages and masonry work.
- Screw sizes D6 and D 7,5 and nominal embedment depth smaller than 50 mm may only be used for anchoring of statically indeterminate systems.
- Verifiable calculation notes and drawings shall be prepared considering the relevant masonry in the area of anchorage, the loads to be transmitted and their transmission to the supports of the structure. The position of the ancho is indicated on the design drawings.
- The screw must be placed in the wall side of the masonry.
- The characteristic resistance of the assessed solid bricks is also valid for larger brick sizes and higher mean compressive strength and higher dry density of the masonry unit.
- For joints widths w_j > 2 mm, installation in the joint and close to the joint is not possible. Horizontal and vertical joints must be filled with mortar. The characteristic resistances are given in Annexes C3, C6, C9, C12, C15 and C18. The distances to joints c_j must comply with the Annexes C2, C5, C8, C11, C14 and C17.
- For KS XL with joints widths $w_j \le 2$ mm; installation in the joint and close to the joint is possible if the joint factors α_j according to Annex C11 and C14 are considered. Horizontal joints must be filled with mortar, vertical joints can, but do not have to be filled with mortar.

MULTI-MONTI-plus	
Intended Use Specification	Annex B1

²⁾ not allowed for Screwhead I, V, TC

³⁾ no performance assessed

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Installation:

- Hole drilling by hammer drilling or rotary drilling, with standard hammer drill bits or hollow drill bits (in accordance with Annex C). The masonry must be not damaged during hammer drilling. If cracks occur during drilling, the rotary mode must be used. In this case the hole must be aborted.
- In case of aborted hole: The hole shall be filled with high strength mortar.
- Bridging of non-bearing layer with the thickness t_{tol} (e.g.: plaster) is possible but has to be considered for choosing the length of the screw. The thickness t_{tol} of the non-bearing layer must be added to the screw-length L. Therefore, applies L ≥ h_{nom} + t_{tol} + t_{fix} (see Annex B2).
- Cleaning of the hole is not necessary if the driller is vented 3 times when reaching the correct drillhole depth (According B3), or when using a hollow drill with functional suction.
- Screw installation carried out by appropriately qualified personnel under the supervision of the person responsible for technical matters on side.

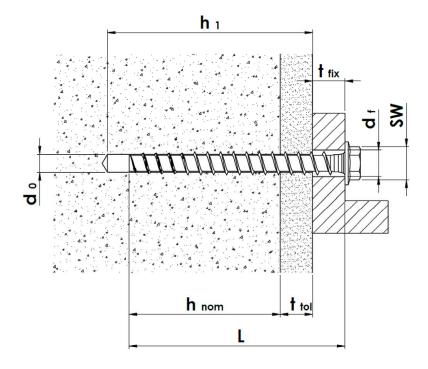
MULTI-MONTI-plus	
Intended Use Specification	Annex B2



Table 3: Installation parameters MULTI-MONTI-plus in masonry

Size MMS-plus	6		7,5		10		12			
Embedment depth in anchor base			h _{nom}		h _{nom}		h _{nom}		h _{nom}	
[mm]				45	35	55	50 ¹⁾	65	75	90 ¹⁾
Norminal drill hole diameter	d ₀	į	5		6		3	10		
Cutting diameter of drill bits	d _{cut} ≤	[mm]	5,40			6,40		45	10,45	
Drillhole depth with cleaning	h₁≥	[mm]	40	40 50		65	60	75	85	100
Drillhole depth without cleaning	h₁≥	[mm]	≥ L - h _{nom} - t _{tol} ²⁾ + 10 mm							
Clearance hole diameter	d _f ≤	[mm]	≤	7	≤	9	≤ '	12	≤ '	14
Wrench size	SW	[mm]	1	0	1	10 13		3	15	
Thickness of fixture	t _{fix} ≤	[mm]	\leq L - h_{nom} - $t_{tol}^{2)}$							
Maximum installation torque moment	max T _{inst}	[Nm]	See stone parameters							

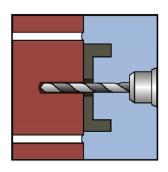
- Applies only to sand-lime brick XL (Annex C11, C12, C13, C14, C15, C16) Only for installation with render bridge

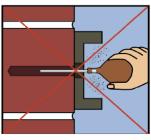


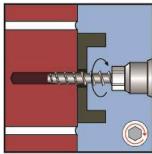
MULTI-MONTI-plus	
Intended Use Installation parameter in masonry	Annex B3

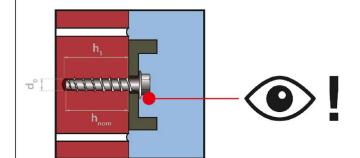


Installation instruction









Step 1: Drill hole creation:

Solid bricks:

Drill the borehole by using a hammer drill or a hollow drill. When using a standard hammer drill, after reaching the required drill hole depth, insert the drill bit at least 3 times to the bottom of the drill hole while the machine is running and pull it out of the hole again. ("ventilate" the drill hole).

Drill hole diameter d_0 and drill hole depth h_1 according to Table 3 Annex B3.

Drilling method (hammer drilling / rotary drilling) according to specifications in Annex C

Borehole cleaning may be omitted if the borehole is drilled correspondingly deeper, or a hollow drill-bit is used - see Table 3 Annex B3.

Step 2: Installation:

Assembly of anchors by hand – refer to mounting parameters.

During installation the max. installation torque may not be exceeded – refer to mounting parameters.

Overtightening of the anchor should be avoided. The anchor should not be able to be turned further easily after insertion is performed.

Anchors which have been overtightened may not be used for fixation of attachments.

Step 3: Check for correct installation:

The head of the anchor has full contact with the attachment and is not damaged, or the required embedment depth h_{nom} in the substructure is reached (embedment depth control by measuring the anchor protrusion)

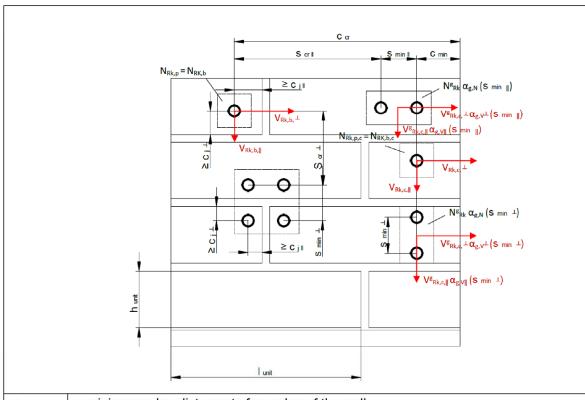
When applying anchors with connecting thread for fastening of attachments, the anchor must not rotate further whilst processing the connection (e.g. tightening of nuts).

MULTI-MONTI-plus	
Intended Use Installation parameter in masonry	Annex B4



Installation Positions for joint width > 2 mm

For joints width > 2 mm, the distances c_j must be observed.



C _{min}	= minimum edge distance to free edge of the wall
C J II	= distance to vertical joints without influence on resistance of the screw anchor
CJ⊥	= distance to horizontal joints without influence on resistance of the screw anchor
Smin II	= minimum spacing parallel to the horizontal joint
S _{min} ⊥	= minimum spacing perpendicular to the horizontal joint
Ccr	= edge distance for ensuring the transmission of the charact. resistance of a single screw anchor
Scr II	= characteristic spacing parallel to the horizontal joint
Scr⊥	= characteristic spacing perpendicular to the horizontal joint
l _{unit}	= length of the masonry unit
h _{unit}	= height of the masonry unit
$\alpha_{g,N}$	= group factor under tension load $(\alpha_{g,N} = \alpha_{g,N} (s_{min I}) = \alpha_{g,N} (s_{min \perp}))$
α _{g,∨ II}	= group factor under shear load parallel to the edge $(\alpha_{g,V I} = \alpha_{g,V I} (s_{min I}) = \alpha_{g,V I} (s_{min} \perp))$
α _{g,∨} ⊥	= group factor under shear load perpendicular to the edge $(\alpha_{g,V} \perp = \alpha_{g,V} \perp (s_{min \mid I}) = \alpha_{g,V} \perp (s_{min} \perp))$

 $N_{Rk} = N_{Rk,b} = N_{Rk,b,c} = N_{Rk,p,c}$

 $V_{Rk,b,II} = V_{Rk,b,} \, \bot$

 $V_{Rk,c} = V_{Rk,c,\perp} = V_{Rk,c,\parallel}$

For $s \ge s_{cr}$: $\alpha_{g,N} = \alpha_{g,V,II} = \alpha_{g,V} \perp = 2$

For $s_{min} \le s < s_{cr}$: $\alpha_{g,N}$; $\alpha_{g,V} \parallel$; $\alpha_{g,V} \perp$ according to installation parameter of brick in Annex C

 $\begin{array}{ll} N^g_{Rk} &= \alpha_{g,N} \bullet N_{Rk} & \text{(Group of 2 anchors)} \\ V^g_{Rk,\; II} &= \alpha_{g,V\; II} \bullet V_{Rk}\; II\; ;\; V^g_{Rk,\; \bot} = \alpha_{g,V} \bot \bullet V_{Rk} \bot & \text{(Group of 2 anchors)} \\ N^g_{Rk} &= \alpha_{g,N}^2 \bullet N_{Rk} & \text{(Group of 4 anchors)} \end{array}$

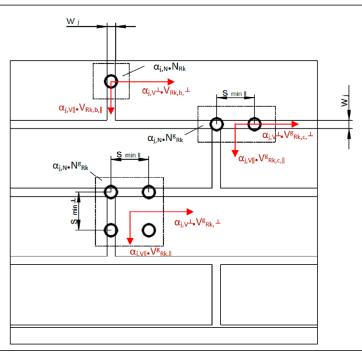
 $V^{g}_{Rk,\;II} = \alpha_{g,V\;II}^{2} \bullet V_{Rk}\;II\;;\;V^{g}_{Rk,\;\bot} = \alpha_{g,V}\,\bot^{2} \bullet V_{Rk} \bot \qquad \qquad \text{(Group of 4 anchors)}$

MULTI-MONTI-plus	
Intended use Installation position in masonry	Annex B5



Installation Positions for joint width ≤ 2 mm

The joint factors on α_j in accordance with Annex C and the group factors of Annex B6 must be taken into account.



wj = maximum permissible joint width for application below c_{j II}, c_{j ⊥}, the joint in which the screw is screwed in applies. In the case of cross joints, the less favorable applies
 c_{j II} = distance to vertical joints without influence on resistance of the screw anchor

= distance to horizontal joints without influence on resistance of the screw anchor

= reduction factor under tension load for screw anchors influenced by joints

= reduction factor under shear load parallel to the vertical joint for screw anchors influenced by joints

= reduction factor under shear load perpendicular to the vertical joint for screw anchors influenced by joints

 $N_{Rk} = N_{Rk,b} = N_{Rk,b,c} = N_{Rk,p,c}$

 $V_{Rk,b,II} = V_{Rk,b,} \, \bot$

 $\mathbf{C}_{j} \perp$

 $\alpha_{j,N}$

 $\alpha_{j,V}$ II

 $\alpha_{i,V} \bot$

 $V_{Rk,c} = V_{Rk,c,\perp} = V_{Rk,c,II}$

For setting position with joint spacing $c < c_{j,II}$, $c_{j} \perp$ and $w_{j} < 2$ and $w_{j} > 2-10$ mm:

$$\begin{split} N^{j}_{Rk} &= \alpha_{j,N} \bullet N_{Rk} & \text{(single anchor)} \\ V^{j}_{Rk,\; ||} &= \alpha_{j,V \;||} \bullet V_{Rk\;||}\;;\; V^{j}_{Rk,\; \perp} = \alpha_{j,V} \perp \bullet V_{Rk} \perp & \text{(single anchor)} \end{split}$$

 $N^{jg}_{Rk} = \alpha_{j,N} \cdot N^{g}_{Rk}$ (Group of 2 anchors)

 $V^{jg}{}_{Rk,\; ||} = \alpha_{j,V\;||} \bullet V^{g}{}_{Rk\;||}\;;\; V^{j}{}^{g}{}_{Rk,\; \perp} = \alpha_{j,V\; \perp} \bullet V^{g}{}_{Rk}{}^{\perp} \qquad \qquad \text{(Group of 2 anchors)}$

MULTI-MONTI-plus	
Intended use Installation position in masonry	Annex B6



Table C1: Characteristic resistance to steel failure of MMS-plus

Size MMS-plus			6	6	7	,5	1	0	1	2
			hn	om	hn	om	hn	om	hr	iom
Embedment depth in anchor	base	[mm]	35	45	35	55	50 ¹⁾	65	75	90 ¹⁾
Characteristic resistance to steel failure under tension- and shear loading										
Characteristic resistance	N _{Rk,s}	[kN]	10,8 17,6 32,1 49				9,9			
Partial factor	γMs,N	-				1,	50			
Characteristic resistance	V _{Rk,s}	[kN]	4,1 6,1 13,7 24,				1,1			
Partial factor	γMs,V	-	- 1,25							
Characteristic bending resistance	M ⁰ Rk,s	[Nm]	6	,7	14	,1	34	,5	66	6,8

¹⁾ Applies only to sand-lime brick XL (Annex C11, C12, C13, C14, C15, C16)

MULTI-MONTI-plus

Performance
Characteristic resistance parameters of the screw anchor
Spacing and edge distance of the screw anchor

group and joint factors



-			ira: S	solid brid	ck Mz,	≥ N	F, Ę	N 771-1: 2	2015-	11		
			al din	nensions				length L	wic	Ith B	heigth H	
		[mm]					240	1	15	71		
				density (≥	1,8		
		Mean compressive strength / Min. compressive strength single brick ¹⁾ [N/mm²]					le	35/28				
	essive strength of a			st not be I	ess thar	า 80	% of	the mean	compr	essive	strength	
Table C2.1:	Installation pa	rameters										
Size					6	5		7,5		1	10	12
General Installation	•	h		[mama]	25		· E	25	E E	-) E	75
Nominal embedme	•	h _{nom}		[mm]	35		15		55		6	75
Maximum installati Setting tool	on torque	max T _{inst}	:	[Nm]			and	3 assembly			<u> </u>	10
Edge distance an	d spacing					11	iaiiu	assembly				
Min. edge distance		Cmin							80			
Min. spacing		S _{min II} = S	min⊥						80			
		Ccr		[mm]	80	8	30	80 8	2,5	9	97,5	
Characteristic space	Scr II							240		112		
·		Scr⊥							80			
Drilling mode												
Hammer drilling or	, , , , , , , , , , , , , , , , , , , 		d har	mmer dri	ll bit or	holl	low (drill bit				
Table C2.2:	Group factors											
Size					- 6	<u> </u>		7,5			10	12
Group factor		$\alpha_{g,N}$ $\alpha_{g,VII} = \alpha_g$	g,V [⊥]	-					1,0 1,36			
Table C2.3:	Reduction fac	tors depe	ndin	g on the	e distar	nce	to j	oints and	l the j	oint w	vidth_	
Size			6	7,5	1	0		12	3	7,5	10	12
	W j	[mm]			> 2-10)					≤ 2	
Max. joint width	vVj	[mm]			≥ 35			≥ 35				
·	w _j C _j ⊥	[mm] ≥ c _{cr}					≥ C _{cr}					
Max. joint width Distance to joints	С _ј ⊥ С _{ј II}	[IIIIII]										
·	Cj⊥	[-]		1 (fu	≥ c _{cr}	tand	ce)			1 (ful	≥ c _{cr} Il resistance	∍)
Distance to joints Joint factor	C _j ⊥ C _j α _{j,N}	[-]		1 (fu	≥ c _{cr} ull resist	tand	ce)			1 (ful	≥ c _{cr} Il resistance < 35	e)
Distance to joints	$\begin{array}{c} C_{j} \perp \\ C_{j} \parallel \\ \alpha_{j,N} \\ \alpha_{j,V\parallel} = \alpha_{j,V\perp} \end{array}$			1 (fu	≥ c _{cr}	tand	ce)			1 (ful	≥ c _{cr} Il resistance	∍)



Solid brick Mz, ≥	NF, EN 771-1	:2015	-11							
Table C3.1:				to pull-ou	t failure	e or bri	ck brea	kout fa	ilure of a sing	le anchor
	under tens	ion loa	ading		1	_		_		
Size						3	7		10	12
Characteristic ter		nce de	epending	on the m	ean coi	mpress	ive stre	ength o	f the brick	
Mean compressive	•									
Min. compressive strength of						$N_{Rk} =$	$N_{Rk,p} =$	$N_{Rk,b} =$	$N_{Rk,p,c} = N_{Rk,b,c}$	[kN]
single brick ¹⁾ [N/m				ı						
Nominal embedment depth			h _{nom}	[mm]	35	45	35	55	65	75
	5/28				1,7	2,4	1,50	2,1	4,6	4,1
1) The compressive str	ength of the sing	le brick ı	must not be	less than 80	% of the r	mean com	pressive	strength.		
Table C3.2:	Characteris	stic res	sistance t	to local b	rick fail	ure or	brick e	dge fail	ure of a	
	single anch	nor un	der sheai	r loading						
Size	•				(3	7	,5	10	12
Characteristic sh	ear resistand	e dep	ending o	n the mea	ın com	pressiv	e stren	gth of t	he brick	
Mean compressive	e strength /									
Min. compressive	strength of						$V_{Rk,b} =$	V _{Rk,b,⊥} =	V _{Rk,b, II} [kN]	
single brick1) [N/m	m²]									
Nominal embedme	ent depth		h _{nom}	[mm]	35	45	35	55	65	75
≥ 3:	5/28				3,5	3,0	3,8	3,7	7,1	10,2
							V _{Rk,c} =	V _{Rk,c,} ⊥ =	V _{Rk,c, II} [k N]	
					3,0	3,0	2,0	2,5	3,5	1,5
1) The compressive str	ength of the sing	le brick ı	must not be l	less than 80	% of the r	nean com	pressive	strength.		
·										
Table C3.3:	Displaceme	ents u	nder tens	sion and	shear lo	oads				
Size	•				(7	,5	10	12
Nominal embedme	ent depth		h _{nom}	[mm]	35	45	35	55	65	75
Tension load			F _N	[kN]	0,49	0,69	0,43	0,60	1,31	1,17
Displacement und	er tension		δ _{N0}		0,03	0,03	0,07	0,03	0,09	0,05
load			δ _{N∞}	[mm]	0,06	0,06	0,14	0,06	0,18	0,10
Shear load			ı = F _V ⊥	[kN]	1,0	0,86	1,09	1,06	2,03	2,91
Displacement und	er shear		δ_{V0}		1,16	1,12	1,12	1,09	1,12	1,57
load			δ√∞	[mm]	1,74	1,68	1,68	1,64	1,68	2,36
		<u> </u>	• • •	I	1 -,	.,	.,	-,	.,	_,

MULTI-MONTI-plus	
Performance Solid brick Mz ≥ NF, characteristic resistance under tension and shear loading, displacements	Annex C3



Solid brick Mz, ≥ NF, EN 771- Table C4.1: Characteri		ce of a singl	e screw ancho	or under fire ex	xposure	
 Size			6	7,5	10	12
Nominal embedment depth	h _{nom}	[mm]	45	55	65	75
Characteristic resistance to s			loading and	shear loading	under fire exp	osure
		R30	0,47	0,81	1,74	5,53
		R60	0,39	0,66	1,37	4,12
$N_{Rk,s,fi} = V_{Rk,s,fi}$	[kN]	R90	0,30	0,52	0,99	2,71
		R120	0,26	0,45	0,81	2,00
Characteristic bending mome	ent under fire	exposure				
		R30	0,29	0,67	1,91	7,51
B 40		R60	0,24	0,55	1,50	5,59
M^0 Rk,s,fi	[Nm]	R90	0,18	0,42	1,09	3,67
		R120	0,16	0,37	0,89	2,72
Characteristic resistance to p	ull-out failui	re and local l	orick failure un	der fire expos	ure	
Mean compressive strength /						
Min. compressive strength of single brick ¹⁾ [N/mm ²]	[N/mm²]	-		35/	28	
		R30	0,15	0,2	0,25	0,25
N. N.	FI N 13	R60	0,15	0,2	0,25	0,25
$N_{Rk,p,fi} = N_{Rk,b,fi}$	[kN]	R90	0,15	0,2	0,25	0,25
		R120	0,1	0,15	0,2	0,2
Min. edge distance		C _{min,fi}		2 x l	nom	•
Characteristic edge distance		C _{cr,fi}		2 x l	nom	
and spacing	[mm]	S _{cr,fi}		2 x	C _{cr,fi}	
Distance to injust		C _{j ,} ⊥,fi		≥ 3	35	
Distance to joints		Cj II,fi		≥ 1	20	
1) The compressive strength of the sing	le brick must no	t be less than 80	% of the mean com	pressive strength.		

1) The compressive strength	of the single brick must not be	e less than 80% of the mean	compressive strength

MULTI-MONTI-plus	
Performance	Annex C4
Solid brick Mz ≥ NF, characteristic resistance under fire exposure	



Solid brick KS, ≥	NF. EN 771-2:20	015-11										
8/			rd: S	olid bri	ck KS,	≥ NF, E	N 771-2	2: 2015-11				
						- w count 17 in a	servett. 2004 EU EU					
			1.30					length L	width B	heigth H		
x	Nomina	ıl dime	ensions				h_{\min}					
		[mm]						240	115	71		
1		Mean g	ross	density (o [kg/dr	n³]			≥ 2,0			
		Mean c	ompre	essive s	trength	/						
		Min. co	mpres	ssive str	ength s	ingle br	rick ¹⁾		25/20			
		[N/mm²]]									
1) The compre	essive strength of a	a single bric	k mus	t not be l	ess thar	1 80% of	the mea	an compres	sive strength			
Table C5.1:	Installation pa	rameters										
Size						S	7,	5	10	12		
General Installati		1.										
Nominal embedme	<u> </u>	h _{nom}		[mm]	35	45	35	55	65	75		
Maximum installat	ion torque	max T _{inst}		[Nm]	2,0	2,0	2,0	2,0	10	10		
Setting tool						hand	assem	bly				
Edge distance an				ı				_				
Min. edge distance	e to free edge	Cmin		,	80							
Min. spacing		S _{min II} = S _{min} ⊥						80				
01	•	Ccr		[mm]	80	80	80	82,5	97,5	112,5		
Characteristic spa	cing	Scr II						240				
-		S _{cr} ⊥						80				
Drilling mode					11 1 14		1 201 1 24					
Hammer drilling or	rotary drilling wi	th standard	d ham	nmer dri	II bit or	hollow (drill bit					
Table C5.2:	Craum factors											
	Group factors					. 1		_	40	40		
Size					6 7,							
Group factor		α _{g,N}			1,0 1,06							
Table C5.3:	Poduction for	$\alpha_{g,VII} = \alpha_g$		a on the	distance to injuste a			and the joint width				
	Reduction lac	lors depe	naing	J ON THE	distar	nce to j	<u>omis a</u>		7,5 10	10		
Size			0	7,5			12	0		12		
Max. joint width	W _j	[mm]			> 2-10	,		≤ 2				
Distance to joints	C _j ⊥	[mm]			≥ 35			≥ 35				
	C _j II			≥ C _{cr}				≥ C _{cr}				
					[-] 1 (full resistance)				1 (full resistance)			
Joint factor	$\alpha_{j,N}$	[-]		1 (fu	ıll resist	tance)		1	(full resista	nce)		
Joint factor	$\alpha_{j,N}$ $\alpha_{j,VII} = \alpha_{j,V} \perp$	[-]		1 (fu		tance)		1		ince)		
Joint factor Distance to joints	$\begin{array}{c} \alpha_{j,N} \\ \\ \alpha_{j,VII} = \alpha_{j,V} \bot \\ \\ C_{j} \bot \end{array}$	[-] [mm]		1 (fu	< 35	tance)		1	< 35	ince)		
Distance to joints	$\begin{aligned} &\alpha_{j,N}\\ &\alpha_{j,VII} = \alpha_{j,V}\bot\\ &c_{j}\bot\\ &c_{j}\amalg\end{aligned}$			`	< 35 < c _{cr}	,			< 35	,		
	$\begin{aligned} &\alpha_{j,N}\\ &\alpha_{j,V I}=\alpha_{j,V}\bot\\ &c_{j}\bot\\ &c_{j}\amalg\\ &\alpha_{j,N} \end{aligned}$		0	1 (fu	< 35 < c _{cr}	,	sed)		< 35	,		
Distance to joints	$\begin{aligned} &\alpha_{j,N}\\ &\alpha_{j,VII} = \alpha_{j,V}\bot\\ &c_{j}\bot\\ &c_{j}\amalg\end{aligned}$	[mm] -	0	`	< 35 < c _{cr}	,	sed)		< 35	,		
Distance to joints	$\begin{aligned} &\alpha_{j,N}\\ &\alpha_{j,V I}=\alpha_{j,V}\bot\\ &c_{j}\bot\\ &c_{j}\amalg\\ &\alpha_{j,N} \end{aligned}$	[mm] -	0	`	< 35 < c _{cr}	,	sed)		< 35	,		
Distance to joints	$\begin{aligned} &\alpha_{j,N}\\ &\alpha_{j,V I}=\alpha_{j,V}\bot\\ &c_{j}\bot\\ &c_{j}\amalg\\ &\alpha_{j,N} \end{aligned}$	[mm] -	0	`	< 35 < c _{cr}	,	ed)		< 35	,		
Distance to joints	$\begin{aligned} &\alpha_{j,N}\\ &\alpha_{j,V I}=\alpha_{j,V}\bot\\ &c_{j}\bot\\ &c_{j}\amalg\\ &\alpha_{j,N} \end{aligned}$	[mm] -	0	`	< 35 < c _{cr}	,	sed)		< 35	,		
Distance to joints	$\begin{aligned} &\alpha_{j,N}\\ &\alpha_{j,V I}=\alpha_{j,V}\bot\\ &c_{j}\bot\\ &c_{j}\amalg\\ &\alpha_{j,N} \end{aligned}$	[mm] -	0	`	< 35 < c _{cr}	,	sed)		< 35	,		
Distance to joints Joint factor	$\begin{array}{c} \alpha_{j,N} \\ \alpha_{j,V I} = \alpha_{j,V}\bot \\ c_{j}\bot \\ c_{j I} \\ \alpha_{j,N} \\ \alpha_{j,V I} = \alpha_{j,V}\bot \end{array}$	[mm] -	0	`	< 35 < c _{cr}	,	eed)		< 35	,		
Distance to joints	$\begin{array}{c} \alpha_{j,N} \\ \alpha_{j,V I} = \alpha_{j,V}\bot \\ c_{j}\bot \\ c_{j I} \\ \alpha_{j,N} \\ \alpha_{j,V I} = \alpha_{j,V}\bot \end{array}$	[mm] -	0	`	< 35 < c _{cr}	,	sed)		< 35	,		
Distance to joints Joint factor MULTI-MONTI-plu	$\begin{array}{c} \alpha_{j,N} \\ \alpha_{j,V I} = \alpha_{j,V}\bot \\ c_{j}\bot \\ c_{j I} \\ \alpha_{j,N} \\ \alpha_{j,V I} = \alpha_{j,V}\bot \end{array}$	[mm] -	0	`	< 35 < c _{cr}	,	sed)		< 35	be used)		
Distance to joints Joint factor	$\begin{array}{c} \alpha_{j,N} \\ \alpha_{j,V I} = \alpha_{j,V}\bot \\ c_{j}\bot \\ c_{j} \amalg \\ \alpha_{j,N} \\ \alpha_{j,V I} = \alpha_{j,V}\bot \end{array}$	[mm] -		(screw	< 35 < c _{cr} must no	ot be us	ed)		< 35 < c _{cr} ew must not	be used)		



Table C6.1:	Characteristic resistance to pull-out failure or brick breakout failure of a single anchunder tension loading								le ancho	
Size	diaci torio	ion loading		Τ ,	 6	7	.5	10	12	
Characteristic ter	nsion resista	nce dependina	on the m				, -			
Mean compressive			- C.I. G.I.C III		р.гоос		gu c	. die biiek		
Min. compressive	•				N _{Rk} =	= Nekn =	= Npkh =	$N_{Rk,p,c} = N_{Rk,b,c}$	[kN]	
single brick ¹⁾ [N/mi	•				TTIK	ι τικ,ρ	TTIK,D	14/λ,ρ,υ	[1414]	
Nominal embedme		h _{nom}	[mm]	35	45	35	55	65	75	
≥ 25	•	1.110111	[[]	2,4	2,6	1,6	3,4	3,7	3,2	
1) The compressive str		le brick must not be	less than 80					٠,٠		
				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	<u>g</u>			
Table C6.2:	Characteri	stic resistance	to local b	rick fail	ure or	brick e	dge fail	ure of a		
		nor under shea					0			
Size					6	7	,5	10	12	
Characteristic sh	ear resistan	ce depending o	n the mea	an com	pressiv	e stren	gth of t	he brick		
Mean compressive										
Min. compressive	compressive strength of				$V_{Rk,b} = V_{Rk,b,\perp} = V_{Rk,b,\parallel} [kN]$					
single brick ¹⁾ [N/mm²]										
Nominal embedment depth		h _{nom}	[mm]	35	45	35	55	65	75	
				3,0	4,9	4,7	4,7	10,6	11,7	
≥ 25	5/20					$V_{Rk,c}$	= V _{Rk,c,} ⊥	= V _{Rk,c, II} [kN]		
				1,5	1,5	1,5	2,0	1,2	1,2	
1) The compressive str	ength of the sing	le brick must not be	less than 80	% of the r	nean com	npressive	strength.			
Table C6.3:	Displacem	ents under ten:	sion and	shear l	oads					
Size					6		,5	10	12	
Nominal embedme	ent depth	h _{nom}	[mm]	35	45	35	55	65	75	
Tension load		F _N	[kN]	0,69	0,74	0,46	1,23	1,29	1,29	
Displacement under	er tension	δνο	[mm]]	0,05	0,04	0,04	0,21	0,11	0,06	
load		δ _{N∞}	-	0,10	0,08	0,08	0,42	0,22	0,12	
Shear load		F _{V II} = F _V ⊥	[kN]	0,86	1,40	1,34	1,34	3,03	3,34	
Displacement under shear		δ _{√0}	[mm]	1,20	1,10	1,29	0,82	0,93	1,41	
•	•		[]	1,80	1,65	1,94	1,23	1,39	2,12	

MULTI-MONTI-plus	
Performance	Annex C6
Solid brick KS ≥ NF, characteristic resistance under tension and shear loading,	
displacements	



Table C7.1: Characteri	stic resistan	ce of a singl	e screw ancho	or under fire e	xposure	
Size			6	7,5	10	12
Nominal embedment depth	h _{nom}	[mm]	45	55	65	75
Characteristic resistance to s	steel failure ι	ınder tensio	n loading and	shear loading	under fire exp	osure
$N_{Rk,s,fi} = V_{Rk,s,fi}$	[kN]	R30	0,47	0,81	1,74	5,53
		R60	0,39	0,66	1,37	4,12
		R90	0,30	0,52	0,99	2,71
		R120	0,26	0,45	0,81	2,00
Characteristic bending mome	ent under fire	exposure				
M^0 Rk,s,fi	[Nm]	R30	0,29	0,67	1,91	7,51
		R60	0,24	0,55	1,50	5,59
		R90	0,18	0,42	1,09	3,67
		R120	0,16	0,37	0,89	2,72
Characteristic resistance to p	oull-out failui	re and local	brick failure ur	der fire expos	ure	
Mean compressive strength /						
Min. compressive strength of single brick ¹⁾ [N/mm ²]	[N/mm²]	-		25/	/20	
		R30	0,15	0,2	0,15	0,15
NI — NI	FI-NIT	R60	0,15	0,2	0,15	0,15
$N_{Rk,p,fi} = N_{Rk,b,fi}$	[kN]	R90	0,15	0,2	0,15	0,15
		R120	0,1	0,15	0,1	0,1
Min. edge distance		C _{min,fi}		2 x	n _{nom}	
Characteristic edge distance		C _{cr,fi}		2 x	n _{nom}	
and spacing	[mm]	S _{r,fi}		2 x	C _{cr,fi}	
Distance to joints		Cj ,⊥,fi		≥ ;	35	
Distance to joints		Cj II,fi		≥ 1	20	
1) The compressive strength of the sing	gle brick must no	t be less than 80	% of the mean com	pressive strength.		

1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength	rick must not be less than 80% of the mean compressi	ve strenath.
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MULTI-MONTI-plus	
Performance	Annex C7
Solid brick KS ≥ NF, characteristic resistance under fire exposure	
· ·	



Hollow brick KS L, ≥ 3DF, EN 771-2:2015-11 Standard: Hollow brick KS L, ≥ 3DF, EN 771-2: 2015-11 width B length L heigth H Nominal dimensions h_{min} [mm] 240 175 113 Mean gross density ρ [kg/dm³] 1,4 28,5 Mean compressive strength/ Min. compressive strength single brick¹⁾ 15/12 [N/mm²] The compressive strength of a single brick must not be less than 80% of the mean compressive strength Table C8.1: Installation parameters Size 6 7.5 10 12 **General Installation parameters** Nominal embedment depth h_{nom} [mm] 35 45 35 55 65 75 Maximum installation torque max Tinst [Nm] 1,0 1,0 2,0 2,0 5,0 5,0 Setting tool hand assembly Edge distance and spacing Min. edge distance to free edge Cmin 58 Min. spacing $s_{min II} = s_{min} \perp$ 80 67,5 58 82,5 97,5 112 58 [mm] Characteristic spacing 240 Scr II 113 S_{cr} ⊥ **Drilling mode** Hammer drilling or rotary drilling with standard hammer drill bit or hollow drill bit Table C8.2: Group factors Size 6 7.5 10 12 0.84 $\alpha_{g,N}$ Group factor 1,69 $\alpha_{g,VII} = \alpha_{g,V} \perp$ Table C8.3: Reduction factors depending on the distance to joints and the joint width Size 6 7.5 10 12 6 7,5 10 12 > 2-10 ≤ 2 Max. joint width **W**j [mm] ≥ 57 ≥ 57 $C_j \perp$ Distance to joints [mm] ≥ c_{cr} ≥ c_{cr} Cill $\alpha_{j,N}$ Joint factor 1 (full resistance) 1 (full resistance) [-] $\alpha_{j,VII} = \alpha_{j,V} \perp$ < 57 < 57 $C_j \perp$ Distance to joints [mm] < ccr < **C**cr Cj II $\alpha_{j,N}$ 0 (screw must not be used) Joint factor [-] 0 (screw must not be used) $\alpha_{j,VII} = \alpha_{j,V} \perp$ **MULTI-MONTI-plus** Annex C8 **Performance** Hollow brick KS L \geq 3DF, dimensions, installation parameters, distances, group and joint factors



Hollow brick KS L Table C9.1:			بم البيعيمة	t failur	- an hui	alı bras	denut fo	iluna of a sina	la anaba
Table C9.1:	Characteristic resistance to pull-out failure or brick breakout failure of a single under tension loading						ie anchoi		
Size	ariaci terisioi	riodding		Τ (3	7	,5	10	12
Characteristic ter	nsion resistand	e depending	on the m				,		· -
Mean compressive					•		J		
Min. compressive	•				N _{Rk} =	= N _{Rkp} =	= N _{Rkb} =	$N_{Rk,p,c} = N_{Rk,b,c}$	[kN]
single brick1) [N/mr	m²]					, ,	,	,.,.	
Nominal embedme	ent depth	h _{nom}	[mm]	35	45	35	55	65	75
≥ 15	<u> </u>			1	,3	1	,5	2,2	2,2
1) The compressive stre	ength of the single I	brick must not be	less than 80	% of the r	nean con	npressive	strength.		·
Table C9.2:	Characteristi	c resistance	to local b	rick fail	ure or	brick e	dge fail	ure of a	
	single ancho	r under shea	r loading						
Size				(3	7	,5	10	12
Characteristic sh	ear resistance	depending o	n the mea	an com	pressiv	e stren	gth of t	he brick	
Mean compressive strength /									
Min. compressive s			$V_{Rk,b} = V_{Rk,b,\perp} = V_{Rk,b,\parallel}[kN]$						
single brick1) [N/mr		_							
Nominal embedme	h _{nom}	[mm]	35	45	35	55	65	75	
≥ 15/12				2,7	2,7	3,7	3,7	8,0	8,0
						V _{Rk,c}	= V _{Rk,c,} ⊥	= V _{Rk,c, II} [kN]	
				2,5	2,5	2,0	2,0	2,0	2,0
1) The compressive stre	ength of the single I	brick must not be	less than 80	% of the r	nean com	npressive	strength.		
Table C9.3:	Displacemen	its under tens	sion and	shear lo	oads				
Size					3		,5	10	12
Nominal embedme	ent depth	h _{nom}	[mm]	35	45	35	55	65	75
Tension load		F _N	[kN]	0,37	0,37	0,49	0,49	0,66	0,66
Displacement unde	er tension	δνο	[mm]]	0,04	0,02	0,07	0,07	0,08	0,07
pad		δ _{N∞}		0,08	0,07	0,14	0,14	0,16	0,14
	I .	$F_{V I} = F_{V \perp}$	[kN]	0,77	0,77	1,06	1,06	2,29	2,29
Shear load						1 4 6 7	0.04		0.70
	er shear	δ _{V0}	[mm]	1,17 1,76	1,11 1,67	1,07 1,61	0,81 1,22	0,74 1,11	0,73 1,10

MULTI-MONTI-plus	
Performance	Annex C9
Hollow brick KS L ≥ 3DF, characteristic resistance under tension and shear loading, displacements	

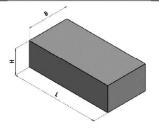


Hollow brick KS L, ≥ 3DF, EN	771-2:2015-	11				
Table C10.1: Characteris	stic resistan	ce of a singl	e screw ancho	or under fire e	xposure	
Size			6	7,5	10	12
Nominal embedment depth	h _{nom}	[mm]	45	55	65	75
Characteristic resistance to s	teel failure ι	inder tensior	loading and	shear loading	under fire exp	osure
		R30	0,47	0,81	1,74	5,53
NI - V	FL-N 13	R60	0,39	0,66	1,37	4,12
$N_{Rk,s,fi} = V_{Rk,s,fi}$	[kN]	R90	0,30	0,52	0,99	2,71
		R120	0,26	0,45	0,81	2,00
Characteristic bending mome	nt under fire	exposure				
	[Nm]	R30	0,29	0,67	1,91	7,51
B # O		R60	0,24	0,55	1,50	5,59
$M^0_{Rk,s,fi}$		R90	0,18	0,42	1,09	3,67
		R120	0,16	0,37	0,89	2,72
Characteristic resistance to p	ull-out failui	e and local b	orick failure un	der fire expos	ure	
Mean compressive strength /						
Min. compressive strength of single brick ¹⁾ [N/mm²]	[N/mm²]			≥ 15	5/12	
Ţ.		R30	0,15	0,15	0,25	0,25
	<u></u>	R60	0,15	0,15	0,25	0,25
$N_{Rk,p,fi} = N_{Rk,b,fi}$	[kN]	R90	0,15	0,15	0,25	0,25
		R120	0,1	0,1	0,2	0,2
Min. edge distance		C _{min,fi}		2 x l	h _{nom}	•
Characteristic edge distance		C _{cr,fi}		2 x l	h _{nom}	
and spacing	[mm]	S _{r,fi}		2 x	C _{cr,fi}	
Distance to ininte		C _j ,⊥,fi		≥ (57	
Distance to joints		Cj II,fi		≥ 1	20	
1) The compressive strength of the sing	le brick must no	t be less than 80°	% of the mean com	pressive strength.		<u> </u>

MULTI-MONTI-plus	
Performance	Annex C10
Hollow brick KS L ≥ 3DF, characteristic resistance under fire exposure	



Solid brick KS XL, EN 771-2:2015-11



Standard: Solid brick KS XL, EN 771-2: 2015-11								
Nominal dimensions	length L	width B	heigth H					
	h _{min}							
[mm]	248	175	498					
Mean gross density ρ [kg/dm³]	2,0							
Mean compressive strength/								
Min. compressive strength single brick ¹⁾	25/20							
[N/mm²]								

1) The compressive strength of a single brick must not be less than 80% of the mean compressive strength

 Table C11.1:
 Installation parameters for diameter 6,10 and 12 mm

Size				6	10		12		
General Installation parameters									
Nominal embedment depth	h _{nom}	[mm]	35	45	50	65	75	90	
Maximum installation torque	max T _{inst}	[Nm]	4,0		10		10		
Setting tool		hand assembly							
Edge distance and spacing									

Edge distance and spacing										
Characteristic angeing	Ccr		1,5 x h _{nom}							
Characteristic spacing	Scr II = Scr 1		3 x h _{nom}							
Min. edge distance to free edge	Cmin	[mm]	30	40	50					
Min. spacing	S _{min II} = S _{min} ⊥		3 x h _{nom}	3 x h _{nom}	3 x h _{nom}					

Drilling mode

Hammer drilling or rotary drilling with standard hammer drill bit or hollow drill bit

Table C11.3:	Reduction factors depending on the distance to joints and the joint width									
Size			6 10 12			6	10	12		
Max. joint width	Wj	[mm]		> 2-10			≤ 2			
Distance to	C _j ⊥	[mana]	≥ C _{cr}			≥ C _{cr}				
joints	Cj II	[mm]	≥ C _{cr}			≥ C _{cr}				
Joint factor	$\alpha_{j,N}$	[-]	1 (full resistance)			1 (full resistance)				
JOINT IACTOR	$\alpha_{j,VII} = \alpha_{j,V} \perp$		' '	(Iuli resistari		i (idii resistance)				
Distance to	C _j ⊥	[mm]		< C cr		< c cr				
joints	Сј ІІ	[mm]		< C _{cr}			< C _{cr}			
Joint factor	α _{j,N}	[-] 0 (not permitted) 0,5								
Joint factor	Joint factor $\alpha_{j, V } = \alpha_{j, V }$		0	0 (not permitted)			0,75			

MULTI-MONTI-plus	
Performance	Annex C11
Solid brick KS XL, dimensions, installation parameters, distances,	
group and joint factors	

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English translation prepared by DIBt



Table C12.1:	Characteris	stic res	sistance '	to pull-ou	t failure	or brick br	eakout fa	ailure of a	single ar	nchor
	under tens	ion loa	iding	·					J	
Size	•					6	1	0	1	2
Characteristic te	nsion resista	nce de	pending	on the m	ean com	pressive s	trength o	f the bric	k	
Mean compressive	e strength /									
Min. compressive	strength of					$N_{Rk} = N_{Rk}$	$_{p} = N_{Rk,b} =$	$N_{Rk,p,c} = 1$	N _{Rk,b,c} [kN]	
single brick1) [N/m	m²]									
Nominal embedm	ent depth		h _{nom}	[mm]	35	45	50	65	75	90
≥ 2	5/20				3,0	4,6	6,9	9,5	11,9	11,9
¹⁾ The compressive st	rength of the sing	le brick n	nust not be	less than 80°	% of the me	an compress	ive strength.			
Table C12.2:	Characteris	stic res	sistance	to local b	rick failu	re or brick	edge fai	lure of a		
	single anch	nor und	der shea	r loading						
Size						6	1	0	12	
Characteristic sh	ear resistand	ce dep	ending o	n the mea	ın compr	essive str	ength of t	he brick		
Mean compressive	e strength /									
Min. compressive strength of					$V_{Rk,b} = V_{Rk,b,\perp} = V_{Rk,b,\parallel} [kN]$					
single brick1) [N/m	m²]									
Nominal embedme	<u> </u>		h _{nom}	[mm]	35	45	50	65	75	90
≥ 2	5/20				4,6	5,2	12	10,3	12	12
							$_{k,c} = V_{Rk,c,\perp}$	$=V_{Rk,c, II}$ [k	(N]	
Min. edge distanc	e to free edge		C _{min}	[mm]	_	30	40		50	
					2,0	2,0	3,0	3,5	5,5	5,5
1) The compressive str	rength of the sing	le brick n	nust not be	less than 80°	% of the me	an compress	ive strength.			
Table C12.3:	Displacem	ents ur	nder tens	sion and s	shear loa	ads				
					1		Γ .			
Size					-	6		0		2
	embedment depth		h _{nom}	[mm]	35	45	50	65	75	90
Tension load			F _N	[kN]	0,86	1,31	1,97	3,09	3,74	3,74
Displacement und	er tension		δ _{N0}	[mm]	0,21	0,23	0,16	0,34	0,33	0,29
load			5 _{N∞}		0,42	0,46	0,32	0,68	0,66	0,58
Shear load			_= F _V ⊥	[kN]	1,31	1,49	3,43	2,94	6,0	6,0
Displacement und	er snear		δ _{∨0} 5 _{∨∞}	[mm]	1,08 1,62	1,19 1,79	0,91 1,37	0,88 1,32	1,85 2,78	1,48 2,22
load			7 . /		1 67	1 70	1 27	1 1 27	7 7 8	」 ソフク

MULTI-MONTI-plus	
Performance	Annex C12
Solid brick KS XL, characteristic resistance under tension and shear loading,	
displacements	



Table C13.1: Characteri	stic resistan	ce of a singl	e screw anchor ur	nder fire exposure				
Size			6	10	12			
Nominal embedment depth	h _{nom}	[mm]						
Characteristic resistance to s	steel failure u	ınder tensio	n loading and shea	r loading under fir	e exposure			
$N_{Rk,s,fi} = V_{Rk,s,fi}$	[kN]	R30	0,47	1,74	5,53			
		R60	0,39	1,37	4,12			
		R90	0,30	0,99	2,71			
		R120	0,26	0,81	2,00			
Characteristic bending mome	ent under fire	exposure						
M^0 _{Rk,s,fi}	[Nm]	R30	0,29	1,91	7,51			
		R60	0,24	1,50	5,59			
		R90	0,18	1,09	3,67			
		R120	0,16	0,89	2,72			
Characteristic resistance to p	oull-out failur	e and local	brick failure under	fire exposure				
Mean compressive strength /								
Min. compressive strength of single brick ¹⁾ [N/mm ²]	[N/mm²]	-		25/20				
		R30		0,15				
NI - NI	FI-A 17	R60		0,15				
$N_{Rk,b,fi} = N_{Rk,p,fi}$	[kN]	R90		0,15				
		R120	0,1					
Min. edge distance		C _{min,fi}		2 x h _{nom}				
Characteristic edge distance		C _{cr,fi}	2 x h _{nom}					
and spacing	[mm]	S _{r,fi}		2 x C _{cr,fi}				
Distance to joints		Cj ,⊥,fi		≥ 35				
Distance to joints		Cj II,fi	≥ 120					
1) The compressive strength of the sing	gle brick must not	t be less than 80	% of the mean compress	sive strength.				

1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength	rick must not be less than 80% of the mean compressi	ve strenath.
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MULTI-MONTI-plus	
Performance	Annex C13
Solid brick KS XL, characteristic resistance under fire exposure	

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English translation prepared by DIBt



Table C14.1:	Installation pa	rameters	for	diamete	r 7,5 mm							
Size						7,5						
General Installat	ion parameters											
Nominal embedm	ent depth	h _{nom} = h _e	ef	[mm]		35			55			
Maximum installa	tion torque	max T _{ins}	t	[Nm]			4	,0				
Setting tool						hand ass	embly					
Edge distance a	nd spacing											
Characteria	tio opooina	Ccr					1,5 x	(h _{nom}				
Characteris	tic spacing	Scr II = Sci	r 土	[mm]			3 x	h _{nom}				
Min. edge distanc	e to free edge	Cmin			30	40	50	30	40	50		
Drilling mode												
Hammer drilling of	or rotary drilling wi	th standar	rd ha	mmer dr	ill bit or ho	llow drill b	oit					
Table C11.2:	Group factors											
Size					7,5							
Nominal embedm	ent depth	h _{nom}	h _{nom}			35		55				
Min. spacing		S _{min II} = S _{min} ⊥		[mm]		35		35				
Min. edge distanc	e to free edge	Cmin		[mm]	30	40	50	30	40	50		
Group factor		$\alpha_{g,N}$			NPA 1)	1,08	1,16	NPA 1)	1,06	1,0		
Group ractor		$\alpha_{g,VII} = \alpha$	g,V [⊥]		NPA 1)	0,54	0,58	NPA 1)	0,55	0,63		
Table C11.3:	Reduction fac	tors depe	endir	ng on th	ne distance to joints and the joint width							
Size					7,5				7,5			
Max. joint width	W j	[mm]			> 2-10			≤ 2				
Distance to	Cj⊥	[mm]			≥ c _{cr}			2	≥ C _{cr}			
joints	Сј ІІ	[111111]			< ccr			<	< C _{cr}			
Joint factor	$\alpha_{j,N}$	[]			ull recistan	ice)		4 (full registeres)				
John Iactor	$\alpha_{j,VII} = \alpha_{j,V}\bot$	[-]	[-] 1 (f			ull resistance)			1 (full resistance)			
Distance to	Cj⊥	[mm]			< C _{cr}			•	< C _{cr}			
joints	Cj II	[111111]			< ccr			<	< C _{cr}			
Joint factor	$\alpha_{j,N}$	[-]		0 (*	not permitte	ed)			0,5			
JUINI IACIUI	$\alpha_{j,\vee II} = \alpha_{j,\vee \perp}$	[-]		ı) o	or bennitt			(),75			

¹⁾ No performance assessed

MULTI-MONTI-plus	
Performance	Annex C14
Solid brick KS XL, dimensions, installation parameters, distances, group and joint factors	



Table C15.1:	Characteri	stic res	sistance	to pull-ou	t failure	or brick b	reakout fa	ailure of a	single a	nchor	
	under tens	ion loa	ading for	diameter	7,5 mm						
Size x embedmen	t depth			[mm]		7,5 x 35	5		7,5 x 55		
Characteristic ter	nsion resista	nce de	epending	on the m	ean com	npressive	strength o	of the bric	k		
Mean compressive	e strength /										
Min. compressive	strength of					$N_{Rk} = N_F$	$R_{k,p} = N_{Rk,b} =$	$= N_{Rk,p,c} = N_{Rk,p,c}$	N _{Rk,b,c} [kN]]	
single brick1) [N/m	m²]										
Min. edge distance	e to free edge		Cmin	[mm]	30	40	50	30	40	50	
≥ 2	5/20					3,8		5,6	7	,5	
1) The compressive str	ength of the sing	le brick i	must not be	less than 80 ^e	% of the m	ean compres	sive strength.				
Table C15.2:	Characteri						_	lure of a			
	single anc	nor un	der shea		for diam						
Size x embedmen	<u> </u>			[mm]		$7,5 \times 35$			7,5 x 55		
Characteristic sh		ce dep	ending o	n the mea	n comp	ressive st	rength of	the brick			
•	Mean compressive strength /										
Min. compressive strength of					$V_{Rk,b} = V_{Rk,b,\perp} = V_{Rk,b,\parallel} [kN]$						
single brick ¹⁾ [N/m											
	ge distance to free edge			[mm]	52,5			82,5			
≥ 2	5/20					4,90 6,10					
					$V_{Rk,c} = V_{Rk,c,\perp} = V_{Rk,c,\parallel} [kN]$						
Min. edge distance		!	C _{min}	[mm]	30	40	50	30	40	50	
	5/20				1,50	4,50	4,50	2,00	5,50	NPA 2	
1) The compressive	-	single b	rick must r	not be less t	than 80%	of the mea	n compressi	ve strength			
2) No performance a	assessed										
Table C15.3:	Displacem	ents u	nder tens	sion and	shear lo	ads for di	ameter 7,	5 mm			
Size					7	,5					
Nominal embedme	ent depth		h _{nom}	[mm]	35	55					
Tension load	•		F _N	[kN]	1,09	2,14					
Displacement und			δνο	[mama]	0,27	0,28					
load		δ _{N∞}	[mm]	0,54	0,56						
Shear load		Fvi	ı = F∨⊥	[kN]	1,40	1,74					
Displacement und	er shear		δ∨0	[mm]	0,82	0,87					
load			δ√∞	[mm]	1,23	1,31					

MULTI-MONTI-plus	
Performance	Annex C15
Solid brick KS XL, characteristic resistance under tension and shear loading,	
displacements	



Table C16.1: Characteri	stic resistan	ce of a singl	e screw anchor under fire exposure for diameter 7,5			
Size			7,5			
Nominal embedment depth h _{nom} [mm]			55			
Characteristic resistance to s	steel failure u	nder tensio	n loading and shear loading under fire exposure			
$N_{Rk,s,fi} = V_{Rk,s,fi}$	[kN]	R30	0,81			
		R60	0,66			
		R90	0,52			
		R120	0,45			
Characteristic bending mome	ent under fire	exposure				
$M^0_{Rk,s,fi}$	[Nm]	R30	0,67			
		R60	0,55			
		R90	0,42			
		R120	0,37			
Characteristic resistance to p	oull-out failur	e and local	brick failure under fire exposure			
Mean compressive strength /						
Min. compressive strength of	[N/mm²]	_	25/20			
single brick ¹⁾ [N/mm²]						
		R30	0,2			
Name - Name	[kN]	R60	0,2			
$N_{Rk,b,fi} = N_{Rk,p,fi}$		R90	0,2			
		R120	0,15			
Min. edge distance		C _{min,fi}	2 x h _{nom}			
Characteristic edge distance		C _{cr,fi}	2 x h _{nom}			
and spacing	[mm]	S _{r,fi}	2 x c _{cr,fi}			
Distance to joints		Cj ,⊥,fi	≥ 35			
Distance to joints		Cj II,fi	≥ 120			
1) The compressive strength of the sing	ale brick must not	be less than 80	% of the mean compressive strength			

MULTI-MONTI-plus	
Performance	Annex C16
Solid brick KS XL, characteristic resistance under fire exposure	



./	≥ 2DF, EN 771-		ard: 9	Solid bri	ck VF	3L, ≥ 2DF, EN 77	71-3: 2015-1	11		
		Produc		JOHA DIT	CK VI	3L, 2 2DI , LIV 77	1-3. 2013-			
_	Nomina	Nominal dimensions					width B	heigth H		
		[mm]					h _{min} 240	115	113	
		Mean	Mean gross density ρ [kg/dm³]					≥ 0,8		
	Mean compressive strength/									
						n single brick ¹⁾	2,5/2			
1) The compre	essive strength of		-	st not be	less th	nan 80% of the me	an compress	ive strength		
Table C17.1:	Installation pa									
Size				10		12				
General Installati	on parameters									
Nominal embedme	ent depth	h _{nom}		[mm]		65		7	5	
Maximum installat	on torque	•		[Nm]		2,0		2,0		
Setting tool			hand assembly							
Edge distance an	d spacing									
Min. edge distance	Min. edge distance to free edge		Cmin		80					
Min. spacing		S _{min II} = S _{min} ⊥		[[[]	No performance assessed					
Characteristic angeing		Ccr		[mm]	1,5 x h _{nom}					
Characteristic spacing $s_{cr l} = s$		Scr II = Sc	r⊥	-			3,0 x h _{nom}			
Drilling mode										
Hammer drilling or	rotary drilling w	ith standar	d ha	mmer dri	II bit o	or hollow drill bit				
Table C17.2:	Group factors	3								
Size						10			2	
Group factor		α _{g,N} No performance assessed								
•		$\alpha_{g,VII} = \alpha_{g,V^{\perp}}$ No performance assessed								
Table C17.3:	Reduction fac	ctors depe	endir	ig on the	e dist	tance to joints a	ind the join	t width		
Size				10		12	10		12	
Max. joint width	W j	[mm]			> 2		≤ 2			
Distance to joints	Cj⊥	[mm]		≥ 57 ≥ c cr			≥ 57			
	Cj II	[]					≥ C _{cr}			
Joint factor	$\alpha_{j,N}$ $\alpha_{j,V I} = \alpha_{j,V} \perp$	[-]		1 (full resistance)			1 (full resistance)			
Distance to ininte	Cj⊥	[mm]		< 57			< 57			
Distance to joints	Cj II	[mm]		< Ccr			< C _{cr}			
Joint factor	$\alpha_{j,N}$ $\alpha_{j,VII} = \alpha_{j,V} \perp$	[-]	0 (screw must not be used)			0 (screw must not be used)				

MULTI-MONTI-plus	
Performance Solid brick VBL ≥ 2DF, dimensions, installation parameters, distances, group and joint factors	Annex C17



Table C18.1:	Characteristic re	esistance	to pull-ou	t failure or bri	ck breakout f	ailure of a single ancho	
	under tension lo	ading	•			·	
Size				1	10	12	
Nominal embedm	h _{nom}	[mm]	65		75		
Characteristic te	nsion resistance o	lepending	on the m	ean compress	sive strength	of the brick	
Mean compressive	e strength /						
Min. compressive	strength of			N _{Rk} =	$N_{Rk,p} = N_{Rk,b} =$	$N_{Rk,p,c} = N_{Rk,b,c} [kN]$	
single brick1) [N/m	m²]						
≥ 2,5/2				0	,5	0,5	
1) The compressive str	rength of the single brick	must not be	less than 809	% of the mean con	npressive strength		
Table C18.2:	Characteristic re	esistance	to local bi	rick failure or	brick edge fa	ilure of a	
	single anchor u	nder shea	r loading				
Size				1	10	12	
Characteristic sh	ear resistance de	pending o	n the mea	ın compressiv	e strength of	the brick	
Mean compressive	e strength /						
Min. compressive	Min. compressive strength of				$V_{Rk,b} = V_{Rk,b,\perp} = V_{Rk,b,\parallel} [kN]$		
single brick1) [N/m	m²]						
Nominal embedme	h _{nom}	[mm]	65		75		
≥ 2,5/2				1,5		1,8	
					$V_{Rk,c} = V_{Rk,c,\perp}$	= V _{Rk,c, II} [kN]	
				0	,9	1,5	
1) The compressive str	rength of the single brick	must not be	less than 809	% of the mean con	npressive strength		
Table C18.3:	Displacements	under tens	sion and s	shear loads			
				10	12		
Size				10	12		
	ent depth	h _{nom}	[mm]	65	75		
Nominal embedme	ent depth	h _{nom}	[mm] [kN]		 		
Nominal embedme Tension load	·		[kN]	65	75		
Nominal embedme Tension load	·	F _N		65 0,17	75 0,17		
Nominal embedment Tension load Displacement und	er tension	F _N δ _{N0}	[kN]	65 0,17 0,02	75 0,17 0,02	- - - -	
Nominal embedme Tension load Displacement und load	er tension	$\begin{array}{c} F_N \\ \delta_{N0} \\ \delta_{N\infty} \end{array}$	[kN]	65 0,17 0,02 0,04	75 0,17 0,02 0,04		

MULTI-MONTI-plus	
Performance Solid brick VBL ≥ 2DF, characteristic resistance under tension and shear loading, displacements	Annex C18