



Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments



European Technical Assessment

ETA-18/0642 of 8 October 2018

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the Deutsches Institut für Bautechnik **European Technical Assessment:** Trade name of the construction product ESSVE Injection system ONE or ONE ICE for Masonry Product family Metal Injection anchors for use in masonry to which the construction product belongs **ESSVE** Produkter AB Manufacturer Esbogatan 14 164 74 KISTA SCHWEDEN ESSVE Plant No. 671 Manufacturing plant This European Technical Assessment 61 pages including 3 annexes which form an integral part contains of this assessment EAD 330076-00-0604 This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of



European Technical Assessment ETA-18/0642

Page 2 of 61 | 8 October 2018

English translation prepared by DIBt

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Page 3 of 61 | 8 October 2018

Specific Part

1 Technical description of the product

The ESSVE Injection System ONE or ONE ICE for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar ESSVE ONE or ESSVE ONE ICE, a perforated sleeve and an anchor rod with hexagon nut and washer. The steel elements are made of zinc coated steel or stainless steel.

The anchor rod is placed into a drilled hole filled with injection mortar and is anchored via the bond between steel element, injection mortar and masonry and mechanical interlock.

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 anchor 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 values for resistance	See Annexes C 1 to C 45
Displacements	See Annex C 5 to C 45

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed

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

In accordance with the European Assessment Document EAD 330076-00-0604 the applicable European legal act is: [97/177/EC].

The system to be applied is: 1



European Technical Assessment ETA-18/0642 English translation prepared by DIBt

Page 4 of 61 | 8 October 2018

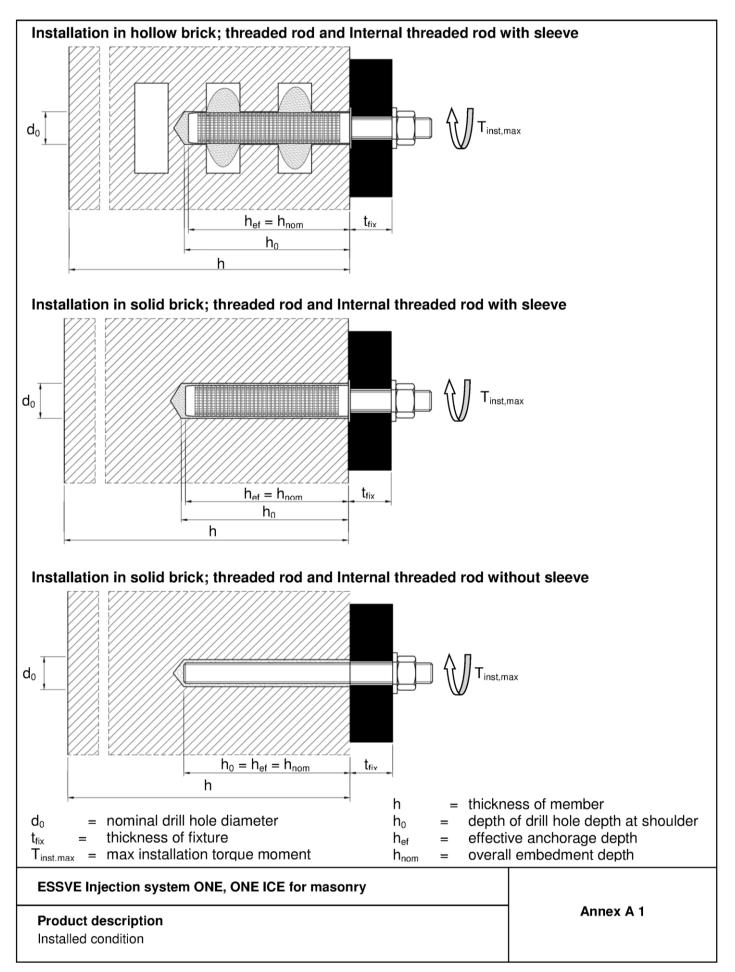
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

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

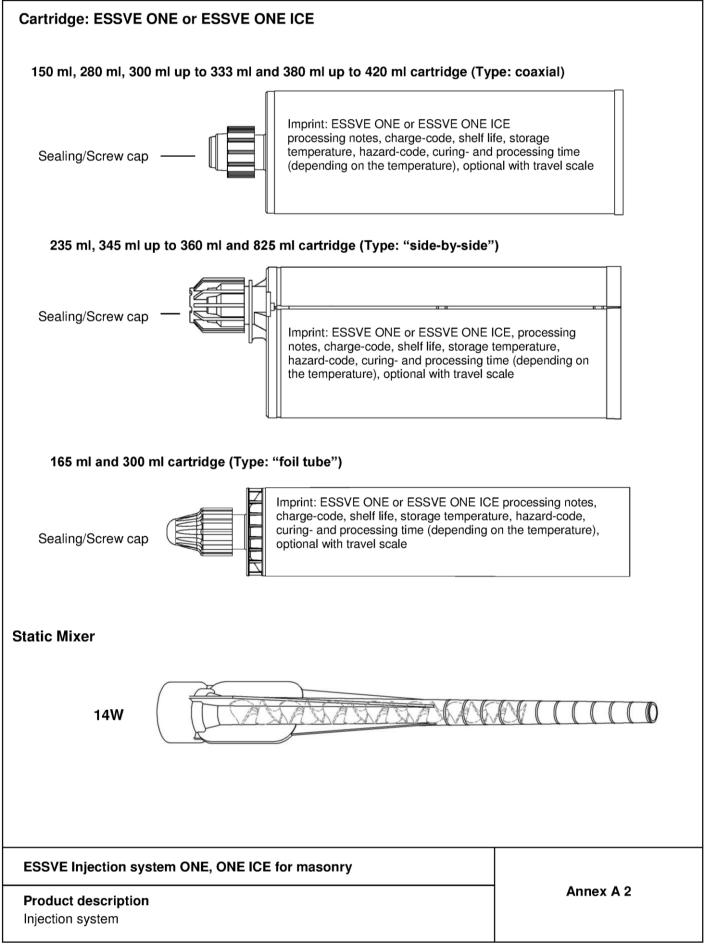
Issued in Berlin on 8 October 2018 by Deutsches Institut für Bautechnik

Dr.-Ing. Lars Eckfeldt p.p. Head of Department *beglaubigt:* Baderschneider



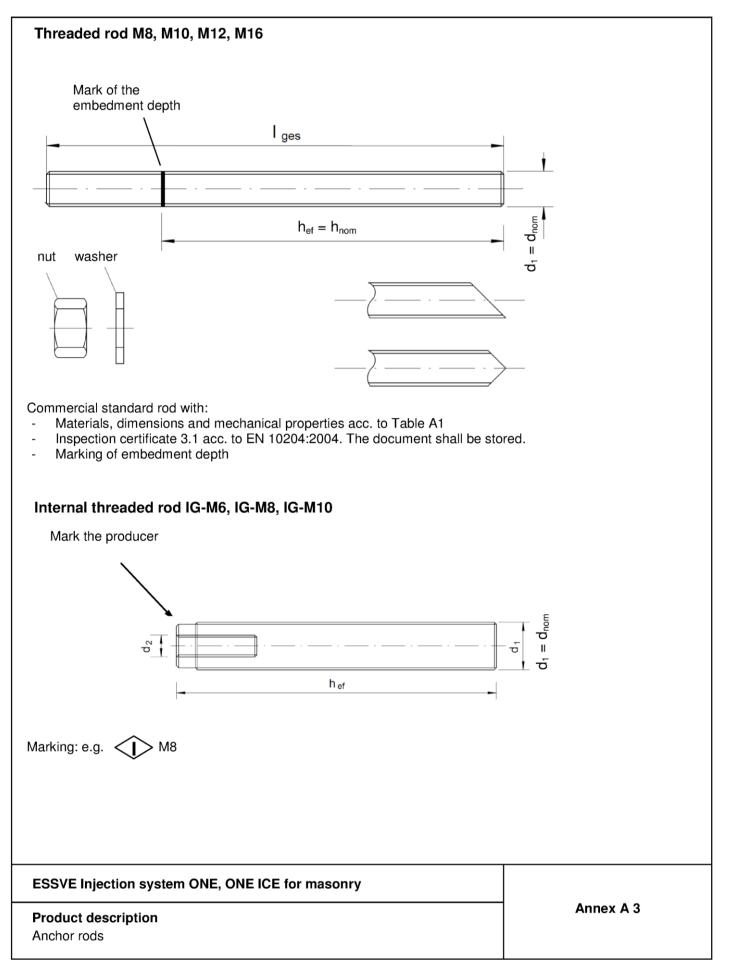






Page 7 of European Technical Assessment ETA-18/0642 of 8 October 2018







1999 or Steel, 61:2009 and EN ISO 10684:2004+AC:2009
Steel, EN 10087:1998 or EN 10263:2001 Property class 4.6, 4.8, 5.6, 5.8, 8.8 acc. EN 1993-1-8:2005+AC:2009 A _s > 8% fracture elongation
Steel acc. EN 10087:1998 or EN 10263:2001 Property class 4 (for class 4.6, 4.8 rod) EN ISO 898-2:2012 Property class 5 (for class 5.6, 5.8 rod) EN ISO 898-2:2012 Property class 8 (for class 8.8 rod) EN ISO 898-2:2012
Steel, zinc plated or hot-dip galvanised
Steel, zinc plated Property class 5.6, 5.8 and 8.8 EN ISO 898-1:2013
Material 1.4401 / 1.4404 / 1.4571, EN 10088-1:2014, Property class 70 EN ISO 3506-1:2009 Property class 80 EN ISO 3506-1:2009
Material 1.4401 / 1.4404 / 1.4571 EN 10088-1:2014, Property class 70 (for class 70 rod) EN ISO 3506-2:2009 Property class 80 (for class 80 rod) EN ISO 3506-2:2009
Material 1.4401, 1.4404 or 1.4571, EN 10088-1:2014
Stainless steel: 1.4401 / 1.4404 / 1.4571, EN 10088-1:2014 Property class 70 (for class 70 rod) EN ISO 3506-1:2009
Material 1.4529 / 1.4565, EN 10088-1:2014, Property class 70 EN ISO 3506-1:2009 Property class 80 EN ISO 3506-1:2009
Material 1.4529 / 1.4565, EN 10088-1:2014, Property class 70 (for class 70 rod) EN ISO 3506-2:2009 Property class 80 (for class 80 rod) EN ISO 3506-2:2009
Material 1.4529 / 1.4565, EN 10088-1:2014
Stainless steel: 1.4529 / 1.4565, EN 10088-1:2014 Property class 70 (for class 70 rod) EN ISO 3506-1:2009
Material: Polypropylene

Page 9 of European Technical Assessment ETA-18/0642 of 8 October 2018



Table A2: Sleeve (Plastic)									
SH 12x80 SH 16x85 SH 20x85 d₅			L _s =	h _{ef} = h _{nom}					
SH 16x130 SH 20x130 SH 20x200 d _s			L _s = h _{ef}	= h _{nom}					
Table A3: Sizes sleeve									
		S	leeve	12x80	16x85	16x130	20x85	20×130	20x200
Diameter of sleeve	d _s : d _{no}		[mm]	12	16	16	20	20	20
Length of sleeve	Ls		[mm]	80	85	130	85	130	200
Effective anchorage depth	h _e	f	[mm]	80	85	130	85	130	200
Overall anchor embedment	h _{no}	m	[mm]	80	85	130	85	130	200
Table A4: Steel					_		_		
,	Anchor	rod	IG-M6	IG-M8	IG-M10	M8	M10	M12	M16
Outside diameter of anchor	$d_1 = d_{nom}$	[mm]	10 ¹⁾	12 ¹⁾	16 ¹⁾	8	10	12	16
Diameter of internal thread	d ₂	[mm]	6	8	10	-	-	-	-
Thread engagement length Min/max	l _{IG}	[mm]	8/20	8/20	10/25	-	-	-	-
Total length of steel element	I _{ges}	[mm]	W	sleeve: hef		hef + t _{fix} + 9,5	hef + t _{fix} + 11,5	hef + t _{fix} + 17,5	hef + t _f + 20,0
¹⁾ Internal threaded rod with me	etric exte	ernal thi	read						
ESSVE Injection system O Product description Sleeves	NE, OI	NE ICE	for mase	onry			Ar	nnex A 5	



Specifications of intended use

Anchorages subject to:

Static and quasi-static loads

Base materials:

- Autoclaved Aerated Concrete (Use category d) according to Annex B2
- Solid brick masonry (Use category b), according to Annex B2.
- Hollow brick masonry (use category c), according to Annex B2 and B3
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2010.
- For other bricks in solid masonry and in hollow or perforated masonry, the characteristic resistance of the anchor may be determined by job site tests according to Technical Report TR 053 under consideration of the β-factor according to Annex C1, Table C1.

Note: The characteristic resistance for solid bricks and autoclaved aerated concrete are also valid for larger brick sizes and larger compressive strength of the masonry unit.

Temperature Range:

- T_a: 40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C)
- T_{b} : 40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)
- T_c: 40°C to +120°C (max. short term temperature +120°C and max. long term temperature +72°C)

Use conditions (Environmental conditions):

- Dry and wet structure (regarding injection mortar).
- Structures subject to dry internal conditions (zinc coated steel, stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and 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 exist (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 swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Use categories in respect of installation and use:

- Category d/d: Installation and use in dry masonry
- Category w/w: Installation and use in dry or wet masonry (incl. w/d installation in wet masonry and use in dry masonry)

Design:

- Verifiable calculation notes and drawings are prepared taking account the relevant masonry in the region of the anchorage, the loads to be transmitted and their transmission to the supports of the structure. The position of the anchor is indicated on the design drawings.
- The anchorages are designed in accordance with the Technical Report TR 054, Design method A under the responsibility of an engineer experienced in anchorages and masonry work.
- N_{Rk,p} = N_{Rk,b} see Annex C4 to C45; N_{Rk,s} see Annex C2; N_{Rk,pb} see Technical Report TR 054
- $V_{\text{Rk,b}}$ and $V_{\text{Rk,c}}$ see Annex C4 to C45; $V_{\text{Rk,s}}$ see Annex C2; $V_{\text{Rk,pb}}$ see Technical Report TR 054
- For application with sleeve with drill bit size ≤ 15 mm installed in joints not filled with mortar:

$$\circ$$
 N_{Bk p} = 0.18 * N_{Bk p} and N_{Bk b} = 0.18 * N_{Bk b} (N_{Bk p} = N_{Bk b} see Annex C4

$$\circ V_{\text{Rk,c,j}} = 0,15 \text{ V}_{\text{Rk,c}} \text{ and } V_{\text{Rk,b,j}} = 0,15 \text{ V}_{\text{Rk,b}} = 0,15 \text{ V}_{\text{Rk,b}} \text{ (N}_{\text{Rk,b}} = N_{\text{Rk,b}} \text{ see Annex C4 to C43)}$$

- Application without sleeve installed in joints not filled with mortar is not allowed.

Installation:

- Dry or wet structures.
- Anchor Installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Fastening screws or threaded rods (incl. nut and washer) must comply with the appropriate material and property class of the Internal threaded rod .

ESSVE Injection system ONE, ONE ICE for masonry

Intended Use

Specifications

 $t \sim C(45)$



Brick-No.	Brick type	Picture	Brick size length width height	Compressive strength	Bulk density	Sleeve - Anchor type	Annex
			[mm]	[N/mm ²]	[kg/dm ³]	-	
Auto	claved aerated	concrete units accor	ding EN 771	-4	1	1	
1	Autoclaved Aerated Concrete AAC6	Ī	499 240 249	6	0,6	M8/M10/M12/M16/IG-M6/IG-M8/IG-M10	C4 C5
alc	ium silicate mas	onry units accordin	g EN 771-2				
2	Calcium silicate solid brick KS-NF		240 115 71	10 20 27	2,0	M8/M10/M12/M16/IG-M6/IG-M8/IG-M10 SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10 SH 20x200 – M12/M16/IG-M8/IG-M10	C6 C8
3	Calcium silicate hollow brick KSL-3DF		240 175 113	8 12 14	1,4	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10 SH 20x200 – M12/M16/IG-M8/IG-M10	C9 C1
4	Calcium silicate hollow brick KSL-12DF	in the second	498 175 238	10 12 16	1,4	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10	C12 C14
Clay	masonry units a	according EN 771-1					
5	Clay solid brick Mz – DF		240 115 55	10 20 28	1,6	M8/M10/M12/M16/IG-M6/IG-M8/IG-M10 SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10 SH 20x200 – M12/M16/IG-M8/IG-M10	C15 C17
6	Clay hollow brick Hlz-16DF		497 240 238	6 8 12 14	0,8	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10 SH 20x200 – M12/M16/IG-M8/IG-M10	C18 C2(
7	Clay hollow brick Porotherm Homebric		500 200 299	4 6 10	0,7	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10	C21 C23
Ir	tended Use	n system ONE, ON		-	ements	Annex B 2	



Brick-No.	Brick type	Picture	Brick size length width height	Compressive strength	Bulk density	Sleeve - Anchor type	Annex
_			[mm]	[N/mm ²]	[kg/dm ³]		
Clay	masonry units	according EN 771	-1				
8	Clay hollow brick BGV Thermo		500 200 314	4 6 10	0,6	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10	C24 C26
9	Clay hollow brick Calibric R+		500 200 314	6 9 12	0,6	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10	C27 C29
10	Clay hollow brick Urbanbric		560 200 274	6 9 12	0,7	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10	C30 C32
11	Clay hollow brick Brique creuse C40	H	500 200 200	4 8 12	0,7	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10	C33 C35
12	Clay hollow brick Blocchi Leggeri		250 120 250	4 6 8 12	0,6	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10 SH 20x200 – M12/M16/IG-M8/IG-M10	C36 C38
13	Clay hollow brick Doppio Uni		250 120 120	10 16 20 28	0,9	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10 SH 20x200 – M12/M16/IG-M8/IG-M10	C39 C41
Ligh	175/	ete according EN 7	71-3				
14	Hollow light weight concrete Bloc creux B40		494 200 190	4	0,8	SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10	C42 C43
15	Solid light weight concrete		300 123 248	2	0,6	M8/M10/M12/M16/IG-M6/IG-M8/IG-M10 SH 12x80 – M8 SH 16x85 – M8/M10/IG-M6 SH 16x130 – M8/M10/IG-M6 SH 20x85 – M12/M16/IG-M8/IG-M10 SH 20x130 – M12/M16/IG-M8/IG-M10 SH 20x200 – M12/M16/IG-M8/IG-M10	C44 C45
Ir	ntended Use	on system ONE, (onts	Annex B 3	



Installation: Steel Brush RBT d_{b} Table B2: Installation parameters in autoclaved aerated concrete AAC and solid masonry (without sleeve) IG-M10 Anchor size **M**8 M10 IG-M6 M12 IG-M8 M16 Nominal drill hole diameter d_0 [mm] 10 12 14 18 Drill hole depth 80 90 100 100 h_0 [mm] 100 Effective anchorage depth 80 90 100 h_{ef} [mm] Minimum wall thickness $h_{ef} + 30$ [mm] h_{min} Diameter of clearance d_f ≤ 9 12 7 14 9 18 12 [mm] hole in the fixture RBT18 RBT10 RBT12 RBT14 Diameter of steel brush 12 14 16 20 d_{b} [mm] Minimum diameter of steel brush 12,5 d_{b.min} 10,5 14,5 18,5 [mm] 2 (14 for Mz DF) Max installation torque moment [Nm] T_{inst,max}

Table B3: Installation parameters in solid and hollow masonry (with sleeve)

Anchor size	M8	M8 / M1	0 / IG-M6	M12 / M16 / IG-M8 / IG-M10				
	\$	Sleeve	12x80	16x85	16x130	20x85	20x130	20x200
Nominal drill hole diameter	do	[mm]	12	16	16	20	20	20
Drill hole depth	ho	[mm]	85	90	135	90	135	205
Effective anchorage depth	h _{ef}	[mm]	80	85	130	85	130	200
Minimum wall thickness	\mathbf{h}_{min}	[mm]	115	115	175	115	175	240
Diameter of clearance hole in the fixture	learance d _i < [mm]			7 (IG-M6) / 9 (M8) / 12 (M10)		9 (IG-M8) / 12 (IG-M10) 14 (M12) / 18 (M16)		
Diameter of staal bruch			RBT12	RB ⁻	T16		RBT20	
Diameter of steel brush	d _b	[mm]	14	1	8		22	
Minimum diameter of steel brush	d _{b,min}	[mm]	12,5	16	6,5		20,5	
Max installation torque moment	T _{inst,max}	[Nm]			2	2		

ESSVE Injection system ONE, ONE ICE for masonry

Intended Use

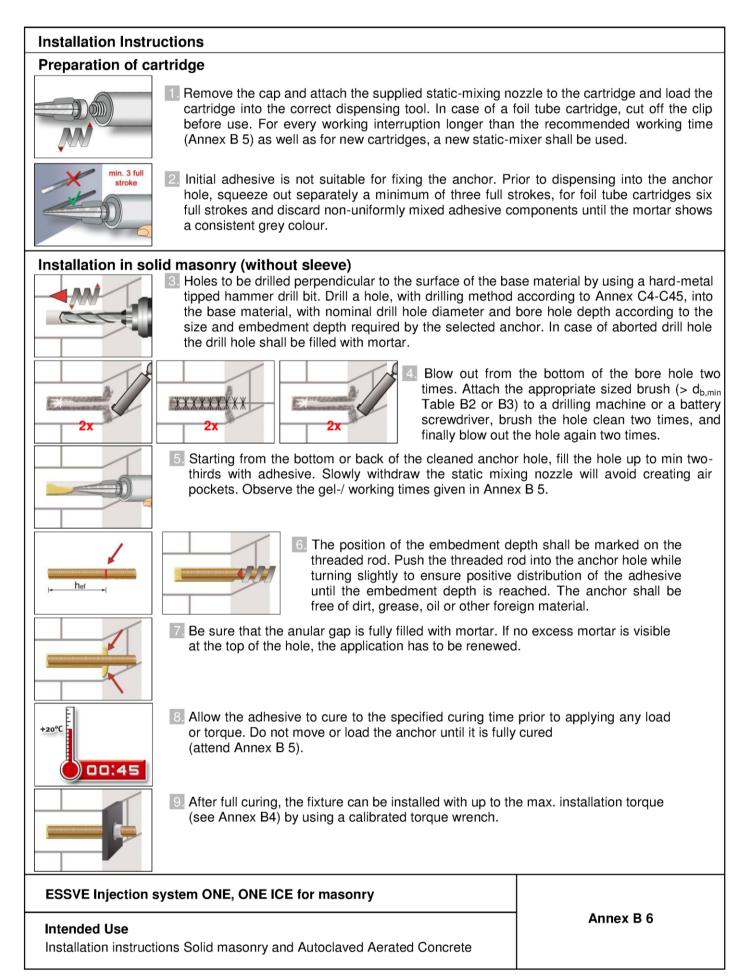
Installation parameters and cleaning brush

Annex B 4



Temperature in the base material T	Temperature of cartridge	Gelling- / working time	Minimum curing time in dry base material ¹⁾
0°C to +4 °C	•	45 min	7 h
+ 5 °C to + 9 °C		25 min	2 h
- 10 °C to + 19 °C		15 min	80 min
- 20 °C to + 29 °C	+5°C to +40°C	6 min	45 min
- 30 °C to + 34 °C		4 min	25 min
- 35 °C to + 39 °C		2 min	20 min
+ 40°C		1,5 min	15 min
Table B5: Maximum woo ESSVE ONE I Temperature in the base material T		n curing time Gelling- / working time	Minimum curing time in dry base material ¹⁾
0 °C to + 4 °C	v	10 min	2,5 h
+ 5 °C to + 9 °C	0°C to +10°C	6 min	80 min
+ 10°C		6 min	60 min
	he curing time <u>must</u> be dou	Jbled	
	he curing time <u>must</u> be dou	Jbled	

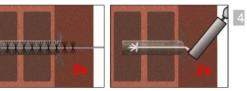






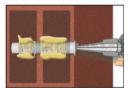
Installation in solid and hollow masonry (with sleeve)

3. Holes to be drilled perpendicular to the surface of the base material by using a hardmetal tipped hammer drill bit. Drill a hole, with drill method according to Annex C4 – C45, into the base material, with nominal drill hole diameter and bore hole depth according to the size and embedment depth required by the selected anchor.

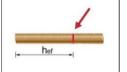


Blow out from the bottom of the bore hole two times. Attach the appropriate sized brush (> $d_{b,min}$ Table B3) to a drilling machine or a battery screwdriver, brush the hole clean two times, and finally blow out the hole again two times.

- 5. Insert the perforated sleeve flush with the surface of the masonry or plaster. Only use sleeves that have the right length. Never cut the sleeve.



6. Starting from the bottom or back fill the sleeve with adhesive. For embedment depth equal to or larger than 130 mm an extension nozzle shall be used. For quantity of mortar attend cartridges label installation instructions. Observe the gel-/ working times given in Annex B 5.





7. The position of the embedment depth shall be marked on the threaded rod. Push the threaded rod into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor shall be free of dirt, grease, oil or other foreign material.



- 8. Allow the adhesive to cure to the specified curing time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (attend Annex B 5).
- 9. After full curing, the fixture can be installed with up to the max. installation torque (see Annex B4) by using a calibrated torque wrench.

ESSVE Injection system ONE, ONE ICE for masonry

Intended Use

Installation instructions hollow brick

Annex B 7



Brick-No.	Installation & Use			β-fa	ctor		
and	category	T _a : 40°C / 24°C T _b : 80			C / 50°C	T _c : 120°	C / 72°C
abbreviation		d/d	w/d w/w	d/d	w/d w/w	d/d	w/d w/w
1 AAC6	For all sizes	0,95	0,86	0,81	0,73	0,81	0,73
2	d₀ ≤ 14 mm	0,93	0,80	0,87	0,74	0,65	0,56
KS-NF	d₀ ≥ 16 mm	0,93	0,93	0,87	0,87	0,65	0,65
3	d₀ ≤ 12 mm	0,93	0,80	0,87	0,74	0,65	0,56
KSL-3DF	d₀ ≥ 16 mm	0,93	0,93	0,87	0,87	0,65	0,65
4	d₀ ≤ 12 mm	0,93	0,80	0,87	0,74	0,65	0,56
KSL-12DF	d₀ ≥ 16 mm	0,93	0,93	0,87	0,87	0,65	0,65
5 MZ-DF							
6 Hlz-16DF							
7 Porotherm Homebric				0,86	0,86	0,73	0,73
8 BGV-Thermo			0,86				
9 Calibric R+	For all sizes	0,86					
10 Urbanbric							
11 Brique creuse C40							
12 Blocchi Leggeri							
13 Doppio Uni							
14	d₀ ≤ 12 mm	0,93	0,80	0,87	0,74	0,65	0,56
Bloc creux B40	d₀ ≥ 16 mm	0,93	0,93	0,87	0,87	0,65	0,65
15	d₀ ≤ 12 mm	0,93	0,80	0,87	0,74	0,65	0,56
Solid light weight concrete	d ₀ ≥ 16 mm	0,93	0,93	0,87	0,87	0,65	0,65

 β -factors for job site testing under tension load

Г



Size			IG-M6	IG-M8	IG-M10	M8	M10	M12	M16
						WIO	WITC	11112	
Characteristic tension resistance					т т				
steel, property class 4.6	$N_{Rk,s}$	[kN]	-	-	-	15	23	34	63
	γMs	[-]		-		4.5	2	/	00
steel, property class 4.8	N _{Rk,s}	[kN] [-]	-	-	-	15	23	34 ,5	63
	$\frac{\gamma_{Ms}}{N_{Rk,s}}$	[kN]	10	- 18	29	18	29	42	79
steel, property class 5.6	γ _{Ms}	[-]		2,0	23	10	1	,0	15
	N _{Rk,s}	[kN]	10	17	29	18	29	42	79
steel, property class 5.8	γ _{Ms}	[-]		1,5				,5	
	N _{Rk.s}	[kN]	16	27	46	29	46	67	126
steel, property class 8.8	γMs	[-]		1,5			1.	,5	
Stainless steel A4 / HCR, property class 70	N _{Rk,s}	[kN]	14	26	41	26	41	59	110
Stamless steel A47 HCR, property class 70	γ́Ms	[-]		1,87			1,	87	
Stainless steel A4 / HCR, property class 80	$N_{Rk,s}$	[kN]	16	29	46	29	46	67	126
Stamless steel A47 HOR, property class of	γMs	[-]		1,6			1	,6	
Characteristic shear resistance									
	$V_{Rk,s}$	[kN]	-	-	-	7	12	17	31
steel, property class 4.6	γMs	[-]		-			1,	67	
	V _{Rk,s}	[kN]	-	-	-	7	12	17	31
steel, property class 4.8	γMs	[-]		-	-		1,	25	
ataal property alage E.C.	$V_{Rk,s}$	[kN]	5	9	15	9	15	21	39
steel, property class 5.6	γMs	[-]		1,67			1,	67	
steel, property class 5.8	$V_{Rk,s}$	[kN]	5	9	15	9	15	21	39
steel, property class 5.6	γMs	[-]		1,25			1,:	25	
steel, property class 8.8	$V_{Rk,s}$	[kN]	8	14	23	15	23	34	63
	γMs	[-]		1,25				25	
Stainless steel A4 / HCR, property class 70	$V_{Rk,s}$	[kN]	7	13	20	13	20	30	55
	γMs	[-]		1,56			1	56	
Stainless steel A4 / HCR, property class 80	$V_{Rk,s}$	[kN]	8	15	23	15	23	34	63
	γMs	[-]		1,33			1,:	33	
Characteristic bending moment		_	_				_	_	_
steel, property class 4.6	$M_{Rk,s}$	[Nm]	-	-	-	15	30	52	133
steel, property class 4.0	γMs	[-]		-			1,	67	
steel, property class 4.8	$M_{Rk,s}$	[Nm]	-	-	-	15	30	52	133
	γ̈́Ms	[-]		-			1	25	
steel, property class 5.6	$M_{Rk,s}$	[Nm]	8	19	37	19	37	66	167
	γMs	[-]		1,67			1,		
steel, property class 5.8	M _{Rk,s}	[Nm]	8	19	37	19	37	66	167
· · ·	ΎMs	[-]	10	1,25	00	00	1,		0.00
steel, property class 8.8	$M_{Rk,s}$	[Nm]	12	30	60	30	60	105	266
	γMs	[-]		1,25	50	00	1,:		000
Stainless steel A4 / HCR, property class 70	M _{Rk,s}	[Nm]	11	26	52	26	52	92	233
	ΎMs	[-]	10	1,56	60	20		56	000
Stainless steel A4 / HCR, property class 80	$M_{Rk,s}$	[Nm]	12	30	60	30	60	105	266

ESSVE Injection system ONE, ONE ICE for masonry

Performances

Characteristic resistance under tension and shear load - steel failure



Spacing and edge distances								
	ance ing mum) spacing for	r anchors placed para r anchors placed perp	•					
Load direction Anchor position	nsion load	Shear load parallel edge		load perpendicular to free edge				
Anchors places parallel to bed joint s _{cr,II ;} (s _{min,II})								
Anchors places perpendicular to bed joint $s_{cr, \perp}$; $(s_{min, \perp})$								
$\begin{aligned} \alpha_{g,N,II} = & Group factor in case of tension load for anchors placed parallel to the bed joint \\ \alpha_{g,V,II} = & Group factor in case of shear load for anchors placed parallel to the bed joint \\ \alpha_{g,N,\perp} = & Group factor in case of tension load for anchors placed perpendicular to the bed joint \\ \alpha_{g,V,\perp} = & Group factor in case of shear load for anchors placed perpendicular to the bed joint \\ Group of two anchors: NgRk = \alpha_{g,N} * N_{RK} and VgRk = \alpha_{g,V} * V_{Rk}Group of four anchors: NgRk = \alpha_{g,N,II} * \alpha_{g,N,L} * N_{RK} and VgRk = \alpha_{g,V,II} * \alpha_{g,V,L} * V_{Rk}(N_{Rk:} N_{Rk,b} or N_{Rk,b,j} for c_{cr}) (V_{Rk:} V_{Rk,c,j}; V_{Rk,c,j}; V_{Rk,b,j} for c_{cr}) (with the relevant \alpha_{g})$								
ESSVE Injection system ONE, ONE ICE Performances Edge distance and anchor spacing	E for masonry		An	nex C 3				



	G-M8 00	M16/IG-M10
Compressive strength $f_b ≥ [N/mm^2]$ 6 Code EN 771-4 Producer (country code) e.g. Porit (DE) Brick dimensions [mm] 499 x 240 x 249 Drilling method Rotary Table C4: Installation parameter Anchor size [-] M8 M10/IG-M6 M12/I Effective anchorage depth [mm] 80 90 10 Edge distance Ccr [mm] 80 90 10 Minimum edge distance Ccr [mm] 75 75 Spacing scr [mm] 3*hef		M16/IG-M1
Code EN 771-4 Producer (country code) e.g. Porit (DE) Brick dimensions [mm] 499 x 240 x 249 Drilling method Rotary Table C4: Installation parameter Anchor size [-] M8 M10/IG-M6 M12/I Effective anchorage depth [mm] 80 90 10 Edge distance C_{cr} [mm] 75 75 Minimum edge distance $C_{min,V,II} (C_{min,v, \perp})^{1)}$ [mm] 75 (1,5*h effective) Spacing S_{cr} [mm] 3*hefective)		M16/IG-M1
Producer (country code) e.g. Porit (DE) Brick dimensions [mm] 499 x 240 x 249 Drilling method Rotary Table C4: Installation parameter Anchor size [-] M8 M10/IG-M6 M12/I Effective anchorage depth [mm] 80 90 10 Edge distance C_{cr} [mm] 1,5*hef Minimum edge distance $C_{min,N}$ [mm] 75 Spacing S_{cr} [mm] 3*hef		M16/IG-M1
Brick dimensions [mm] 499 x 240 x 249 Drilling method Rotary Table C4: Installation parameter Anchor size [-] M8 M10/IG-M6 M12/I Effective anchorage depth [mm] 80 90 10 Edge distance C_{cr} [mm] 1,5*h_{eff} Minimum edge distance $C_{min,V,II}$ [mm] 75 Spacing s_{cr} [mm] 3*h_{eff}		M16/IG-M1
Drilling method Rotary Table C4: Installation parameter Anchor size [-] M8 M10/IG-M6 M12/I Effective anchorage depth [mm] 80 90 10 Edge distance C_{cr} [mm] 1,5*hef Minimum edge distance $C_{min,N}$ [mm] 75 Spacing S_{cr} [mm] 3*hef		M16/IC-M1
Table C4: Installation parameterAnchor size[-]M8M10/IG-M6M12/IEffective anchorage depth[mm]809010Edge distance c_{cr} [mm]1,5*h_{eff}Minimum edge distance $c_{min,V,II}$ [mm]75Cmin,V,II $(c_{min,v, \perp})^{1)}$ [mm]75 (1,5*h_{eff})Spacing s_{cr} [mm]3*h_{eff}		M16/IQ-M1
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		M16/IG-M1
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		N/16/1(N/1
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	10	
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		100
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$		
Spacing s _{cr} [mm] 3 [*] h _{ef}	- ()	
	ef)	
¹⁾ $C_{min,V,II}$ for shear loading parallel to the free edge; $C_{min,V,I}$ for shear loading perpendicular the free edge		
L: anchors placed 75 100	[-]	2,0 1,4
$\begin{array}{c c c c c c c c c } \hline & & & & & & & & & & & & & & & & & & $		2,0
Table C6: Group factor for anchor group in case of shear loading parallel to free edge		
Configuration with c ≥ with s ≥		
II: anchors placed parallel to horizontal ioint751001,5*hef3*hef		1,2 2,0
joint 1,5 her 3 her	[-]	2,0



fective	v - • • • • • • • • • • • • • • • • • •	s of I	resistance	1,5*hef 1,5*hef e under		acteristic		hef oads		x _{g,V,II} x _{g,V,⊥}	. [-]		2,0
racteristi	c value	s of I	resistance				near l	oads		Xg,V,⊥			2,0
fective	c value	s of I	resistance	e under									
					Char	acteristi	c resi	stance					
						Use cat	tegor	y					/ -1
			d/d					w/v w/c				w	/d //d /w
chorage depth	40°C/2	24°C	80°C/50°	C 120°	C/72°C	40°C/2	4°C	80°C/5	0°C	120°C	/72°C	tempe	r all erature ige
h _{ef}			$N_{Bkb} = N_{Bl}$	1)								VBk	2)3) b
[mm]				κ.p		[kN		110,0	-110,0			- 10	,0
• •			Compres	sive str	ength f								
80	2,5 (2	2,0)						2,0 (1	,5)	1,5 (1,2)	6	,0
90			·······		(1,5)							10),0
100	5,0 (3	3,5)	4,0 (3,0)) 3,0	(2,5)	4,5 (3	,0)	3,5 (2	,5)	3,0 (2,5)	10),0
100	6,5 (4	1,5)	5,5 (3,5)) 4,0	(3,0)	5,5 (4	,0)	5,0 (3	,5)	4,0 (3,0)	1(0,0
		o or gr	eater. For S	1661 4.6 8	เกิด 4.8 N	unipiy V	Rk,b Dy	0,8					
h _{ef}	Ν	δι	N/N	δΝΟ		δN∞	,	V		δνο			δ∨∞
			-				[k	:N]					mm]
· · ·								-		<u> </u>			,20
		C),18 –	,						,		_	,80
				-								_	,
100	1,8		,08	0,14),29	2	.,1		1,4			2,10
	80 90 100 id for c _{cr} , v o f V _{Rk,c} s e valid for	h _{ef}	[mm] 80 2,5 (2,0) 90 4,0 (2,5) 100 5,0 (3,5) 100 6,5 (4,5) id for c _{cr} , values in brack of V _{Rk,c} see ETAG029, e valid for steel 5.6 or gr accements h _{ef} N δ _f [mm] [kN] [min] 80 0,9 0	h _{ef} N _{Rk,b} = N _{Rl} [mm] Compres 80 2,5 (2,0) 2,5 (1,5) 90 4,0 (2,5) 3,0 (2,0) 100 5,0 (3,5) 4,0 (3,0) 100 6,5 (4,5) 5,5 (3,5) id for c _{cr} , values in brackets are valied for steel 5.6 or greater. For sevalid for steel 5.6 or gr	$\begin{tabular}{ c c c c c } \hline h_{ef} & N_{Rk,b} = N_{Rk,p}^{1} \\ \hline \hline \\ \hline \mm] & & & & & & & & & & & & & & & & & & $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	h _{ef} N _{Rk,b} = N _{Rk,p} (k) [mm] [k] Compressive strength f _b ≥ 6 N/r 80 2,5 (2,0) 2,5 (1,5) 2,0 (1,2) 2,5 (1) 90 4,0 (2,5) 3,0 (2,0) 2,5 (1,5) 3,5 (2) 100 5,0 (3,5) 4,0 (3,0) 3,0 (2,5) 4,5 (3) 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4) id for c _{cr} , values in brackets are valid for single anchors with cond of V _{Rk,c} see ETAG029, Annex C; avalid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply V accements h _{ef} N δ _N / N δ _{N∞} [mm] [kN] [mm/kN] [mm] [mm] 80 0,9 0.18 0,16 0,32	h _{ef} N _{Rk,b} = N _{Rk,p} ¹⁾ I [mm] [kN] Compressive strength f _b ≥ 6 N/mm ² 80 2,5 (2,0) 2,5 (1,5) 2,0 (1,2) 2,5 (1,5) 90 4,0 (2,5) 3,0 (2,0) 2,5 (1,5) 3,5 (2,5) 100 5,0 (3,5) 4,0 (3,0) 3,0 (2,5) 4,5 (3,0) 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4,0) id for c _{cr} , values in brackets are valid for single anchors with c _{min} of V _{Rk,c} see ETAG029, Annex C; evalid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply V _{Rk,b} by lacements [mm] [kN] [mm/kN] [mm] [mm] [k] 80 0,9 0.18 0,16 0,32 1	h _{ef} N _{Rk,b} = N _{Rk,p} ¹⁾ N _{Rk,b} = N [mm] [kN] Compressive strength f _b ≥ 6 N/mm ² 80 2,5 (2,0) 2,5 (1,5) 2,0 (1,2) 2,5 (1,5) 2,0 (1 90 4,0 (2,5) 3,0 (2,0) 2,5 (1,5) 3,5 (2,5) 3,0 (2 100 5,0 (3,5) 4,0 (3,0) 3,0 (2,5) 4,5 (3,0) 3,5 (2 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4,0) 5,0 (3 id for c _{cr} , values in brackets are valid for single anchors with c _{min} of V _{Rk,c} see ETAG029, Annex C; evalid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply V _{Rk,b} by 0,8 lacements M _{ef} N δ _N / N δ _{N0} δ _{N∞} V [mm] [kN] [mm] [mm] [kN] [kN] 80 0,9 0.18 0.16 0.32 1,3	h _{ef} N _{Rk,b} = N _{Rk,p} ¹⁾ N _{Rk,b} = N _{Rk,p} ¹⁾ [mm] [kN] Compressive strength f _b ≥ 6 N/mm ² 80 2,5 (2,0) 2,5 (1,5) 2,0 (1,2) 2,5 (1,5) 2,0 (1,5) 90 4,0 (2,5) 3,0 (2,0) 2,5 (1,5) 3,5 (2,5) 3,0 (2,0) 100 5,0 (3,5) 4,0 (3,0) 3,0 (2,5) 4,5 (3,0) 3,5 (2,5) 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4,0) 5,0 (3,5) id for c _{cr} , values in brackets are valid for single anchors with c _{min} of V _{Rk,c} see ETAG029, Annex C; evalid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply V _{Rk,b} by 0,8 lacements [mm] [kN] [mm] [kN] 80 0,9 0,18 0,16 0,32 1,3	hef N _{Rk,b} = N _{Rk,p} ¹⁾ N _{Rk,b} = N _{Rk,p} ¹⁾ Imm] [kN] [kN] Compressive strength $f_b \ge 6$ N/mm² 80 2,5 (2,0) 2,5 (1,5) 2,0 (1,2) 2,5 (1,5) 2,0 (1,5) 1,5 (1,5) 90 4,0 (2,5) 3,0 (2,0) 2,5 (1,5) 3,5 (2,5) 3,0 (2,0) 2,5 (1,5) 100 5,0 (3,5) 4,0 (3,0) 3,0 (2,5) 4,5 (3,0) 3,5 (2,5) 3,0 (1,0) 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4,0) 5,0 (3,5) 4,0 (2,0) 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4,0) 5,0 (3,5) 4,0 (2,0) 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4,0) 5,0 (3,5) 4,0 (2,0) 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4,0) 5,0 (3,5) 4,0 (2,0) 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4,0) 5,0 (3,5) 4,0 (2,0) 100 6,5 (4,5) 5,6 (7,0) 5,0 (3,5)	hef N _{Rk,b} = N _{Rk,p} ¹⁾ N _{Rk,b} = N _{Rk,p} ¹⁾ Imm] [kN] Compressive strength f _b ≥ 6 N/mm ² 80 2,5 (2,0) 2,5 (1,5) 2,0 (1,2) 2,5 (1,5) 2,0 (1,5) 1,5 (1,2) 90 4,0 (2,5) 3,0 (2,0) 2,5 (1,5) 3,5 (2,5) 3,0 (2,0) 2,5 (1,5) 100 5,0 (3,5) 4,0 (3,0) 3,0 (2,5) 4,5 (3,0) 3,5 (2,5) 3,0 (2,5) 100 6,5 (4,5) 5,5 (3,5) 4,0 (3,0) 5,5 (4,0) 5,0 (3,5) 4,0 (3,0) id for c _{cr} , values in brackets are valid for single anchors with c _{min} of V _{Rk,c} see ETAG029, Annex C; evalid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply V _{Rk,b} by 0,8 lacements Non N∞ N∞ V õv0 101 [kN] [mm] [mm] [mm] [mm]	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$



Brick type: Calcium silicate solic	brick KS-NF	
Table C10: Description of the brid	ck .	
Brick type	Calcium silicate solid brick KS-NF	
Bulk density ρ [kg/dm ³]	2,0	
Compressive strength $f_b \ge [N/mm^2]$	10, 20 or 27	
Code	EN 771-2	
Producer (country code)	e.g. Wemding (DE)	
Brick dimensions [mm]	240 x 115 x 71	
Drilling method	Hammer	
Table C11: Installation parameter		
Anchor size [-]	All sizes

Anchor size		[-]	All Sizes
Edge distance	Ccr	[mm]	1,5*h _{ef}
Minimum edge distance	C _{min}	[mm]	60
Spacing	Scr	[mm]	3*h _{ef}
Minimum spacing	S _{min}	[mm]	120

Table C12: Group factor for anchor group in case of tension loading

Configura	ation	with c ≥	with s ≥			
II: anchors placed		60	120			1,0
parallel to horizontal	••	140	120	$\alpha_{g,N,II}$		1,5
joint		1,5*hef	3*h _{ef}		r 1	2,0
⊥: anchors placed		60	120		[-]	0,5
perpendicular to		1,5*hef	120	$\alpha_{g,N,\perp}$		1,0
horizontal joint		1,5*hef	3*h _{ef}			2,0

Table C13: Group factor for anchor group in case of shear loading parallel to free edge

Configura	ation	with c ≥	with s ≥			
II: anchors placed		60	120			1,0
parallel to horizontal	∨ ••	115	120	$\alpha_{g,V,II}$		1,7
joint		1,5*hef	3*h _{ef}		r ı	2,0
\perp : anchors placed		60	120		[-]	1,0
perpendicular to	I V 🚦	1,5*hef	120	$\alpha_{g,V,\perp}$		1,0
horizontal joint		1,5*hef	3*h _{ef}			2,0

Table C14: Group factor for anchor group in case of shear loading perpendicular to free edge

tion.					
ation	with c ≥	with s ≥			
	60	120			1,0
	1,5*hef	3*h _{ef}	α _{g,V,II}	F 1	2,0
	60	120		[-]	1,0
	1,5*hef	3*h _{ef}	α _{g,V,⊥}		2,0
		60 1,5*hef 60 60	60 120 1,5*hef 3*hef 60 120	60 120 1,5*hef 3*hef 60 120 α _{g,V,II} α _{g,V,II}	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

ESSVE Injection system ONE, ONE ICE for masonry

Performances calcium solid brick KS-NF

Installation parameters

Deutsches Institut $\left| \right|$ für Bautechnik

Brick	type: Cal	cium silicat	e solid br	ick KS-NF					
Table (C15: Cł	naracteristic v	alues of r	esistance u	under tensio	on and she	ar loads		
					Cha	racteristic r			
						Use categ	jory		
Anchor	Olasus	Effective anchorage depth		d/d			w/d w/w		d/d w/d w/w
size	Sleeve	h _{ef} [mm]	40°C/24°C	80°C/50°C	120°C/72°C	40°C/24°C	80°C/50°C	120°C/72°C	For All temperature range
	-	h _{ef}		$N_{Rk,b} = N_{Rk,p}$	1)		$N_{Rk,b} = N_{Rk,p}$	1)	V _{Rk,b} ²⁾³⁾
		[mm])	[kN])	- חג,ט
		[]	Con	nressive	strength f _b ≥				
M8	-	80	4,5 (2,0)	4,5 (2,0)	3,0 (1,5)	3,5 (1,5)	3,5 (1,5)	2,5 (1,2)	2,5 (1,5)
M10 / IG-M6	-	90	4,5 (2,0)	4,5 (2,0)	3,0 (1,5)	3,5 (1,5)	3,5 (1,5)	2,5 (1,2)	3,0 (2,0)
M12 / IG-M8	-	100	4,5 (2,0)	4,5 (2,0)	3,0 (1,5)	3,5 (1,5)	3,5 (1,5)	2,5 (1,2)	2,5 (1,5)
M16 / IG-M10	-	100	3,5 (1,5)	3,5 (1,5)	2,5 (1,2)	3,0 (1,5)	3,5 (1,5)	2,0 (0,9)	2,5 (1,5)
M8	12x80	80	3,5 (1,5)	3,5 (1,5)	2,5 (1,2)	3,5 (1,5)	3,0 (1,5)	2,5 (1,2)	2,5 (1,5)
M8 /	16x85	85	3,5 (1,5)	3,0 (1,5)	2,0 (0,9)	3,5 (1,5)	3,0 (1,5)	2,5 (1,2)	2,5 (1,5)
M10/ IG-M6	16x130	130	3,5 (1,5)	3,0 (1,5)	2,0 (0,9)	3,5 (1,5)	3,0 (1,5)	2,5 (1,2)	2,5 (1,5)
M12 /	20x85	85	3,0 (1,5)	2,5 (1,2)	2,0 (0,9)	3,0 (1,5)	2,5 (1,2)	2,0 (0,9)	2,5 (1,5)
M16 /	20x130	130	3,0 (1,5)	2,5 (1,2)	2,0 (0,9)	3,0 (1,5)	2,5 (1,2)	2,0 (0,9)	2,5 (1,5)
IG-M8 / IG-M10	20x200	200	3,0 (1,5)	2,5 (1,2)	2,0 (0,9)	3,0 (1,5)	2,5 (1,2)	2,0 (0,9)	2,5 (1,5)
					strength f _b ≥	20 N/mm ²			
M8	-	80	6,0 (3,0)	5,5 (2,5)	4,0 (2,0)	5,0 (2,5)	5,0 (2,5)	3,5 (1,5)	4,0 (2,5)
M10 / IG-M6	-	90	6,0 (3,0)	5,5 (2,5)	4,0 (2,0)	5,0 (2,5)	5,0 (2,5)	3,5 (1,5)	4,5 (2,5)
M12/ IG-M8	-	100	6,0 (3,0)	5,5 (2,5)	4,0 (2,0)	5,0 (2,5)	5,0 (2,5)	3,5 (1,5)	4,0 (2,5)
M16/ IG-M10	-	100	5,0 (2,5)	5,0 (2,5)	3,5 (1,5)	5,0 (2,5)	5,0 (2,5)	3,5 (1,5)	4,0 (2,5)
M8	12x80	80	5,5 (2,5)	5,0 (2,5)	3,5 (1,5)	4,5 (2,0)	4,5 (2,0)	3,0 (1,5)	4,0 (2,5)
M8 /	16x85	85	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	4,0 (2,5)
M10/ IG-M6	16x130	130	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	4,0 (2,5)
M12 /	20x85	85	4,0 (2,0)	4,0 (2,0)	3,0 (1,5)	4,0 (2,0)	4,0 (2,0)	3,0 (1,5)	4,0 (2,5)
M16 /	20x130	130	4,0 (2,0)	4,0 (2,0)	3,0 (1,5)	4,0 (2,0)	4,0 (2,0)	3,0 (1,5)	4,0 (2,5)
IG-M8 / IG-M10		200 d for c _{cr} , values	4,0 (2,0)	4,0 (2,0)	3,0 (1,5)	4,0 (2,0)	4,0 (2,0)	3,0 (1,5)	4,0 (2,5)

Values are valid for c_{cr} , values in brackets are valid for single anchors with c_{min} For c_{cr} calculation of $V_{Rk,c}$ see Technical Report TR 054; values in brackets $V_{Rk,b} = V_{Rk,c}$ for single anchors with c_{min} The values are valid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply $V_{Rk,b}$ by 0,8 2)

3)

ESSVE Injection system ONE, ONE ICE for masonry

Performances calcium solid brick KS-NF

Characteristic values of resistance under tension and shear load



					Cha	racteristic r	esistance		
						Use categ	jory		
Anchor	Sleeve	Effective anchorage depth		d/d			w/d w/w		d/d w/d w/w
size	Sleeve	h _{ef} [mm]	40°C/24°C	80°C/50°C		40°C/24°C		120°C/72°C	For All temperature range
		h _{ef}		$N_{Rk,b} = N_{Rk,t}$	1) ວ		$N_{Rk,b} = N_{Rk,p}$	1)	$V_{Rk,b}^{(2)3)}$
		[mm]				[kN]			
					strength f _b ≥				
M8	-	80	7,0 (3,5)	6,5 (3,0)	5,0 (2,5)	6,0 (3,0)	5,5 (2,5)	4,0 (2,0)	4,5 (2,5)
M10 / IG-M6	-	90	7,0 (3,5)	6,5 (3,0)	5,0 (2,5)	6,0 (3,0)	5,5 (2,5)	4,0 (2,0)	5,5 (3,0)
M12 / IG-M8	-	100	7,0 (3,5)	6,5 (3,0)	5,0 (2,5)	6,0 (3,0)	5,5 (2,5)	4,0 (2,0)	4,5 (2,5)
M16 / IG-M10	-	100	6,0 (3,0)	5,5 (2,5)	4,5 (2,0)	6,0 (3,0)	5,5 (2,5)	4,0 (2,0)	4,5 (2,5)
M8	12x80	80	6,5 (3,0)	6,0 (3,0)	4,5 (2,0)	5,5 (2,5)	5,0 (2,5)	3,5 (1,5)	4,5 (2,5)
M8 /	16x85	85	5,5 (2,5)	5,0 (2,5)	4,0 (2,0)	5,5 (2,5)	5,0 (2,5)	4,0 (2,0)	4,5 (2,5)
M10/ IG-M6	16x130	130	5,5 (2,5)	5,0 (2,5)	4,0 (2,0)	5,5 (2,5)	5,0 (2,5)	4,0 (2,0)	4,5 (2,5)
M12 /	20x85	85	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	4,5 (2,5)
M16 /	20x130	130	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	4,5 (2,5)
IG-M8 / IG-M10	20x200	200	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	5,0 (2,5)	4,5 (2,0)	3,5 (1,5)	4,5 (2,5)

¹⁾ Values are valid for c_{cr} , values in brackets are valid for single anchors with c_{min}

²⁾ For c_{cr} calculation of $V_{Rk,c}$ see Technical Report TR 054; values in brackets $V_{Rk,b} = V_{Rk,c}$ for single anchors with c_{min}

³⁾ The values are valid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply $V_{Rk,b}$ by 0,8

Table C17: Displacements

Anchor size	Sleeve	Effective anchorage depth h _{ef}	N	δ _N / N	δ_{N0}	δ _{N∞}	V	δ_{V0}	δγ∞
		[mm]	[kN]	[mm/kN]	[mm]	[mm]	[kN]	[mm]	[mm]
M8	-	80					1,7	0,90	1,35
M10 / IG-M6	-	90	2,0		0,30	0,60	2,0	1,10	1,65
M12 / IG-M8	-	100							
M16 / IG-M10	-	100	1,7	0,15	0,26	0,51			
M8	12x80	80		0,10	,				
M8 / M10/	16x85	85	1 4		0.01	0.42	1,7	0,90	1,35
IG-M6	16x130	130	1,4		0,21	0,43			
M12 / M16 /	20x85	85] [
IG-M8 /	20x130	130	1,3		0,19	0,39			
IG-M10	20x200	200]						

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Performances calcium solid brick KS-NF

Characteristic values of resistance under tension and shear load (continue) Displacements



Brick type		Calcium silicate hol KSL-3DF	llow brick				
	o [kg/dm ³]	1,4					
	≥ [N/mm²]	8, 12 or 14				1°0	
	- [[%/11111]	EN 771-2				697	
Producer (country code)		e.g. Wemding (DE)	<u> </u>			Y	l.
Brick dimensions	[mm]	240 x 175 x 113					
Drilling method	[]	Rotary					
	175			14 44 14 32 14 44			
	16	5 44 14 38 17	38 14	14 44 16			
Table C19: Installation p Anchor size				×	All sizes		
Anchor size			38 14	×	All sizes 100 (120))	
Anchor size Edge distance	parameters		[-]	×)	
Anchor size Edge distance Minimum edge distance	C _{cr} C _{min} S _{cr,II}		[-] [mm] [mm]	×	100 (120) ¹ 60 240)	
Anchor size Edge distance Minimum edge distance Spacing	C _{cr} C _{min} S _{cr,⊥}		[-] [mm] [mm] [mm] [mm]	×	100 (120) ¹ 60 240 120)	
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing	C _{cr} C _{min} S _{cr,⊥} S _{min}	\$ \$	[-] [mm] [mm]	×	100 (120) ¹ 60 240)	
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH20	C _{cr} C _{min} S _{cr,II} S _{cr,⊥} S _{min} 0x85; SH20x	\$ \$	[-] [mm] [mm] [mm] [mm] [mm]	44 16	100 (120) ¹ 60 240 120)	
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH20	C _{cr} C _{min} S _{cr,II} S _{cr,⊥} S _{min} 0x85; SH20x	3 130 and SH20x200	[-] [mm] [mm] [mm] [mm] [mm]	44 16	100 (120) ¹ 60 240 120)	
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH20 Table C20: Group factor Configuration	C _{cr} C _{min} S _{cr,II} S _{cr,⊥} S _{min} 0x85; SH20x	130 and SH20x200 or group in case of te	[-] [mm] [mm] [mm] [mm] [mm]	44_16	100 (120) ¹ 60 240 120)	1,5
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH20 Table C20: Group factor Configuration II: anchors placed parallel to horizontal	C _{cr} C _{min} S _{cr,II} S _{cr,⊥} S _{min} 0x85; SH20x	5 130 and SH20x200 or group in case of te with c ≥	[-] [mm] [mm] [mm] [mm] [mm]	44 16 ding with s ≥	100 (120) ¹ 60 240 120)	1,5
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH20 Table C20: Group factor Configuration II: anchors placed	C _{cr} C _{min} S _{cr,II} S _{cr,⊥} S _{min} 0x85; SH20x	s 130 and SH20x200 or group in case of te with c ≥ 60	[-] [mm] [mm] [mm] [mm] [mm]	44 16 ding with s ≥ 120	100 (120) ¹ 60 240 120 120		
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH20 Table C20: Group factor Configuration II: anchors placed parallel to horizontal joint ⊥: anchors placed	C _{cr} C _{min} S _{cr,II} S _{cr,⊥} S _{min} 0x85; SH20x	5 130 and SH20x200 or group in case of te with c ≥ 60 C _{cr}	[-] [mm] [mm] [mm] [mm] [mm]	44 16 ding with s ≥ 120 240	100 (120) ¹ 60 240 120 120)	2,0
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing 1) Value in brackets for SH20 Table C20: Group factor Configuration II: anchors placed parallel to horizontal joint	C _{cr} C _{min} S _{cr,II} S _{cr,⊥} S _{min} 0x85; SH20x	5 130 and SH20x200 or group in case of te 60 c _{cr} 160	[-] [mm] [mm] [mm] [mm] [mm]	44 16 ding with s ≥ 120 240 120	100 (120) ¹ 60 240 120 120		2,0 2,0



	Configur	ation		with c ≥		with s	>			
II: anchoi			г	60		120	-			1,0
parallel to		V ••	1	160		120	c	χ _{g,V,II}		1,6
joi				Ccr		240		9, 1,		2,0
⊥: ancho	rs placed		E .	60		120			[-]	1,0
perpend horizon				C _{cr}		120	C	xg,∨,⊥		2,0
Table C2	2: Grou	p factor for a	nchor grou	up in case o	of shear loa	ding perpe	endicular t	to free	edge	
	Configur	ation		with c ≥		with s a	2			
II: anchor				60		120				1,0
parallel to joi				Ccr		240	C	Xg,V,II	[-]	2,0
⊥: ancho				60		120			^[-]	1,0
perpend horizon				C _{cr}		120	C	χ́g,V,⊥		2,0
Table C2	3: Char	acteristic val	ues of res	istance und	der tension	and shear	loads			
					Char	acteristic re	sistance			
						Use catego	ory			
Anchor		Effective anchorage		d/d			w/d; w/w	/		d/d; w/d; w/w
size	Sleeve	depth	40°C/24°C		120°C/72°C		80°C/50°C		C/72°C	For all temperature range
		h _{ef}		$N_{Rk,b} = N_{Rk,p}$	1)		$N_{Rk,b} = N_{Rk}$	1) .,p		V _{Rk,b} ⁴⁾
		[mm]				[kN]				
	10.00				rength f _b ≥ 8		1.0			-2 (2.2)
M8	12x80	80	1,5	1,5	1,2	1,5	1,2	_	0,9	$2,5^{2}$ $(0,9)^{3}$ $4,0^{2}$ $(1,5)^{3}$
M8 / M10 / IG-M6	16x85	85 130	1,5 1,5	1,5 1,5	1,2 1,2	1,5 1,5	1,5 1,5	_	1,2 1,2	$4,0^{2}$ (1,5) ³ $4,0^{2}$ (1,5) ³
M12 /	16x130 20x85	85					4,0			$4,0^{2}(1,5)^{3}$
M16 /			4,5	4,0	3,0	4,5	,		3,0	
IG-M8 /	20x130	130	4,5	4,0	3,0	4,5	4,0	_	3,0	$4,0^{2}$ $(1,5)^{3}$
IG-M10	20x200	200	4,5	4,0	3,0	4,5	4,0		3,0	$4,0^{2}$ $(1,5)^{3}$
• • •					ength f _b ≥ 1					a a21
M8	12x80	80	2,0	2,0	1,5	2,0	1,5		1,2	$3,0^{2}$ $(1,2)^{3}$
M8 / M10	16x85	85	2,0	2,0	1,5	2,0	2,0		1,5	$4,5^{2}$ $(1,5)^{3}$
/ IG-M6 M12 /	16x130	130	2,5	2,5	1,5	2,5	2,5		1,5	$4,5^{2}$ $(1,5)^{3}$
M12/ M16/	20x85	85	6,0	5,5	4,0	6,0	5,5	_	4,0	$4,5^{2}$ $(1,5)^{3}$
IG-M8 /	20x130	130	6,0	5,5	4,0	6,0	5,5	_	4,0	$4,5^{2}$ $(1,5)^{3}$
IG-M10	20x200	200	6,0	5,5	4,0	6,0	5,5	4	4,0	$4,5^{2}$ $(1,5)^{3}$
 ²⁾ V_{Rk,c,II} ³⁾ V_{Rk,c,⊥} 	= V _{Rk,b} valic = V _{Rk,b} (valu	or c _{cr} and c _{min} I for shear load ues in brackets) Ilid for steel 5.6	valid for sh	ear load in di			8			
ESSVE	Injection	system ONE	ONE ICE	for masonr	у					
								_	nex C 1	



Brick typ	be: Calci	um silicate	hollow bri	ck KS L-3	BDF				
Table C2	4: Cha	racteristic v	alues of res	istance ur			-	tinue)	
					Char	acteristic re			
		Effective	e	d/d		Use catego	w/d w/w		d/d; w/d; w/w
Anchor size	Sleeve	depth	40°C/24°C	80°C/50°C	120°C/72°C	40°C/24°C	80°C/50°C	120°C/72°C	For all
		h _{ef}		$N_{Rk,b} = N_{Rk}$	1) .p		$N_{Rk,b} = N_{Rk,c}$	1)	V _{Rk,b} ⁴⁾
		[mm]				[kN]			
			Comp	ressive st	rength f _b ≥ 1	<u>4 N/mm²</u>			
M8	12x80	80	2,5	2,5	1,5	2,0	2,0	1,5	$3,5^{2}(1,5)^{3}$
M8 / M10	16x85	85	2,5	2,5	1,5	2,5	2,5	1,5	$6,0^{2}$ (2,0) ³
/ IG-M6	16x130	130	2,5	2,5	2,0	2,5	2,5	2,0	$6,0^{2}$ (2,0) ³
M12 /	20x85	85	6,5	6,0	4,5	6,5	6,0	4,5	$6,0^{2}$ (2,0) ³
M16 / IG-M8 /	20x130	130	6,5	6,0	4,5	6,5	6,0	4,5	$6,0^{2}$ (2,0) ³
IG-M10	20x200	200	6,5	6,0	4,5	6,5	6,0	4,5	$6,0^{2}$ (2,0) ³
 ²⁾ V_{Rk,c,II} ³⁾ V_{Rk,c,⊥} ⁴⁾ The va Table C2 	= V _{Rk,b} valid = V _{Rk,b} (val alues are va 5: Disp	ues in bracke alid for steel 5 lacements	ad parallel to fr ts) valid for sh 6.6 or greater. Effective nchorage	ear load in c For steel 4.6		oly V _{Rk,b} by 0,		δνο	
Anchor si	ze Sle		lepth h _{ef}						
M8	10	x80	[mm] 80	[kN] [mm	n/kN] [mn	1] [mm		[mm]	[mm]
				0.71	0.0	4 4 4 4	1,0	1,0	1,50
M8 / M10 IG-M6		x85 x130	85	0,71	0,64	4 1,29	1		
				0,	90			1.0	0.05
M12 / M1	0/	x85	85	1 00		7 0.0	1,7	1,9	2,85
IG-M8 /	20	×130	130	1,86	1,6	7 3,34	+		

ESSVE Injection system ONE, ONE ICE for masonry

Performances calcium hollow brick KS L-3DF Characteristic values of resistance under tension and shear load (continue) Displacements

200

Annex C 11

IG-M10

20x200



Table C26: Descriptio	on of the brid	Calcium silicate hollo	ave beight				
Brick type		KSL-12DF	OW DRICK				
Bulk density	ρ [kg/dm ³]	1,4					
•	$_{\rm b} \ge [\rm N/mm^2]$	10, 12 or 16					
Code		EN 771-2					1
Producer (country code)		e.g. Wemding (DE)					
Brick dimensions	[mm]	498 x 175 x 238					
Drilling method		Rotary					
						59 23 59 17	*
, 35 , 59	, 64 ,	59 , 64 ,	59	64	59 / 35	1	
Table C27: Installation	n parameters	1 1 5	[-]	64	All sizes	1	
Table C27: Installation Anchor size Edge distance	n parameters	3 3	[-] [mm]	64 /	All sizes 100 (120) ¹)	
Table C27: Installation Anchor size Edge distance	n parameters	3 3	[-] [mm]	64 /	All sizes 100 (120) ¹ 100 (120) ¹)	
1 1 .	C _{cr} C _{min} ²⁾ S _{cr,II}	1 1 3	[-] [mm] [mm]	64 /	All sizes 100 (120) ¹ 100 (120) ¹ 498)	
Table C27: Installation Anchor size Edge distance Edge distance Minimum edge distance Spacing Minimum spacing	n parameters C _{or} C _{min} ²⁾ S _{cr,⊥} S _{min}	1 1 S	[-] [mm]	64 /	All sizes 100 (120) ¹ 100 (120) ¹)	
Table C27: Installation Anchor size Edge distance Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : cmin according	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} H20x85 and SH to Technical F	1 1 S	[-] [mm] [mm] [mm] [mm] [mm]		All sizes 100 (120) ¹ 100 (120) ¹ 498 238)	
Table C27: Installation Anchor size Edge distance Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SF ²⁾ For V _{Rk,c} : cmin according Table C28: Group fact Configuration II: anchors placed	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} H20x85 and SH to Technical F	A20x130 Report TR 054 or group in case of ter	[-] [mm] [mm] [mm] [mm] [mm]	Jing	All sizes 100 (120) ¹ 100 (120) ¹ 498 238)	1,0
Table C27: Installation Anchor size Edge distance Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SF ²⁾ For V _{Rk,c} : cmin according Table C28: Group fact Configuration II: anchors placed parallel to horizontal For Value	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} H20x85 and SH to Technical F	1 1 s l20x130 Report TR 054 or group in case of ten with c ≥ 100	[-] [mm] [mm] [mm] [mm] [mm]	Jing with s ≥ 120	All sizes 100 (120) ¹ 100 (120) ¹ 498 238)	
Table C27: Installation Anchor size Edge distance Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : cmin according Table C28: Group fact Configuration II: anchors placed parallel to horizontal joint	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} H20x85 and SH to Technical F	A A A A A A A A A A A A A A A A A A A	[-] [mm] [mm] [mm] [mm] [mm]	ding with s ≥ 120 498	All sizes 100 (120) ¹ 100 (120) ¹ 498 238 120)	2,0
Table C27: Installation Anchor size Edge distance Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : cmin according Table C28: Group fact Configuration II: anchors placed parallel to horizontal joint ⊥: anchors placed Image: control of the second se	n parameters	a 1 a 1 a 1 a 1 b 120×130 Report TR 054 b r group in case of ten with c ≥ 100 c_{cr} 100	[-] [mm] [mm] [mm] [mm] [mm]	ding with s ≥ 120 498 120	All sizes 100 (120) ¹ 100 (120) ¹ 498 238 120 α _{g,N,II})	2,0 1,0
Table C27: Installation Anchor size Edge distance Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : cmin according Table C28: Group fact Configuration II: anchors placed parallel to horizontal joint	Cor Cmin ² Sor,II Scr,L Smin H20x85 and SH to Technical F tor for ancho	A A A A A A A A A A A A A A A A A A A	[-] [mm] [mm] [mm] [mm] [mm]	ding with s ≥ 120 498	All sizes 100 (120) ¹ 100 (120) ¹ 498 238 120)	2,0
Table C27: Installation Anchor size Edge distance Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : cmin according Table C28: Group fact Configuration II: anchors placed parallel to horizontal joint joint Image: control of the second	n parameters C _{cr} C _{min} ²⁾ S _{cr,I} S _{or,⊥} S _{min} H20x85 and SH to Technical F tor for ancho	s 20×130 Report TR 054 or group in case of ten with c ≥ 100 c_{cr} 100 c_{cr}	[-] [mm] [mm] [mm] [mm] [mm]	ding with s ≥ 120 498 120	All sizes 100 (120) ¹ 100 (120) ¹ 498 238 120 α _{g,N,II})	2,0 1,0



	Configuration			with c ≥		with s ≥	:		
II: anchors parallel to ho joint	placed prizontal	V ••		C _{cr}		498		g,V,II	2,0
⊥: anchors perpendicu horizontal	lar to			C _{cr}		238	α	g,V,_	2,0
Table C30:	Group fac	tor for anch	or group	in case of	shear load	ling perpe	ndicular t	o free edge	
	Configuration			with c ≥		with s ≥	:		
II: anchors parallel to ho joint	rizontal			C _{cr}		498	α	g,V,II	2,0
⊥: anchors perpendicu horizontal	lar to			C _{cr}		238	α	[-]	2,0
Table C31:	Characte	ristic values	of resista	ance unde		nd shear racteristic r Use cate	resistance		
Anchor size	Sleeve	Effective anchorage depth		d/d			w/d w/w		d/d w/d w/w
Anchor Size	Sieeve	doptin	40°C/24°C	80°C/50°C	120°C/72°C			120°C/72°C	For all temperatur range
		h _{ef}		$N_{Rk,b} = N_{Rk,c}$	1) p	1	$N_{Rk,b} = N_{Rk,b}$	1) p	$V_{Rk,b}^{(2)3)}$
		[mm]				[kN]			
					gth f _b ≥ 10				
M8	12x80	80	0,6	0,6	0,4	0,5	0,5	0,4	2,5
M8 / M10 /	16x85	85	0,6	0,6	0,4	0,6	0,6	0,4	5,5
IG-M6	16x130	130	2,5	2,5	2,0	2,5	2,5	2,0	5,5
/12 / M16 / IG-M8 /	20x85	85	1,5	1,5	0,9	1,5	1,5	0,9	5,5
IG-M10	20x130	130	2,5	2,5	2,0	2,5	2,5	2,0	5,5
			Compres	sive stren	gth f _b ≥ 12	N/mm ²	1		
M8	12x80	80	0,75	0,6	0,5	0,6	0,6	0,4	3,0
M8 / M10 /	16x85	85	0,75	0,6	0,5	0,75	0,6	0,5	6,5
IG-M6	16x130	130	3,0	3,0	2,0	3,0	3,0	2,0	6,5
M12 / M16 /	20x85	85	1,5	1,5	1,2	1,5	1,5	1,2	6,5
IG-M8 / IG-M10	20x130	130	3,0	3,0	2,0	3,0	3,0	2,0	6,5
¹⁾ Values a ²⁾ Calculati	re valid for c _{cr} on of V _{Rk,c} see es are valid for	Technical Rep						n c ≥ 120 mm	$: \mathbf{V}_{Rk,c,II} = \mathbf{V}_{Rk,t}$
ESSVE In	jection syste	em ONE, ON	E ICE for	masonry					



Brick type:	Calcium si	licate holl	ow brick	KS L-120)F				
Table C32:	Character	istic values	of resista	ince unde	r tension a	nd shear I	loads (cor	ntinue)	
					Char	acteristic r Use categ			
Anabaraina	Cleave	Effective anchorage depth		d/d			w/d w/w		d/d w/d w/w
Anchor size	Sleeve	depth	40°C/24°C	80°C/50°C	120°C/72°C	40°C/24°C	80°C/50°C	120°C/72°C	For all temperature range
		h _{ef}	1	$V_{Rk,b} = N_{Rk,c}$	1) p	1	$V_{Rk,b} = N_{Rk,b}$	1) p	V _{Rk,b} ²⁾³⁾
		[mm]				[kN]			
			Compres	sive stren	gth f _b ≥ 16	N/mm ²			
M8	12x80	80	0,9	0,9	0,6	0,75	0,75	0,5	3,5
M8 / M10 /	16x85	85	0,9	0,9	0,6	0,9	0,9	0,6	8,0
IG-M6	16x130	130	4,0	3,5	2,5	4,0	3,5	2,5	8,0
M12 / M16 /	20x85	85	2,0	2,0	1,5	2,0	2,0	1,5	8,0
IG-M8 / IG-M10	20x130	130	4,0	3,5	2,5	4,0	3,5	2,5	8,0

¹⁾ Values are valid for c_{cr} and c_{min}

²⁾ Calculation of V_{Rk,c} see Technical Report TR 054, except for shear load parallel to free edge with $c \ge 120 \text{ mm}$: V_{Rk,c,II} = V_{Rk,b} ³⁾ The values are valid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply V_{Rk,b} by 0,8

Table C33:Displacements

Anchor size	Sleeve	Effective anchorage depth h _{ef}	Ν	δ _N / N	δ _{N0}	δ _{N∞}	V	δ_{V0}	δ _{V∞}
		[mm]	[kN]	[mm/kN]	[mm]	[mm]	[kN]	[mm]	[mm]
M8	12x80	80	0,26		0,23	0.46	1,0	1,3	1,95
M8 / M10 /	16x85	85	0,20		0,23	0,46			
IG-M6	16x130	130	1,14	0.90	1,03	2,06			
M12 / M16	20x85	85	0,57		0,51	1,03	2,3	2,5	3,75
/ IG-M8 / IG-M10	20x130	130	1,14		1,03	2,06			

ESSVE Injection system ONE, ONE ICE for masonry

Performances calcium hollow brick KS L-12DF Characteristic values of resistance under tension and shear load (continue) Displacements



Brick type: Clay solid brick Mz-DF	-	
Table C34: Description of the bric	k	
Brick type	Clay solid brick Mz-DF	
Bulk density ρ [kg/dm ³]	1,6	
Compressive strength $f_b \ge [N/mm^2]$	10, 20 or 28	
Code	EN 771-1	
Producer (country code)	e.g. Unipor (DE)	
Brick dimensions [mm]	240 x 115 x 55	
Drilling method	Hammer	

[-]	All sizes
[mm]	1,5*h _{ef}
[mm]	60
[mm]	3*h _{ef}
[mm]	120
	[mm] [mm]

Table C36: Group factor for anchor group in case of tension loading

Configura	ation	with c ≥	with s ≥			
II: anchors placed		60	120			0,7
parallel to horizontal joint		1,5*hef	3*h _{ef}	α _{g,N,II}	.,	2,0
⊥: anchors placed		60	120		[-]	0,5
perpendicular to		1,5*hef	120	$\alpha_{g,N,\perp}$		1,0
horizontal joint		1,5*hef	3*h _{ef}			2,0

Table C37: Group factor for anchor group in case of shear loading parallel to free edge

Configura	ation	with c ≥	with s ≥			
II: anchors placed		60	120			0,5
parallel to horizontal	V ••	90	120	$\alpha_{g,V,II}$		1,1
joint		1,5*hef	3*h _{ef}		r 1	2,0
⊥: anchors placed		60	120		[-]	0,5
perpendicular to	I V 🚦	1,5*hef	120	$\alpha_{g,V,\perp}$		1,0
horizontal joint		1,5*hef	3*h _{ef}			2,0

Table C38: Group factor for anchor group in case of shear loading perpendicular to free edge

Configura	ation	with c ≥	with s ≥			
II: anchors placed		60	120			0,5
parallel to horizontal	V-•••	1,5*hef	120	α _{g,V,II}		1,0
joint		1,5*hef	3*h _{ef}			2,0
⊥: anchors placed		60	120		[-]	0,5
perpendicular to	∨ —••	1,5*hef	120	$\alpha_{g,V,\perp}$		1,0
horizontal joint		1,5*hef	3*h _{ef}			2,0

ESSVE Injection system ONE, ONE ICE for masonry

Performances clay solid brick Mz-DF

Description of the brick

Installation parameters



M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M10 M8 M12 / M16 / IG-M8 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M10	Sleeve - - - 12x80 16x85 16x130 20x85 20x130 20x200 -	Effective anchorage depth [mm] Compressive s 80 90 100 100 100 100 100 100 100 100 100	$\begin{array}{c c} 3,5 \ (1,5) \\ \hline 3,5 \ (1,5) \\ \hline 4,0 \ (2,0) \\ \hline 4,0 \ (2,0) \\ \hline 3,5 \ (1,5) \$	Use d/d w/d w/w $80^{\circ}C/50^{\circ}C$ $N_{Rk,b} = N_{Rk,p}^{1/2}$ N/mm^2 3,5 (1,5) 3,5 (1,5)	ristic resistance category 120°C/72°C [kN] 2,5 (1,2) 3,0 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	$\begin{array}{c} d/d \\ w/d \\ w/w \\ For all \\ temperature \\ range \\ V_{Rk,b}^{2)3)} \\ \hline \\ \hline \\ 3,5 (1,2) \\ 3,5 (1,$
M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M10	- - - 12x80 16x85 16x130 20x85 20x130 20x200	anchorage depth hef [mm] Compressive s 80 90 100 100 100 80 85 130 85 130 85 130 85 130 85	trength $f_b \ge 10$ 3,5 (1,5) 3,5 (1,5) 4,0 (2,0) 4,0 (2,0) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	$\frac{d/d}{w/d}$ w/w $80^{\circ}C/50^{\circ}C$ $N_{Rk,b} = N_{Rk,p}^{1/2}$ $\frac{N/mm^{2}}{3,5 (1,5)}$ $3,5 (1,5)$ $4,0 (2,0)$ $4,0 (2,0)$ $4,0 (2,0)$ $3,5 (1,5)$	120°C/72°C [kN] 2,5 (1,2) 3,0 (1,5) 3,5 (1,5) 3,5 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	$\begin{tabular}{ c c c c c } & w/d & w/w & \\ & For all & \\ temperature & \\ & range & \\ & V_{Rk,b}^{2(3)} & \\ \hline & & \\ & & \\ \hline & & \\$
M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M10	- - - 12x80 16x85 16x130 20x85 20x130 20x200	anchorage depth hef [mm] Compressive s 80 90 100 100 100 80 85 130 85 130 85 130 85 130 85	trength $f_b \ge 10$ 3,5 (1,5) 3,5 (1,5) 4,0 (2,0) 4,0 (2,0) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	$w/d \\ w/w$ $80^{\circ}C/50^{\circ}C$ $N_{Bk,b} = N_{Bk,p}^{1}$ N/mm^{2} $3,5 (1,5)$ $3,5 (1,5)$ $4,0 (2,0)$ $4,0 (2,0)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$	[kN] 2,5 (1,2) 3,0 (1,5) 3,5 (1,5) 3,5 (1,5) 3,0 (1,2) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	$\begin{tabular}{ c c c c c } & w/d & w/w & \\ & For all & \\ temperature & \\ & range & \\ & V_{Rk,b}^{2(3)} & \\ \hline & & \\ & & \\ \hline & & \\$
M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M10	- - - 12x80 16x85 16x130 20x85 20x130 20x200	depth h _{ef} [mm] Compressive s 80 90 100 100 100 80 85 130 85 130 85 130 200 Compressive s	trength $f_b \ge 10$ 3,5 (1,5) 3,5 (1,5) 4,0 (2,0) 4,0 (2,0) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	$\begin{tabular}{ c c c c } \hline w/w \\ \hline 80^\circ C/50^\circ C \\ \hline N_{Rk,b} = N_{Rk,p}^{-1} \\ \hline N/mm^2 \\ \hline 3.5 (1.5) \\ \hline 3.5$	[kN] 2,5 (1,2) 3,0 (1,5) 3,5 (1,5) 3,5 (1,5) 3,0 (1,2) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	$\begin{array}{r} \mbox{w/w} \\ For all \\ temperature \\ range \\ \mbox{$V_{\rm Rk,b}$}^{2/3)} \\ \hline \\ \mbox{$3,5$ (1,2)$} \\ \mb$
M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 IG-M6 M12 / IG-M8 M8 / M10 / IG-M6 M12 / IG-M6 M12 / IG-M6 M12 / M16 / IG-M8 / IG-M10	- - - 12x80 16x85 16x130 20x85 20x130 20x200	h _{ef} [mm] Compressive s 80 90 100 100 100 80 85 130 85 130 85 130 200 Compressive s	trength $f_b \ge 10$ 3,5 (1,5) 3,5 (1,5) 4,0 (2,0) 4,0 (2,0) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	$80^{\circ}C/50^{\circ}C$ $N_{Rk,b} = N_{Rk,p}^{1}$ N/mm^{2} $3,5 (1,5)$ $3,5 (1,5)$ $4,0 (2,0)$ $4,0 (2,0)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$	[kN] 2,5 (1,2) 3,0 (1,5) 3,5 (1,5) 3,5 (1,5) 3,0 (1,2) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	For all temperature range $V_{Rk,b}^{(2)3)}$ 3,5 (1,2) 3,5 (1,2)
M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M8 / IG-M8 / IG-M8 / IG-M8 / IG-M10 X	- - 12x80 16x85 16x130 20x85 20x130 20x200	[mm] Compressive s 80 90 100 100 80 85 130 85 130 200 Compressive s	trength $f_b \ge 10$ 3,5 (1,5) 3,5 (1,5) 4,0 (2,0) 4,0 (2,0) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	$N_{Rk,b} = N_{Rk,p}^{1}$ N/mm^{2} $3,5 (1,5)$ $3,5 (1,5)$ $4,0 (2,0)$ $4,0 (2,0)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$ $3,5 (1,5)$	[kN] 2,5 (1,2) 3,0 (1,5) 3,5 (1,5) 3,5 (1,5) 3,0 (1,2) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	$\begin{array}{r} \text{temperature} \\ range \\ V_{\text{Rk,b}}^{2)3)} \\ \hline \\ $
M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M10 X	- - 12x80 16x85 16x130 20x85 20x130 20x200	[mm] Compressive s 80 90 100 100 80 85 130 85 130 200 Compressive s	$\begin{array}{c c} 3,5 \ (1,5) \\ \hline 3,5 \ (1,5) \\ \hline 4,0 \ (2,0) \\ \hline 4,0 \ (2,0) \\ \hline 3,5 \ (1,5) \$	N/mm ² 3,5 (1,5) 3,5 (1,5) 4,0 (2,0) 4,0 (2,0) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	[kN] 2,5 (1,2) 3,0 (1,5) 3,5 (1,5) 3,5 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	V _{Rk,b} ²⁾³⁾ 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 5,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2)
M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M10 M8	- - 12x80 16x85 16x130 20x85 20x130 20x200	Compressive s 80 90 100 100 80 85 130 85 130 200 Compressive s	$\begin{array}{c c} 3,5 \ (1,5) \\ \hline 3,5 \ (1,5) \\ \hline 4,0 \ (2,0) \\ \hline 4,0 \ (2,0) \\ \hline 3,5 \ (1,5) \$	N/mm ² 3,5 (1,5) 3,5 (1,5) 4,0 (2,0) 4,0 (2,0) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	[kN] 2,5 (1,2) 3,0 (1,5) 3,5 (1,5) 3,5 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	$\begin{array}{r} 3,5 \ (1,2) \\ 3,5 \ (1,2) \\ 3,5 \ (1,2) \\ 5,5 \ (1,5) \\ 3,5 \ (1,2) \\ 3,5 \ (1,2) \\ 3,5 \ (1,2) \\ 3,5 \ (1,2) \\ 3,5 \ (1,2) \\ 3,5 \ (1,2) \\ 3,5 \ (1,2) \\ 3,5 \ (1,2) \end{array}$
M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M8 / IG-M10 X	- - 12x80 16x85 16x130 20x85 20x130 20x200	80 90 100 80 85 130 85 130 200 Compressive s	$\begin{array}{c c} 3,5 \ (1,5) \\ \hline 3,5 \ (1,5) \\ \hline 4,0 \ (2,0) \\ \hline 4,0 \ (2,0) \\ \hline 3,5 \ (1,5) \$	$\begin{array}{c} 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 4,0 \ (2,0) \\ 4,0 \ (2,0) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \end{array}$	$\begin{array}{c} 3,0 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,0 \ (1,2) \\ 3,0 \ (1,5) \\ 3,0 \ (1,5) \\ 3,0 \ (1,5) \\ 3,0 \ (1,5) \\ 3,0 \ (1,5) \end{array}$	3,5 (1,2) 3,5 (1,2) 5,5 (1,5) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2)
M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M6 M12 / M16 / IG-M8 / IG-M10 M8 M10 / IG-M8 / IG-M10 M12 / M16 / IG-M8 / IG-M10 M12 / M16 / IG-M8 / IG-M10 M12 / M16 / IG-M8 / IG-M10	- - 12x80 16x85 16x130 20x85 20x130 20x200	80 90 100 80 85 130 85 130 200 Compressive s	$\begin{array}{c c} 3,5 \ (1,5) \\ \hline 3,5 \ (1,5) \\ \hline 4,0 \ (2,0) \\ \hline 4,0 \ (2,0) \\ \hline 3,5 \ (1,5) \$	$\begin{array}{c} 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 4,0 \ (2,0) \\ 4,0 \ (2,0) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \end{array}$	$\begin{array}{c} 3,0 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,0 \ (1,2) \\ 3,0 \ (1,5) \\ 3,0 \ (1,5) \\ 3,0 \ (1,5) \\ 3,0 \ (1,5) \\ 3,0 \ (1,5) \end{array}$	3,5 (1,2) 3,5 (1,2) 5,5 (1,5) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2)
M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 M8 M12 / M16 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M10 / IG-M6 M12 / IG-M8 M8 / M10 / IG-M6 M12 / IG-M6 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10	- 12x80 16x85 16x130 20x85 20x130 20x200	100 100 80 85 130 85 130 200 Compressive s	$\begin{array}{c} 4,0\ (2,0)\\ 4,0\ (2,0)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ \end{array}$	$\begin{array}{r} 4,0\ (2,0)\\ 4,0\ (2,0)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ 3,5\ (1,5)\\ \end{array}$	3,5 (1,5) 3,5 (1,5) 3,0 (1,2) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	3,5 (1,2) 5,5 (1,5) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2)
M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M10 M8 M8 / M10 / IG-M8 / IG-M8 / IG-M10 M8	- 12x80 16x85 16x130 20x85 20x130 20x200	100 80 85 130 85 130 200 Compressive s	$\begin{array}{c c} 4,0 & (2,0) \\\hline 3,5 & (1,5) \\\hline trength f_b \geq 20 \end{array}$	4,0 (2,0) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	3,5 (1,5) 3,0 (1,2) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	3,5 (1,2) 5,5 (1,5) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2)
M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 X M8 M10 / IG-M6 M12 / IG-M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M12 / IG-M8 M16 / IG-M10 IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M10	16x85 16x130 20x85 20x130 20x200	80 85 130 85 130 200 Compressive s	$\begin{array}{c c} 4,0 & (2,0) \\\hline 3,5 & (1,5) \\\hline trength f_b \geq 20 \end{array}$	3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	3,0 (1,2) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	5,5 (1,5) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2)
M8 / M10 / IG-M6 IG-M6 IG-M6 M12 / M16 / IG-M8 / IG-M10 IG M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M16 / IG-M10 M8 M16 / IG-M10 IG-M6 IG-M6 M12 / IG-M6 IG-M6 M12 / M16 / IG-M8 / IG-M8 / IG-M10	16x85 16x130 20x85 20x130 20x200	85 130 85 130 200 Compressive s	$\begin{array}{c} 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ \end{array}$	3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	3,0 (1,5) 3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2) 3,5 (1,2)
IG-M6 1 M12 / M16 / 1 IG-M8 / 2 IG-M10 2 M8 1 M10 / IG-M6 1 M12 / IG-M8 1 M16 / IG-M10 1 M8 1 M16 / IG-M10 1 IG-M6 1 M12 / M16 / 1 IG-M8 / 2 IG-M10 2	16x130 20x85 20x130 20x200	130 85 130 200 Compressive s	$\begin{array}{c c} 3,5 \ (1,5) \\ \hline 3,5 \ (1,5) \\ trength \ f_b \geq 20 \end{array}$	3,5 (1,5) 3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	3,0 (1,5) 3,0 (1,5) 3,0 (1,5)	3,5 (1,2) 3,5 (1,2) 3,5 (1,2)
M12 / M16 / IG-M8 / IG-M10 2 M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 2 M12 / M16 / IG-M8 / IG-M10 2	20x85 20x130 20x200	85 130 200 Compressive s	$\begin{array}{c} 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ 3,5 \ (1,5) \\ \end{array}$	3,5 (1,5) 3,5 (1,5) 3,5 (1,5)	3,0 (1,5) 3,0 (1,5)	3,5 (1,2) 3,5 (1,2)
IG-M8 / 2 IG-M10 2 M8 4 M10 / IG-M6 4 M12 / IG-M8 4 M16 / IG-M10 4 M8 / M10 / 4 IG-M6 4 M12 / M16 / 4 IG-M8 / 2 IG-M8 / 2 IG-M10 2	20x130 20x200	130 200 Compressive s	3,5 (1,5) 3,5 (1,5) trength f _b ≥ 20	3,5 (1,5) 3,5 (1,5)	3,0 (1,5)	3,5 (1,2)
IG-M10 2 M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 2 M12 / M16 / IG-M8 / 2 IG-M10 2 M8	20x200	200 Compressive s	3,5 (1,5) trength f _b ≥ 20	3,5 (1,5)		
M8 M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M6 M12 / M16 / IG-M8 / IG-M10		Compressive s	trength f _b ≥ 20		3,0 (1,5)	
M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10	-			N/mm ²		
M10 / IG-M6 M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10	-					
M12 / IG-M8 M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 2		00	4,5 (2,5)	4,5 (2,5)	4,0 (2,0)	5,0 (1,5)
M16 / IG-M10 M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10 2	-	90	5,5 (2,5)	5,5 (2,5)	4,5 (2,0)	5,0 (1,5)
M8 M8 / M10 / IG-M6 M12 / M16 / IG-M8 / IG-M10	-	100	6,0 (3,0)	6,0 (3,0)	5,0 (2,5)	5,0 (1,5)
M8 / M10 / IG-M6 / M12 / M16 / IG-M8 / 2 IG-M10 2	-	100	6,0 (3,0)	6,0 (3,0)	5,0 (2,5)	8,0 (2,5)
IG-M6 M12 / M16 / IG-M8 / IG-M10	12x80	80	4,5 (2,5)	4,5 (2,5)	4,0 (2,0)	5,0 (1,5)
M12 / M16 / IG-M8 / IG-M10	16x85	85	5,0 (2,5)	5,0 (2,5)	4,0 (2,0)	5,0 (1,5)
IG-M8 / 2 IG-M10	16x130	130	5,0 (2,5)	5,0 (2,5)	4,0 (2,0)	5,0 (1,5)
IG-M10	20x85	85	5,0 (2,5)	5,0 (2,5)	4,0 (2,0)	5,0 (1,5)
	20x130	130	5,0 (2,5)	5,0 (2,5)	4,0 (2,0)	5,0 (1,5)
	20x200	200	5,0 (2,5)	5,0 (2,5)	4,0 (2,0)	5,0 (1,5)
140		Compressive s	trength f _b ≥ 28	N/mm ²		
M8	-	80	5,5 (2,5)	5,5 (2,5)	4,5 (2,5)	5,5 (2,0)
M10 / IG-M6	-	90	6,0 (3,0)	6,0 (3,0)	5,0 (2,5)	5,5 (2,0)
M12 / IG-M8	-	100	7,0 (3,5)	7,0 (3,5)	6,0 (3,0)	5,5 (2,0)
M16 / IG-M10	-	100	7,0 (3,5)	7,0 (3,5)	6,0 (3,0)	9,0 (3,0)
M8	12x80	80	5,5 (2,5)	5,5 (2,5)	4,5 (2,5)	5,5 (2,0)
M8 / M10 /	16x85	85	6,0 (3,0)	6,0 (3,0)	5,0 (2,5)	5,5 (2,0)
IG-M6	16x130	130	6,0 (3,0)	6,0 (3,0)	5,0 (2,5)	5,5 (2,0)
M12 / M16 /	20x85	85	6,0 (3,0)	6,0 (3,0)	5,0 (2,5)	5,5 (2,0)
IG-M8 / IG-M10		130	6,0 (3,0)	6,0 (3,0)	5,0 (2,5)	5,5 (2,0)

¹⁾ Values are valid for c_{cr}, values in brackets are valid for single anchors with c_{min}

For c_{cr} calculation of $V_{Rk,c}$ see Technical Report TR 054; for c_{min} values in brackets $V_{Rk,b} = V_{Rk,c}$

³⁾ The values are valid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply $V_{Rk,b}$ by 0.8

ESSVE Injection system ONE, ONE ICE for masonry

Performances clay solid brick Mz-DF

Characteristic values of resistance under tension and shear load



Brick type: Clay solid brick Mz-DF										
Table C40: Di	splaceme	nts								
Anchor size	Sleeve	Effective anchorage depth h _{ef}	N	δ _N / N	δ _{N0}	δ _{N∞}	V	δ_{V0}	δγ∞	
		[mm]	[kN]	[mm/kN]	[mm]	[mm]	[kN]	[mm]	[mm]	
M8	-	80	1,3		0,19	0,39				
M10 / IG-M6	-	90	1,6		0,24	0,47	1,9			
M12 / IG-M8	-	100	17		0.00	0.51				
M16 / IG-M10	-	100	1,7		0,26	0,51	2,9			
M8	12x80	80		0.15				1 00	1 50	
M8 / M10 /	16x85	85		0,15				1,00	1,50	
IG-M6	16x130	130			0.10	0.00	1.0			
M12 / M16 /	20x85	85	- 1,3 		0,19	0,39	1,9			
IG-M8 /	20x130	130								
IG-M10	20x200	200	1							

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Performances clay solid brick Mz-DF Displacements



Brick type		Clay hollow brick					
	p [kg/dm ³]	HLz-16-DF 0,8			A State	and the second sec	
	≥ [N/mm²]	6, 8, 12, 14					
Code	- [19/11111]	EN 771-1				-	
Producer (country code)		e.g. Unipor DE)					
Brick dimensions	[mm]	497 x 240 x 238					
Drilling method		Rotary					
UFC					¢13 ₩-6		
	14 777 14,5			6-#			
				6-#			
Anchor size	parameters		[-]	6-#	All sizes)	
Anchor size Edge distance	parameters		[mm]	6-#	100 (120) ¹		
Anchor size Edge distance Minimum edge distance	parameters			6-#			
Anchor size Edge distance Minimum edge distance	C _{cr} C _{min} ²⁾ S _{cr,II}		[mm] [mm]	6-#	100 (120) ¹ 100 (120) ¹ 497 238		
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing	Ccr Cmin ²⁾ Scr,II Scr,L Smin 0x85; SH20>	s 	[mm] [mm] [mm]	6-#	100 (120) ¹ 100 (120) ¹ 497		
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to	Ccr Cmin ²⁾ Scr,II Scr,⊥ Smin 0x85; SH20> o Technical F	s 	[mm] [mm] [mm] [mm]		100 (120) ¹ 100 (120) ¹ 497 238		1,3 2,0 1,1 2,0



001	figuration	with c a	2	with s ≥				
II: anchors placed parallel to horizontal joint L: anchors placed perpendicular to horizontal joint		C _{cr}		497	α _{g,V,II}	[-]	2,0	
				238	$\alpha_{g,V,\perp}$		2,0	
Table C45: G	roup factor for anc	hor group in case	e of shear load	ding perpendi	cular to free e	dge		
Con	figuration	with c a	2	with s ≥				
II: anchors place parallel to horizor joint		C _{cr}		497	α _{g,V,II}	r 1	2,0	
⊥: anchors place perpendicular t horizontal joint	o V	Ccr		238	$\alpha_{g,V,\perp}$	[-]	2,0	
Table C46: 0	Characteristic value	s of resistance u	nder tension a	Characte	ds ristic resistance e category	9		
				Ose			d/d	
		Effective		w/d			d/d w/d	
127 Feb 14		anchorage	w/d w/w			w/w		
Anchor size	Sleeve	depth				F	For all	
			40°C/24°C	80°C/50°C	120°C/72°C	temperature range		
		h _{ef}		$N_{Rk,b} = N_{Rk,p}^{1}$)	\ \	2)3) Rk,b	
		[mm]		[kN]				
		Compressive s		1				
M8	12x80	80	2,5	2,5	2,0		2,5	
M8 / M10/	16x85	85	2,5	2,5	2,0		4,5	
IG-M6	16x130	130	3,5	3,5	3,0		4,5	
M12/M16/	20x85	85	2,5	2,5	2,0		5,0	
G-M8 / IG-M10	20x130	130	3,5 3,5		3,0		6,0	
	20x200	200	3,5	3,5	3,0		6,0	
		Compressive s			··· _ · · ·	1		
M8	12x80	80	3,0	3,0	2,5		3,0	
M8 / M10/	16x85	85	3,0	3,0	2,5		5,5	
IG-M6	16x130	130	4,5	4,5	3,5		5,5	
M12/M16/	20x85	85	3,0	3,0	2,5		6,0	
G-M8 / IG-M10	20x130	130	4,5	4,5	3,5		7,0	
²⁾ Calculation V _{Rk,b}	20x200 e valid for c _{cr} and c _{min} on of V _{Rk,c} see Technica es are valid for steel 5.6	nonan anti-enconan ana mananana ataunan	na n	ontena indite anna anna anna anna anna anna anna an		 125 mm	7,0 : V _{Rk,c,II} =	
	ion system ONE, O	-						
V _{Rk,b} ³⁾ The value	s are valid for steel 5.6	or greater. For stee	I 4.6 and 4.8 mu	ontena indite anna anna anna anna anna anna anna an	8	ex C 19		



			nder tension a				
				Characte	ristic resistance		
				Use	e category		
		Effective		d/d		d/d	
		anchorage		w/d		w/d	
Anchor size	Sleeve	depth		w/w			
Anchor Size	Oleeve	Goptii		80°C/50°C	120°C/72°C	For all	
			40°C/24°C			temperature	
				$N_{Rk,b} = N_{Rk,p}^{1}$		range	
		h _{ef}		V _{Rk,b} ²⁾³⁾			
		[mm]					
		Compressive s	trength f _b ≥ 12	N/mm ²			
M8	12x80	80	3,5	3,5	3,0	4,0	
M8 / M10/	16x85	85	3,5	3,5	3,0	6,5	
IG-M6	16x130	130	5,0	5,0	4,5	6,5	
	20x85	85	3,5	3,5	3,0	7,0	
M12 / M16 / IG-M8 / IG-M10	20x130	130	5,0	5,0	4,5	9,0	
	20x200	200	5,0	5,0	4,5	9,0	
		Compressive s	trength f _b ≥ 14	N/mm ²			
M8	12x80	80	4,0	4,0	3,0	4,0	
M8 / M10/	16x85	85	4,0	4,0	3,0	6,5	
IG-M6	16x130	130	5,5	5,5	4,5	6,5	
	20x85	85	4,0	4,0	3,0	7,0	
M12 / M16 / HG-M8 / IG-M10 H	20x130	130	5,5	5,5	4,5	9,0	
	20x200	200	5,5	5,5	4,5	9,0	

¹⁾ Values are valid for c_{cr} and c_{min}

²⁾ Calculation of V_{Rk,c} see Technical Report TR 054, except for shear load parallel to free edge with $c \ge 125$ mm: V_{Rk,c,II} = $V_{Rk,b}$

³⁾ The values are valid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply $V_{Rk,b}$ by 0,8

Table C48: Displacements

Anchor size	Sleeve	Effective anchorage depth h _{ef}	N	δ _N / N	δ _{N0}	δ _{N∞}	V	δ_{V0}	δ _{V∞}
		[mm]	[kN]	[mm/kN]	[mm]	[mm]	[kN]	[mm]	[mm]
M8	12x80	80	1,14	0,10	0,11	0,23	1,10	1,20	1,80
M8 / M10/	16x85	85					1.00	1 50	0.05
IG-M6	16x130	130	1,57		0,16	0,31	1,86	1,50	2,25
M12 / M16 / IG-M8 / IG-M10	20x85	85	1,14		0,11	0,23	1,86	1,50	2,25
	20x130	130	1 57		0,16	0,31	2,57	2,10	2 15
	20x200	200	1,57						3,15

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Performances clay hollow brick HLz-16DF

Characteristic values of resistance under tension and shear load (continue) Displacements



Drick type Porotherm Homebric Bulk density ρ [kg/dm ³] 0,7 Compressive strength $b \ge [N/mn^2]$ 4,6 or 10 Code EN 771-1 Producer (country code) e.g. Wienerberger (FR) Brick dimensions [mm] 500 x 200 x 299 Difference Drilling method Rotary Rotary Image: Country code in the state i	Bulk density Compressive strength f	o [kg/dm ³]		k			
Compressive strength $f_b \ge [N/mn^2]$ 4, 6 or 10 Code EN 771-1 Producer (country code) e.g. Wienerberger (FR) Brick dimensions [mm] 500 x 200 x 299 Difference Drilling method Rotary Rotary Table C50: Installation parameters Anchor size [-] All sizes Edge distance Corr [mm] 100 (120) ¹⁰ Minimum edge distance Corr [mm] 100 (120) ¹⁰ Spacing Sort [mm] 100 (120) ¹⁰ Spacing Sort [mm] 100 1 ¹⁰ Value in brackets for SH20x83 and SH20x130 3 100 ²¹ For Viske: Care according to Technical Report TR 054 Table C51: Group factor for anchor group in case of tension loading It anchor splaced with s ≥	Compressive strength f	o [ka/dm ³]					
Code EN 771-1 Producer (country code) e.g. Wienerberger (FR) Brick dimensions [mm] Soo x 200 x 299 Drilling method Rotary Image: Soo x 200 x 299 Image: Soo x 200 x 200 Image: Soo x 200 x 200 Image: Soo x 200 x 209 Image: Soo x 200 x 200 <tbo< th=""><td></td><td></td><td>,</td><td></td><td></td><td></td><td></td></tbo<>			,				
Producer (country code) e.g. Wienerberger (FR) Brick dimensions [mm] 500 x 200 x 299 Drilling method Rotary Image: State of the stat	Code	$f_b \ge [N/mm^2]$				물급	
Brick dimensions [mm] 500 × 200 × 299 Drilling method Rotary Image: Second						₿₩	
Drilling method Rotary Image: constraint of the state) 🦾 🕌			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		[mm]					
Table C50: Installation parameters Anchor size [-] Anchor size [-] Edge distance c_{rm}^{23} Minimum edge distance c_{rm}^{23} Minimum spacing $s_{rn,\perp}$ Inimum spacing s_{min} * For V _{Fkcc} : C _{min} according to Technical Report TR 054 Table C51: Group factor for anchor group in case of tension loading * Initian the second se	Drilling method		Rotary				
Table C50: Installation parameters Anchor size [-] Edge distance c_{mn}^{20} Winimum edge distance c_{mn}^{20} Spacing Ser.il Synam 100 '') Value in brackets for SH20x85 and SH20x130 '') Yalue in brackets for Yalue in brackets for Yalue in the Se i	6						
Table C50: Installation parameters Anchor size (1) Edge distance Corr Minimum edge distance Corr Spacing Social Struct Imm Spacing Social Social Social Spacing Social Social Struct Struct Imm Struct Imm Struct Social Struct Social Struct Imm Struct Social Struct	0				10.5	-	
Spacing Imm 299 Scr, \perp [mm] 299 Winimum spacing smin [mm] 100 1) Value in brackets for SH20x85 and SH20x130 smin 100 2) For V _{Rk,c} : c _{min} according to Technical Report TR 054 Table C51: Group factor for anchor group in case of tension loading Configuration with c ≥ with s ≥ 200 100 2,	200 10,5 Table C50: Installation Anchor size Edge distance	n parameters			100 (120) ¹		
Image: Scr, \perp Image: Im	•			-			
1) Value in brackets for SH20x85 and SH20x130 2) For V _{Rk,c} : c _{min} according to Technical Report TR 054 Table C51: Group factor for anchor group in case of tension loading Configuration with c ≥ with s ≥ II: anchors placed 200 100 2,		$\mathbf{S}_{\mathrm{cr},\perp}$		-			
II: anchors placed 200 100 2,	 Value in brackets for SF For V_{Rk,c}: c_{min} according Table C51: Group fac 	H20x85 and SH to Technical F	120x130 Report TR 054 or group in case of tens	on loading	100		
	+						
	parallel to horizontal				α _{g,N,II}		2,0 2,0
	joint					[-]	
perpendicular to	L: onohoro placed	•			α _{g,N,⊥}		1,2 2,0



Configurat	ion	with	C≥	with s	2			
II: anchors placed parallel to horizontal joint		Co	or	500	α	I,V,II	[.]	2,0
⊥: anchors placed perpendicular to horizontal joint		C	or.	299	α	I,V,⊥	[-]	2,0
able C53: Group	factor for and	chor group in ca	ise of shear l	oading perp	endicular to	o free	edge	
Configurat	ion	with	C≥	with s	2			
II: anchors placed parallel to horizontal joint	V	Co	or	500	α	I, V,II		2,0
⊥: anchors placed perpendicular to horizontal joint		C	or	299	α	I,V,⊥	- [-]	2,0
able C54: Charac	cteristic value	es of resistance	under tensio		r loads cteristic resi	stance	0	
					Use categor		5	
		Effective		d/d	ose categor	/	d/c	4
		anchorage		w/d			w/c	
Anchor size	Sleeve	depth		w/w			w/w	
			40°C/24°C	80°C/50°C	120°C/72°C	F	or all tem	
	-	b)		ranç V _{Rk,b}	2)3)
	-	h _{ef} [mm]		$N_{Rk,b} = N_{Rk,p}$	[kN]		V Rk,b	
		Compressive	strength f	\geq 4 N/mm ²	[KK]			
M8	12x80	80	0,9	0,9	0,75		2,0)
	16x85	85	0,9	0,9	0,75		2,0	
M8 / M10/ IG-M6	16x130	130	1,2	1,2	0,9		2,0	
M12 / M16 /	20x85	85	0,9	0,9	0,75		2,5	5
IG-M8 / IG-M10	20x130	130	1,2	1,2	0,9		2,5	5
		Compressive	e strength f _b	≥ 6 N/mm ²		_		
M8	12x80	80	0,9	0,9	0,9	_	2,5	
M8 / M10/ IG-M6	16x85	85	0,9	0,9	0,9		2,5	
	16x130	130	1,2	1,2	1,2		2,5	
M12 / M16 / IG-M8 / IG-M10	20x85 20x130	85	0,9	0,9	0,9	-	3,0	
 Values are valid Calculation of V_F V_{Rk,b} 	for c _{cr} and c _{min} _{Rk,c} see Technic	130 al Report TR 054, 6 or greater. For st				vith c	<u>3,0</u> ≥ 200 mm	
		ONE ICE for mas	onry					



							istic resist category	ance	
Anabara	ine	Clasura	Effective anchorage depth	e	v	d/d v/d v/w	Juligoty	d/c w/c w/v	k
Anchor s	ize	Sleeve	depin	40°C/2			0°C/72°C	For all tem	perature
			h _{ef}		N _{Rk,b} =	= N _{Rk,p} ¹⁾		V _{Rk,b}	
			[mm]				[kN]		
				ive strength					
M8		12x80	80	1,2		,2	1,2	3,0	
M8 / M10/ I	G-M6	16x85	85	1,2		,2	1,2	3,0	
		16x130	130	1,5		,5	1,5	3,5	
M12 / M1 IG-M8 / IG-	_	20x85 20x130	<u>85</u> 130	1,2		,2 ,5	1,2 1,5	4,0	
²⁾ Calcula V _{Rk,b}	ation of $V_{Rk,c}$		al Report TR 0	-		-	_	h c ≥ 200 mm	V _{Rk,c,II} =
²⁾ Calcula V _{Rk,b} ³⁾ The va	ation of $V_{Rk,c}$	see Technica d for steel 5.6	6 or greater. Fo	or steel 4.6 an δ _N / N [mm/kN]		ly V _{Rk,b} by 0 δ _{N∞} [mm] 0,55	_	δ _{vo} [mm]	δ _{√∞} [mm]
²⁾ Calcula ³⁾ The va Table C56: Anchor size M8 M8 / M10/	ation of V _{Rk,c} lues are vali Displace Sleeve <u>12x80</u> 16x85	see Technica d for steel 5.6 ments Effec ancho depth [mr 80 85	6 or greater. Fo	or steel 4.6 an δ _N / N	d 4.8 multip δ _{№0} [mm] 0,27	ly V _{Rk,b} by 0 δ _{N∞} [mm]	,8 V [kN] 0,9 0,9	δ _{vo}	δ _{∨∞}

ESSVE Injection system ONE, ONE ICE for masonry

Performances clay hollow brick Porotherm Homebric Characteristic values of resistance under tension and shear load (continue) Displacements

Annex C 23



Brick type		Clay hollow brick					
	a [kg/dm ³]	BGV Thermo					
Bulk density	ρ [kg/dm³] ₀ ≥ [N/mm²]	0,6					
	₀ < [IN/mm]	4, 6 or 10 EN 771-1					
Code							
Producer (country code) Brick dimensions	[mm]	e.g. Leroux (FR) 500 x 200 x 314					
Drilling method	[IIIII]	Rotary					
		5					
200						5	
Table C58: Installation		 		5			
Anchor size		3 3		5	All sizes		
Anchor size Edge distance	C _{cr}	<u> </u>	[mm]	5	100 (120) ¹		
Anchor size Edge distance	C _{cr} ²⁾	s	[mm] [mm]	5	100 (120) ¹ 100 (120) ¹		
Anchor size Edge distance Minimum edge distance	C _{cr} C _{min} ²⁾ S _{cr,II}	3	[mm] [mm] [mm]	5	100 (120) ¹ 100 (120) ¹ 500		
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing	C _{cr} ²⁾	3	[mm] [mm]	5	100 (120) ¹ 100 (120) ¹		
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C59: Group fact	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} I20x85 and SH to Technical F	120x130 Report TR 054 or group in case of 1	[mm] [mm] [mm] [mm]	ading	100 (120) ¹ 100 (120) ¹ 500 314		
Anchor size Edge distance Minimum edge distance Spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C59: Group fact Configuration	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} I20x85 and SH to Technical F	l20x130 Report TR 054 or group in case of t with c ≥	[mm] [mm] [mm] [mm]	ading with s ≥	100 (120) ¹ 100 (120) ¹ 500 314		1.7
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C59: Group fact Configuration II: anchors placed parallel to horizontal	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} I20x85 and SH to Technical F	H20x130 Report TR 054 or group in case of t with c ≥ 200	[mm] [mm] [mm] [mm]	ading with s ≥ 100	100 (120) ¹ 100 (120) ¹ 500 314		
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C59: Group fact Configuration II: anchors placed parallel to horizontal joint	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} I20x85 and SH to Technical F	H20x130 Report TR 054 or group in case of t with c ≥ 200 c_{cr}	[mm] [mm] [mm] [mm]	ading with s ≥ 100 500	100 (120) ¹ 100 (120) ¹ 500 314 100		1,7
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing $^{1)}$ Value in brackets for SH $^{2)}$ For V _{Rk,c} : c _{min} according Table C59: Group fact Configuration II: anchors placed parallel to horizontal joint \bot : anchors placed	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} I20x85 and SH to Technical F	120x130 Report TR 054 or group in case of t with c ≥ 200	[mm] [mm] [mm] [mm]	ading with s ≥ 100	100 (120) ¹ 100 (120) ¹ 500 314 100		
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C59: Group fact	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} I20x85 and SH to Technical F	120x130 Report TR 054 or group in case of 1	[mm] [mm] [mm] [mm]	ading	100 (120) ¹ 100 (120) ¹ 500 314		
Anchor size	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} I20x85 and SH to Technical F	H20x130 Report TR 054 or group in case of t with c ≥ 200 c_{cr}	[mm] [mm] [mm] [mm]	ading with s ≥ 100 500 100	100 (120) ¹ 100 (120) ¹ 500 314 100		2,0
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C59: Group fact Configuration II: anchors placed parallel to horizontal joint	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min} I20x85 and SH to Technical F	H20x130 Report TR 054 or group in case of t with c ≥ 200 c_{cr}	[mm] [mm] [mm] [mm]	ading with s ≥ 100 500	100 (120) ¹ 100 (120) ¹ 500 314 100		2,0



Configura	tion	with c ≥	with s ≥			
II: anchors placed barallel to horizontal joint		C _{cr}	500	α _{g,V,II}	[]	2,0
⊥: anchors placed perpendicular to horizontal joint		C _{cr}	314	$lpha_{g,V,\perp}$	[-]	2,0
able C61: Group	factor for anchor	group in case of shear	r loading perpendic	ular to free	edge	
Configura	tion	with c ≥	with s ≥			
II: anchors placed parallel to horizontal joint		C _{cr}	500	α _{g,V,II}		2,0
⊥: anchors placed perpendicular to horizontal joint		C _{cr}	314	$lpha_{g,V,\perp}$	- [-]	2,0



Brick type:	-	w brick BGV							
Table C62:	Character	istic values of	resistar	nce under t	ension and	shear load	ls		
					Cha	aracteristic	resistanc	e	
						Use cate	gory		
		Effectiv	-		d/d			d/d	
		anchorag	ge		w/d			w/d	
Anchor size	Sleeve	depth			w/w			w/w	
			4	0°C/24°C	80°C/50°C		;/72°C	For all temp range	е
		h _{ef}			$N_{Rk,b} = N_{Rk}$			V _{Rk,b} ²)3)
		[mm]		•		[kN]			
			ompress		th f _b ≥ 4 N/m				
M8	12x80	80		0,6	0,6	0,		2,0	
M8 / M10/	16x85	85		0,6	0,6	0,		2,0	
IG-M6	16x130	130		1,2	1,2	0,	,9	2,5	
M12 / M16 / IG-M8 /	20x85	85		0,6	0,6	0,	,6	2,5	
IG-M10	20x130	130		1,2	1,2	0,	,9	2,5	
		C	ompress	sive streng	th f _b ≥6 N/m	<u>າ</u> ຫ2			
M8	12x80	80		0,9	0,9	0,	75	2,5	
M8 / M10/	16x85	85		0,9	0,9	0,	75	2,5	
IG-M6	16x130	130		1,5	1,5	1,	,2	3,0	
M12 / M16 / IG-M8 /	20x85	85		0,9	0,9	0,	75	3,0	
IG-M10	20x130	130		1,5	1,5	1,	,2	3,0	
	1	C	ompress	ive strenat	h f _b ≥ 10 N/r	nm ²			
M8	12x80	80		0,9	0,9	0,	.9	3,5	
M8 / M10/	16x85	85		0,9	0,9	0.		3,5	
IG-M6	16x130	130		2,0	2,0	1,		4,0	
M12 / M16 / IG-M8 /	20x85	85		0,9	0,9	0,		4,0	
IG-M10	20x130	130		2,0	2,0	1,	,5	4,0	
²⁾ Calcula V _{Rk,b}		c _{er} and c _{min} see Technical Re for steel 5.6 or g						h c ≥ 250 mm:	V _{Rk,c,II} =
Table C63:	Displacem	nents							
		Effective							
Anchor size	Sleeve	anchorage depth h _{ef}	Ν	δ _N / N	δ_{N0}	δ _{N∞}	V	δ_{V0}	δ _{V∞}
		[mm]	[kN]	[mm/kN]	[mm]	[mm]	[kN]	[mm]	[mm]
M8	12x80	80	0.00			0.14	0 -		
M8 / M10/	16x85	85	0,26		0,21	0,41	0,7		
IG-M6	16x130	130	0,43	0.00	0,34	0,69		1 00	1 50
M12 / M16 /	20x85	85	0,40	0,80	0,21	0,00	0.00	1,00	1,50
IG-M8 /	20x85 20x130	130	0,28	-	0,21	0,69	0,86		
IG-M10					,	,			

ESSVE Injection system ONE, ONE ICE for masonry

Performances clay hollow brick BGV Thermo Characteristic values of resistance under tension and shear load Displacements Annex C 26



	n of the brid						
		Clay hollow brick					
Brick type		Calibric R+			- Siles		
Bulk density	ρ [kg/dm³]	0,6			THE REAL	100	
	≥ [N/mm²]	6, 9 or 12			~		7
Code		EN 771-1			and the second s	~	9
Producer (country code)		e.g. Terreal (FR)					
Brick dimensions	[mm]	500 x 200 x 314					
Drilling method		Rotary					
×			500	6			
200							
Table C65: Installation Anchor size		\$	[-]		All sizes		
Edge distance	C _{cr} C _{min} ²⁾		[mm]		100 (120) ¹⁾ 100 (120) ¹⁾		
Minimum edge distance	S _{cr,II}		[mm] [mm]		500		
	Scr,II				314		
Spacing	Ser		[mm]				
Minimum spacing	S _{cr,⊥} S _{min}		[mm] [mm]		100		
Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Bk,c} : c _{min} according to	s _{min} 20x85 and SH o Technical F		[mm]	ading with s ≥			
Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to Table C66: Group facto Configuration II: anchors placed	s _{min} 20x85 and SH o Technical F	Report TR 054 or group in case of	[mm]	0.750			1,7
Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to Table C66: Group facto Configuration II: anchors placed parallel to horizontal	s _{min} 20x85 and SH o Technical F	Report TR 054 or group in case of with c ≥ 175	[mm]	with s ≥ 100			
Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to Table C66: Group facto Configuration II: anchors placed parallel to horizontal joint	s _{min} 20x85 and SH o Technical F	Report TR 054 or group in case of with c ≥ 175 c _{cr}	[mm]	with s ≥ 100 500	100	[-]	2,0
Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to Table C66: Group facto Configuration II: anchors placed parallel to horizontal joint L: anchors placed perpendicular to	s _{min} 20x85 and SH o Technical F	Report TR 054 or group in case of with c ≥ 175 C _{cr} 175	[mm]	with s ≥ 100 500 100	100	[-]	2,0 1,0
 ²⁾ For V_{Rk,c}: c_{min} according to Table C66: Group facto Configuration II: anchors placed parallel to horizontal joint 1: anchors placed 	S _{min} 20x85 and SH o Technical F or for ancho	Report TR 054 or group in case of with c ≥ 175 C _{cr} 175 C _{cr}	[mm]	with s ≥ 100 500	100	[-]	



(Configuration	w	ith c ≥	with s ≥			
II: anchors pl parallel to hor joint	aced		C _{cr}	500	α _{g,V,II}		2,0
⊥: anchors p perpendicul horizontal j	ar to 🔰 🔤 🗸		C _{cr}	314	$\alpha_{g,V,\perp}$	[-]	2,0
Table C68:	Group factor f	or anchor group in	case of shear	loading perpend	licular to free e	edge	
(Configuration	w	ith c ≥	with s ≥			
II: anchors pl parallel to hori joint			C _{cr}	500	α _g ,v,ii	[]	2,0
⊥: anchors p perpendicula horizontal j	ar to 🔰 🔤 🗸 🗕		C _{cr}	314	$\alpha_{g,V,\perp}$	[-]	2,0
Table C69:	Characteristic	values of resistan	ce under tensi	Characteri	ads stic resistance category		
		Effective		d/d w/d	category		d/d w/d
Anchor size	Sleeve	anchorage depth		w/w			w/w
AIGHUI SIZE	Sieeve	dopin	40°C/24°C	80°C/50°C	120°C/72°C	te	For all mperatur range
		h _{ef}		$N_{Rk,b} = N_{Rk,p}^{(1)}$,	$V_{Rk,b}^{(2)3)}$
		[mm]			[kN]		
			sive strength f _t				
M8	12x80	80	0,9	0,9	0,75		3,0
M8 / M10/	16x85	85	0,9	0,9	0,75		4,0
IG-M6	16x130	130	1,2	1,2	0,9		4,0
M12 / M16 / IG-M8 /	20x85	85	0,9	0,9	0,75		6,0
IG-M10	20x130	130	1,2	1,2	0,9		6,0
		Compress	sive strength f	, ≥ 9 N/mm²			
M8	12x80	80	1,2	1,2	0,9		3,5
M8 / M10/	16x85	85	1,2	1,2	0,9		5,0
IG-M6	16x130	130	1,5	1,5	1,2		5,0
M12 / M16 /	20x85	85	1,2	1,2	0,9		7,5
IG-M8 / IG-M10	20x130	130	1,5	1,5	1,2		7,5
²⁾ Calcul V _{Rk,b}		nd c _{min} Technical Report TR 05 Steel 5.6 or greater. For			-	250 mm	: V _{Rk,c,II} =
	ection system C	ONE, ONE ICE for m	asonry				
ESSVE Inj							



				Characteri	stic resistance	
				Use	category	
		Effective		d/d		d/d
		anchorage		w/d		w/d
Anchor size	Sleeve	depth		w/w		w/w
			40°C/24°C	80°C/50°C	120°C/72°C	For all temperature range
		h _{ef}		$N_{Rk,b} = N_{Rk,p}^{(1)}$		V _{Rk,b} ²⁾³⁾
		[mm]			[kN]	
		Compress	sive strength f _b	≥ 12 N/mm²		
M8	12x80	80	1,2	1,2	0,9	4,0
M8 / M10/	16x85	85	1,2	1,2	0,9	5,5
IG-M6	16x130	130	1,5	1,5	1,2	5,5
M12 / M16 /	20x85	85	1,2	1,2	0,9	8,5
IG-M8 / IG-M10	20x130	130	1,5	1,5	1,2	8,5
²⁾ Calcula V _{Rk,b}		Technical Report TR 0		·	-	50 mm: V _{Rk,c,II} =

Anchor size	Sleeve	Effective anchorage depth h _{ef}	N	δ_{N} / N	δ_{N0}	δ _{N∞}	V	δ_{V0}	δ∨∞
		[mm]	[kN]	[mm/kN]	[mm]	[mm]	[kN]	[mm]	[mm]
M8	12x80	80	0,34		0.07	0.55	1,0	1,10	1,65
M8 / M10/	16x85	85	0,34		0,27	0,55	1 40		
IG-M6	16x130	130	0,43	0,80	0,34	0,69	1,43		
M12 / M16 /	20x85	85	0,34	-,	0,27	0,55		2,00	3,00
IG-M8 / IG-M10	20x130	130	0,43		0,34	0,69	2,14		

ESSVE Injection system ONE, ONE ICE for masonry	
Performances clay hollow brick Calibric R+	Annex C 29
Characteristic values of resistance under tension and shear load (continue)	
Displacements	



Bulk density ρ [kg/dm ³] 0.7 Compressive strength $f_b \ge [N/mm^2]$ 6, 9 or 12 Code EN 771-1 Producer (country code) e.g. Imerys (FR) Brick dimensions [mm] 560 x 200 x 274 Drilling method Rotary Table C73: Installation parameters Anchor size Edge distance Corr Corr [mm] 100 (120) ¹⁰ Minimum edge distance Corr [mm] 100 (120) ¹⁰ Spacing Ser.1 [mm] 274	Brick type		Clay hollow brick					
Compressive strength $f_b \ge [N/mm^n]$ $f_b \ge N771.1$ Producer (country code) e_a , Imerys (FR) Brick dimensions [mm] $560 \times 200 \times 274$ Drilling method Rotary Table C73: Installation parameters Anchor size [1] All sizes Edge distance Corr ² mm Minimum edge distance Corr ² [mm] Minimum spacing Social [mm] 10 View for States Social 10 View for States Social 10 View for States Social 20 63 Social 20 100 100 20 Social [mm]		FL /					EFE	-
Code EN 771-1 Producer (country code) e.g. Imerys (FR) Brick dimensions [mm] 560 x 200 x 274 Drilling method Rotary 560 560 20 6 , 5 20 6 , 3 20 6 , 5 20 6 , 3 20 6 , 3 20 1 , 1 , 1 20 1 , 1 , 1 20 1 , 1 , 1 <						TEE		
Producer (country code) e.g. Imerys (FR) Brick dimensions [mm] 560 x 200 x 274 Drilling method Rotary 560 9 ,5 20 6 ,5 3 1 ,0 1 ,0		≥ [N/mm⁻]				525	5	
Brick dimensions [mm] 560 x 200 x 274 Drilling method Rotary 560 9 ,5 9 ,6 1 ,0 <tr< td=""><td></td><td></td><td></td><td></td><td></td><td>Eta</td><td></td><td></td></tr<>						Eta		
Drilling method Rotary 560 9,5 20 6,5 20 6,5 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 63 40 640 5,5 200 65 63 40 63 40 640 100 63 100 100 120 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 <td></td> <td>[]</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		[]						
Table C73: Installation parameters Anchor size [] All sizes Edge distance c_{rr} Minimum edge distance c_{rm}^{20} Minimum edge distance c_{rm}^{20} Minimum spacing Secult * Tor Vake: Cran according to Technical Report TR 054 Table C74: Group factor for anchor group in case of tension loading * * * For Vake: Cran according to Technical Report TR 054 Table C74: Group factor for anchor group in case of tension loading * 185 100 $\alpha_{g,N,ii}$ [-] * 185 100 $\alpha_{g,N,ii}$ [-] 1,1 parallel to horizontal ••••••••••••••••••••••••••••••••••••		լուոյ						
Image: second system of the system of th	Drilling method		Rolary					
Image: second system of the system of th								
Image: constraint of the second state of the second st			560			9 9.5		
Image: Second State of								
			20	6,	5			
Fable C73: Installation parameters Anchor size [-] All sizes Edge distance $Carr$ [mm] 100 (120) ¹⁰ Minimum edge distance $Carr$ [mm] 100 (120) ¹⁰ Spacing Ser.1 [mm] 274 Minimum spacing Ser.1 [mm] 100 ¹ Yalue in brackets for SH20x85 and SH20x130 ************************************				-5,	5			
40 40 Anchor size Edge distance Cer [-] All sizes Edge distance Cer [mm] 100 (120) ¹⁾ Minimum edge distance Cm ² [mm] 100 (120) ¹⁾ Spacing ser.it [mm] 100 (120) ¹⁾ Spacing ser.it [mm] 560 System ser.it [mm] 100 ¹ Value in brackets for SH20x85 and SH20x130 * * ² For VRk,c: Cmin according to Technical Report TR 054 * Table C74: Group factor for anchor group in case of tension loading I: anchors placed perpendicular to horizontal joint iss 100 $\alpha_{g,N,ill}$ [-] 1,9 2.0 1.1 cer 560 $\alpha_{g,N,ill}$ [-] 1,0 1: anchors placed perpendicular to horizontal joint cer 274 $\alpha_{g,N,ill}$ [-] 1,1 2.0 1.1 cer 274 $\alpha_{g,N,ill}$ [-] 1,2,0](ø40)				20	0	
40 40 Anchor size Edge distance Cer [-] All sizes Edge distance Cer [mm] 100 (120) ¹⁾ Minimum edge distance Cm ² [mm] 100 (120) ¹⁾ Spacing ser.it [mm] 100 (120) ¹⁾ Spacing ser.it [mm] 560 System ser.it [mm] 100 ¹ Value in brackets for SH20x85 and SH20x130 * * ² For VRk,c: Cmin according to Technical Report TR 054 * Table C74: Group factor for anchor group in case of tension loading I: anchors placed perpendicular to horizontal joint iss 100 $\alpha_{g,N,ill}$ [-] 1,9 2.0 1.1 cer 560 $\alpha_{g,N,ill}$ [-] 1,0 1: anchors placed perpendicular to horizontal joint cer 274 $\alpha_{g,N,ill}$ [-] 1,1 2.0 1.1 cer 274 $\alpha_{g,N,ill}$ [-] 1,2,0								
Table C73: Installation parameters Anchor size [-] All sizes Edge distance C_{cr} $[mm]$ 100 (120) ¹) Minimum edge distance C_{min}^{20} $[mm]$ 100 (120) ¹ Spacing $Ser_{.ll}$ $[mm]$ 100 (120) ¹ Spacing $Ser_{.ll}$ $[mm]$ 560 $Spacing$ $Ser_{.ll}$ $[mm]$ 100 ¹ Value in brackets for SH20x85 and SH20x130 $??74$ $?$ ² For V _{Rk,c} : Cmin according to Technical Report TR 054 Table C74: Group factor for anchor group in case of tension loading I: anchors placed 185 100 $\alpha_{g,N,ll}$ $[-]$ $1,9$ $parallel to horizontal joint C_{cr} 2560 \alpha_{g,N,ll} [-] 1,0 $		_ 63						
Table C73: Installation parameters Anchor size [-] All sizes Edge distance C_{cr} $[mm]$ 100 (120) ¹) Minimum edge distance C_{min}^{20} $[mm]$ 100 (120) ¹ Spacing $Ser_{.ll}$ $[mm]$ 100 (120) ¹ Spacing $Ser_{.ll}$ $[mm]$ 560 $Spacing$ $Ser_{.ll}$ $[mm]$ 100 ¹ Value in brackets for SH20x85 and SH20x130 $??74$ $?$ ² For V _{Rk,c} : Cmin according to Technical Report TR 054 Table C74: Group factor for anchor group in case of tension loading I: anchors placed 185 100 $\alpha_{g,N,ll}$ $[-]$ $1,9$ $parallel to horizontal joint C_{cr} 2560 \alpha_{g,N,ll} [-] 1,0 $					40 -			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		parameters	;					
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Anchor size		3					
Ser.⊥ [mm] 274 Minimum spacing Smin [mm] 100 1) Value in brackets for SH20x85 and SH20x130 100 100 2) For V _{Rk,c} : cmin according to Technical Report TR 054 Table C74: Group factor for anchor group in case of tension loading II: anchors placed parallel to horizontal joint With c ≥ with s ≥	Anchor size Edge distance	C _{cr}	;	[mm]		100 (120) ¹⁾		
$\begin{array}{c c c c c c c } \hline 1 \\ \hline 1 \\ \hline 2 \\ \hline 2 \\ \hline 2 \\ \hline 3 \\ \hline 5 \\ \hline 7 \\ \hline 8 \\ \hline 8 \\ \hline 1 \\ \hline 2 \\ \hline 5 \\ \hline 7 \\ \hline 8 \\ \hline 8 \\ \hline 1 \\ 1 \\$	Anchor size Edge distance Minimum edge distance	C _{cr} C _{min} ²⁾	i	[mm] [mm]		100 (120) ¹⁾ 100 (120) ¹⁾		
²⁾ For V _{Rk,c} : c _{min} according to Technical Report TR 054 Table C74: Group factor for anchor group in case of tension loading	Anchor size Edge distance Minimum edge distance	Ccr Cmin ²⁾ Scr,II		[mm] [mm] [mm]		100 (120) ¹⁾ 100 (120) ¹⁾ 560		
II: anchors placed parallel to horizontal joint185100 $\alpha_{g,N,II}$ 1,9L: anchors placed perpendicular to horizontal joint185100 $\alpha_{g,N,L}$ 2,01,1 c_{cr} 274 $\alpha_{g,N,L}$ 2,0	Anchor size Edge distance Minimum edge distance Spacing Minimum spacing	Ccr Cmin ²⁾ Scr,II Scr,⊥ Smin		[mm] [mm] [mm] [mm]		100 (120) ¹⁾ 100 (120) ¹⁾ 560 274		
parallel to horizontal joint•••••Ccr560α _{g,N,II} 2,0L: anchors placed perpendicular to horizontal joint•••185100α _{g,N,L} 1,1Ccr274α _{g,N,L} 2,0	Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according t	C _{cr} C _{min²⁾} S _{cr,II} S _{cr,⊥} S _{min} 20x85 and SH o Technical R	20x130 /eport TR 054	[mm] [mm] [mm] [mm]	ading	100 (120) ¹⁾ 100 (120) ¹⁾ 560 274		
joint c_{cr} 560 a_{dr} 2,0L: anchors placed perpendicular to horizontal joint1851001,1 c_{cr} 274 $\alpha_{g,N,\perp}$ 2,0	Anchor size Edge distance Minimum edge distance Spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to Table C74: Group factor Configuration	C _{cr} C _{min²⁾} S _{cr,II} S _{cr,⊥} S _{min} 20x85 and SH o Technical R	20x130 eport TR 054 r group in case of 1 with c ≥	[mm] [mm] [mm] [mm]	with s ≥	100 (120) ¹⁾ 100 (120) ¹⁾ 560 274		
L: anchors placed perpendicular to horizontal joint1851001,1 c_{cr} 274 $\alpha_{g,N,\perp}$ 2,0	Anchor size Edge distance Minimum edge distance Spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to Table C74: Group factor Configuration II: anchors placed	C _{cr} C _{min²⁾} S _{cr,II} S _{cr,⊥} S _{min} 20x85 and SH o Technical R	20x130 eport TR 054 r group in case of 1 with c ≥	[mm] [mm] [mm] [mm]	with s ≥	100 (120) ¹⁾ 100 (120) ¹⁾ 560 274 100		1,9
horizontal joint C _{cr} 274 2,0	Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to Table C74: Group factor Configuration II: anchors placed parallel to horizontal joint	C _{cr} C _{min²⁾} S _{cr,II} S _{cr,⊥} S _{min} 20x85 and SH o Technical R	20x130 eport TR 054 r group in case of t with c ≥ 185	[mm] [mm] [mm] [mm]	with s ≥ 100	100 (120) ¹⁾ 100 (120) ¹⁾ 560 274 100		
	Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to Table C74: Group factor Configuration II: anchors placed parallel to horizontal joint ⊥: anchors placed	C _{cr} C _{min²⁾} S _{cr,II} S _{cr,⊥} S _{min} 20x85 and SH o Technical R	20x130 leport TR 054 r group in case of 1 with c ≥ 185 c _{cr}	[mm] [mm] [mm] [mm]	with s ≥ 100 560	100 (120) ¹⁾ 100 (120) ¹⁾ 560 274 100 α _{g,N,II}		2,0
ESSVE Injection system ONE ONE ICE for maconry	Anchor size Edge distance Minimum edge distance Spacing Minimum spacing 1) Value in brackets for SH2 2) For V _{Rk,c} : c _{min} according to Table C74: Group factor II: anchors placed parallel to horizontal joint L: anchors placed perpendicular to	C _{cr} C _{min²⁾} S _{cr,II} S _{cr,⊥} S _{min} 20x85 and SH o Technical R	20x130 teport TR 054 r group in case of 1 with c ≥ 185 C _{cr} 185	[mm] [mm] [mm] [mm]	with s ≥ 100 560 100	100 (120) ¹⁾ 100 (120) ¹⁾ 560 274 100 α _{g,N,II}		2,0 1,1
ESSVE Injection system ONE ONE ICE for maconry	Anchor size Edge distance Minimum edge distance Spacing Minimum spacing 1) Value in brackets for SH2 2) For V _{Rk,c} : c _{min} according to Table C74: Group factor II: anchors placed parallel to horizontal joint L: anchors placed perpendicular to	C _{cr} C _{min²⁾} S _{cr,II} S _{cr,⊥} S _{min} 20x85 and SH o Technical R	20x130 teport TR 054 r group in case of 1 with c ≥ 185 C _{cr} 185	[mm] [mm] [mm] [mm]	with s ≥ 100 560 100	100 (120) ¹⁾ 100 (120) ¹⁾ 560 274 100 α _{g,N,II}		2,0 1,1
	Anchor size Edge distance Minimum edge distance Spacing Minimum spacing 1) Value in brackets for SH2 2) For V _{Rk,c} : c _{min} according to Table C74: Group factor II: anchors placed parallel to horizontal joint L: anchors placed perpendicular to	C _{cr} C _{min²⁾} S _{cr,II} S _{cr,⊥} S _{min} 20x85 and SH o Technical R	20x130 teport TR 054 r group in case of 1 with c ≥ 185 C _{cr} 185	[mm] [mm] [mm] [mm]	with s ≥ 100 560 100	100 (120) ¹⁾ 100 (120) ¹⁾ 560 274 100 α _{g,N,II}		2,0 1,1
Porformanage alow bollow brick Urbanbrig Annex C 30	Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH2 ²⁾ For V _{Rk,c} : c _{min} according to Table C74: Group factor II: anchors placed parallel to horizontal joint L: anchors placed perpendicular to horizontal joint	C _{cr} C _{min²} S _{cr,II} S _{cr,⊥} S _{min} 20x85 and SH o Technical R or for ancho	20x130 eport TR 054 r group in case of t with c ≥ 185 C _{or} 185 C _{or}	[mm] [mm] [mm] [mm]	with s ≥ 100 560 100	$\begin{array}{c c} 100 (120)^{1)} \\ \hline 100 (120)^{1)} \\ \hline 560 \\ 274 \\ \hline 100 \\ \hline \\ \\ \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	[-]	2,0 1,1



	ay hollow brick Ur roup factor for anch		of shear loa	ding parallel to	o free edge		
Con	figuration	with c ≥	:	with s ≥			
II: anchors place parallel to horizon joint		C _{cr}		560	α _{g,V,II}	. 1	2,0
⊥: anchors place perpendicular to horizontal joint	D V 🏅	C _{cr}		274	$\alpha_{g,V,\perp}$	[-]	2,0
Table C76: G	roup factor for anch	or group in case	of shear loa	ding perpendi	cular to free e	dge	
Con	figuration	with c ≥	:	with s ≥			
II: anchors place parallel to horizon joint		C _{cr}		560	α _{g,V,II}	[-]	2,0
⊥: anchors place perpendicular to horizontal joint	o │ │ ∨	C _{cr}		274	$lpha_{g,V,\perp}$	[-]	2,0
Table C77: C	characteristic values	s of resistance ur	der tension	and shear load	ds		
				Character	ristic resistance)	
				Use	category		
		Effective anchorage depth		d/d		d/d w/d w/w For all	
	Sleeve		w/d				
Anchor size			w/w				
			40°C/24°C	80°C/50°C	120°C/72°C	tem	perature range
		h _{ef}		$N_{Rk,b} = N_{Rk,p}^{1}$		\	(2)3) Rk,b
		[mm]		2	[kN]		
	10.00	Compressive s				1	
M8	12x80	80	0,9	0,9	0,75		3,0
M8 / M10/ IG-M6	16x85	85	0,9	0,9	0,75		3,0
M12 / M16 /	16x130 20x85	130 85	2,0 0,9	2,0 0,9	<u>1,5</u> 0,75		3,0 3,5
IG-M8 / IG-M10	20x130	130	2,0	2,0	1,5		3,5
	20/100	Compressive s	,		1,0		0,0
M8	12x80	80	0,9	0,9	0,9		4,0
M8 / M10/	16x85	85	0,9	0,9	0,9		4,0
IG-M6	16x130	130	2,5	2,5	2,0		4,0
M12/M16/	20x85	85	0,9	0,9	0,9		4,5
IG-M8 / IG-M10	20x130	130	2,5	2,5	2,0		4,5
²⁾ Calculatio V _{Rk,b}	e valid for c_{cr} and c_{min} n of $V_{Rk,c}$ see Technical s are valid for steel 5.6				-	190 mm	: V _{Rk,c,II} =
ESSVE Inject	ion system ONE, ON	IE ICE for mason	iry				
Installation para	s clay hollow brick l meters (continue) alues of resistance unde				Anne	ex C 31	



Brick type:	Clay hollow	brick Urban	bric						
Table C78:	Characteris	tic values of r	esistan	ce under t	ension a	nd shear loa	ds (continu	ıe)	
						Character	ristic resista	ince	
						Use	category		
		a	Effectiv nchorag			d/d w/d w/w			d/d w/d w/w
Anchor size	Slee	ve	depth	40°	C/24°C	80°C/50°C	120°C/72	°C tem	For all perature range
			h _{ef}			$N_{Rk,b} = N_{Rk,p}^{1}$)	V	/ _{Rk,b} ²⁾³⁾
			[mm]				[kN]		
		Con	npressi	ive strengt	h f _b ≥ 12	N/mm ²			
M8	12x8	30	80		1,2	1,2	0,9		4,5
M8 / M10/	16x	35	85		1,2	1,2	0,9		4,5
IG-M6	16x1	30	130		3,0	3,0	2,5		4,5
M12 / M16 /	20x8	35	85		1,2	1,2	0,9		5,0
G-M8 / IG-M1	0 20x1	30	130		3,0	3,0	2,5		5,0
²⁾ Calcula V _{Rk,b}		e Technical Repo					Ū	c ≥ 190 mm	: V _{Rk,c,II} =
Anchor size	Sleeve	Effective anchorage depth h _{ef}	N	δ _N / N	δ _{N0}	δ _{N∞}	v	δ_{V0}	δ _{V∞}
		[mm]	[kN]	[mm/kN]	[mm]	[mm]	[kN]	[mm]	[mm]
M8	12x80	80	0.04			0.55			
M8 / M10/	16x85	85	0,34		0,27	0,55	1,30		
	10.100	100	0.00	1		4.07	1		

0,69

0,27

0,69

1,37

0,55

1,37

1,43

1,00

1,50

0,86

0,34

0,86

0,80

130

85

130

ESSVE Injection system ONE, ONE ICE for masonry	
Performances clay hollow brick Urbanbric	Annex C 32
Characteristic values of resistance under tension and shear load (continue)	
Displacements	

IG-M6

M12 / M16 /

IG-M8 /

IG-M10

16x130

20x85

20x130



Table C80: Description o	of the brid	ck				
Brick type		Clay hollow brick Brique creuse C40)			
Bulk density ρ [[kg/dm ³]	0,7)			1
	[N/mm ²]	4, 8 or 12				
Code		EN 771-1				
Producer (country code)		e.g. Terreal (FR)				
Brick dimensions	[mm]	500 x 200 x 200				
Drilling method		Rotary				
				7 7 200		
	arameters		[-]		All sizes	
Anchor size Edge distance	Ccr		[-] [mm]		100 (120) ¹	
Anchor size Edge distance	C _{cr} C _{min} ²⁾		[mm] [mm]		100 (120) ¹ 100 (120) ¹	
Anchor size Edge distance Minimum edge distance	C _{cr} C _{min} ²⁾ S _{cr,II}		[mm] [mm] [mm]		100 (120) ¹ 100 (120) ¹ 500	
Anchor size Edge distance Minimum edge distance Spacing	C _{cr} C _{min} ²⁾ S _{cr,II} S _{cr,⊥}		[mm] [mm] [mm] [mm]		100 (120) ¹ 100 (120) ¹	
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH20x ²⁾ For V _{Rk,c} : c _{min} according to T Table C82: Group factor f	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	s H20x130 Report TR 054 or group in case of t	[mm] [mm] [mm] [mm]		100 (120) ¹ 100 (120) ¹ 500 200	
Anchor size Edge distance Minimum edge distance Spacing ¹⁾ Value in brackets for SH20x ²⁾ For V _{Rk,c} : c _{min} according to T Table C82: Group factor 1 Configuration	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	s 	[mm] [mm] [mm] [mm]	ading with s ≥	100 (120) ¹ 100 (120) ¹ 500 200	
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing 1) Value in brackets for SH20x 2) For V _{Rk,c} : c _{min} according to T Table C82: Group factor f Configuration II: anchors placed parallel to horizontal joint	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	s H20x130 Report TR 054 or group in case of t	[mm] [mm] [mm] [mm]		100 (120) ¹ 100 (120) ¹ 500 200	2,0
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing 1) Value in brackets for SH20x 2) For V _{Rk,c} : c _{min} according to T Table C82: Group factor f Configuration II: anchors placed parallel to horizontal	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	s 	[mm] [mm] [mm] [mm]	with s ≥	100 (120) ¹ 100 (120) ¹ 500 200 200	2,0



Cont	iguration	with c ≥	:	with s ≥			
II: anchors place parallel to horizon joint		C _{cr}		500	α _{g,V,II}	[1]	2,0
⊥: anchors place perpendicular to horizontal joint	D V ╏	C _{cr}		200	$\alpha_{g,V,\perp}$	[-]	2,0
Table C84: G	roup factor for anc	nor group in case	of shear load	ding perpendi	cular to free e	dge	
Cont	figuration	with c ≥	:	with s ≥			
II: anchors place parallel to horizon joint	d J	C _{cr}		500	α _{g,V,II}		2,0
⊥: anchors place perpendicular to horizontal joint	>	C _{cr}		200	$\alpha_{g,V,\perp}$	[-]	2,0
Table C85: C	haracteristic value	s of resistance ur	nder tension a	Characte Use	ds ristic resistance category	1	
		Effective anchorage		d/d w/d w/w			d/d w/d w/w
Anchor size	Sleeve depth		40°C/24°C	80°C/50°C	120°C/72°C	tem	For all perature range
		h _{ef}		$N_{Rk,b} = N_{Rk,p}^{1}$)	\ \	/ _{Rk,b} ²⁾³⁾
		[mm]			[kN]		
		Compressive s	trength $f_b \ge 4$	N/mm ²			
M8	12x80	80	0,6	0,6	0,6		0,9
M8 / M10/	16x85	85	0,6	0,6	0,6		0,9
IG-M6	16x130	130	0,6	0,6	0,6		0,9
M12 / M16 /	20x85	85	0,6	0,6	0,6		0,9
G-M8 / IG-M10	20x130	130	0,6	0,6	0,6		0,9
	Walk M. Walkard	Compressive st			April 1, 1920 1, 1920		
M8	12x80	80	0,9	0,9	0,75		1,2
M8 / M10/	16x85	85	0,9	0,9	0,75		1,2
IG-M6	16x130	130	0,9	0,9	0,75		1,2
M12 / M16 / G-M8 / IG-M10	20x85 20x130	85 130	0,9 0,9	0,9	0,75		1,2 1,2
 Values are ²⁾ Calculatio ³⁾ The value 	e valid for c _{cr} and c _{min} n of V _{Rk,c} see Technica s are valid for steel 5.6	l Report TR 054 or greater. For steel	4.6 and 4.8 mu				· ,—
	on system ONE, O	Brique creuse C40			Anne	x C 34	



n all e ()3)
all ature e ⁽⁾⁽³⁾
n all e ⁽⁾³⁾
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δ _{V∞}
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mm]
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1,35
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Brick type Bulk density ρ [kg/c Compressive strength $f_b \ge [N/m]$ Code Producer (country code) Brick dimensions [r Drilling method 120			6 -77			
Compressive strength f _b ≥ [N/m Code Producer (country code) Brick dimensions [r Drilling method	nm ²] 4, 6, 8 or 12 EN 771-1 e.g. Wienerberge mm] 250 x 120 x 250		6 - 7 7			
Code Producer (country code) Brick dimensions [r Drilling method	EN 771-1 e.g. Wienerberge mm] 250 x 120 x 250		6 - 7 7			
Producer (country code) Brick dimensions [r Drilling method	e.g. Wienerberge mm] 250 x 120 x 250		6-77			
Brick dimensions [r Drilling method	mm] 250 x 120 x 250		6 - 7 7			
Drilling method			6 -77			
			6 - 7 7			
120						
			43	6		
Table C89: Installation param Anchor size	neters	[-]		All sizes		
Edge distance c _{cr}		[mm]		100 (120) ¹⁾		
Minimum edge distance c _{mi}		[mm]		60 250		
		[mm]		250		
Spacing Scr.		+ + -				
Spacing scr. Minimum spacing smi	r,⊥	[mm] [mm]		120 100		
Spacing scr. Minimum spacing smi 1) Value in brackets for SH20x85; \$ Table C90: Group factor for a Configuration II: anchors placed	r,⊥	[mm] [mm]	ading with s ≥ 100	120 100		1,0
Spacing scr. Minimum spacing smi 1) Value in brackets for SH20x85; \$ Table C90: Group factor for a Configuration Configuration	r,⊥ ⁱⁱⁿ SH20x130 and SH20x200 anchor group in case of with c ≥	[mm] [mm]	with s ≥	120	[-]	1,0



II: anchors placed parallel to horizonta joint ⊥: anchors placed perpendicular to		with $c \ge 60^{1}$		with s ≥ 100 ¹⁾				
parallel to horizonta joint ⊥: anchors placed		00		100.7			1,0	
⊥: anchors placed					α _{g,V,II}		-	
		Ccr		250		[-]	2,0	
		60 ¹⁾		100 ¹⁾	(i = 1)		1,6	
horizontal joint		C _{cr}		250	α _{g,V,⊥}		2,0	
¹⁾ Only valid for $V_{Rk,k}$	according to Table C93	3 and C94 values in	brackets		I			
Table C92: Gro	oup factor for ancho	r group in case o	of shear loadii	ng perpendic	ular to free ed	dge		
Config	guration	with c ≥		with s ≥				
II: anchors placed		60 ¹⁾		100 ¹⁾			1,0	
parallel to horizonta joint		C _{cr}		250	α _{g,V,II}		2,0	
⊥: anchors placed		60 ¹⁾		100 ¹⁾		[-]	1,6	
perpendicular to	V				α _{g,V,⊥}			
horizontal joint	according to Table C93	C _{cr}		250			2,0	
		Effective				/d; w/w		
		Effective anchorage depth	Characteristic resistance Use category d/d; w/d; w/w					
Anchor size	Sleeve		40°C/24°C	80°C/50°C	120°C/72°C	For all temperature range		
		h _{ef}		$N_{Rk,b} = N_{Rk,p}^{1}$			V _{Rk,b} ⁴⁾	
		[mm]			[kN]			
M8	12x80	Compressive str 80	engtn 1 _b ≥ 4 N ∣	/mm [_]				
	16x85	85	-					
M8 / M10/ IG-M6	16x130	130	-					
	20x85	85	0,4	0,4	0,3	2,	0 ²⁾ (0,9) ³⁾	
M12 / M16 /	20x130	130	-					
G-M8 / IG-M10	20x200	200	-					
		Compressive str	⊥ enath f⊾≥6 N	/mm ²				
M8	12x80	80						
M8 / M10/	16x85	85						
IG-M6	16x130	130					-2)	
	20x85	85	0,5	0,5	0,4	2,	5 ²⁾ (1,2) ³⁾	
M12 / M16 /	20x130	130	-					
G-M8 / IG-M10	20x200	200	-					
		rt TR 054, except fo ors with c _{min}		-	e with c ≥ 125 n	יm: V _{Rk}	$_{\rm ,c,II} = V_{\rm Rk,b}$	
values in black	0							



						Character	istic resistance	
							category	
			⊏ff	ective			d/d	
				horage			w/d	
Anchor siz	e s	Sleeve		epth -		1	w/w	
					40°C/24°C	80°C/50°C	120°C/72°C	For all temperature range
				h _{ef}		$N_{Rk,b} = N_{Rk,p}$	1)	V _{Rk,b} ⁴⁾
				nm]			[kN]	111,0
						-	• •	
					ngth f _b ≥8 N	l/mm²	1	
M8		12x80		80				
M8 / M10		16x85		85				
IG-M6		6x130		130	0,6	0,6	0,5	$3,0^{2}$ $(1,2)^{3}$
M12 / M16		20x85		85	0,0	0,0	0,0	0,0 (1,2)
G-M8 / IG-N	110	20x130		130				
	2	20x200		200		2		
					gth f _b ≥ 12 N	N/mm ⁻		
M8		12x80		80				
M8 / M10		16x85		85				
IG-M6		6x130		130	0,6	0,6	0,6	$3,5^{2}(1,5)^{3}$
M12 / M16		20x85		85				
G-M8 / IG-N		20x130 20x200		130 200				
1) Volu	es are valid fo			200				
	values are vali	$V_{Rk,c} = V_{Rk,b}$ for a did for steel 5.6 or sments			and 4.8 multi	ply $V_{Rk,b}$ by 0,8		
Table C95:								
Table C95:	•							
Table C95: Anchor size	Sleeve	Effective anchorage depth h _{ef}	N	δ _N / N	δ_{N0}	δ _{N∞}	ν δ _ν	_{′0} δ _{∨∞}
Anchor		Effective anchorage	N [kN]	δ _N / N [mm/kN]	δ _{N0} [mm]	δ _{N∞} [mm]	V δ _ν [kN] [mi	



Table C96: Descriptio	on of the bri						
Brick type		Clay hollow brick Doppio Uni					
Bulk density	ρ [kg/dm³]	0,9		19	And and a second	- Service of the	-
	$p [N/mm^2]$	10, 16, 20 or 28					
Code	5 – []	EN 771-1					
Producer (country code)		e.g. Wienerberger (l	T)				e P
Brick dimensions	[mm]	250 x 120 x 120	- /				
Drilling method		Rotary					
					0		
	,	230					
	n parameter				All sizes		
Anchor size Edge distance	Cor	S	[-] [mm]		100 (120) ¹)	
Anchor size Edge distance	-	S	[-] [mm]		100 (120) ¹ 60)	
Anchor size Edge distance Minimum edge distance	C _{cr} C _{min} ²⁾ S _{cr,II}	S	[-] [mm] [mm]		100 (120) ¹ 60 250)	
Anchor size Edge distance Minimum edge distance	C _{cr} C _{min} ²⁾ S _{cr,II} S _{cr,⊥}	S	[-] [mm] [mm] [mm]		100 (120) ¹ 60 250 120)	
Anchor size Edge distance Minimum edge distance Spacing	C _{cr} C _{min} ²⁾ S _{cr,II}	S	[-] [mm] [mm]		100 (120) ¹ 60 250)	
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C98: Group fact	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min,II} S _{min,⊥} 20x85; SH20 to Technical	s x130 and SH20x200 Report TR 054 or group in case of ter	[-] [mm] [mm] [mm] [mm] [mm]	-	100 (120) ¹ 60 250 120 100)	
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C98: Group fact Configuration	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min,II} S _{min,⊥} 20x85; SH20 to Technical	s x130 and SH20x200 Report TR 054 or group in case of ter with c ≥	[-] [mm] [mm] [mm] [mm] [mm]	with s ≥	100 (120) ¹ 60 250 120 100)	
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C98: Group fact	C _{cr} C _{min} ²⁾ S _{cr,I} S _{cr,⊥} S _{min,II} S _{min,⊥} 20x85; SH20 to Technical	s x130 and SH20x200 Report TR 054 or group in case of ter	[-] [mm] [mm] [mm] [mm] [mm]	-	100 (120) ¹ 60 250 120 100		1,0
Anchor size Edge distance Minimum edge distance Spacing Minimum spacing ¹⁾ Value in brackets for SH ²⁾ For V _{Rk,c} : c _{min} according Table C98: Group fact Configuration II: anchors placed parallel to horizontal	C _{cr} C _{min} ²⁾ S _{cr,⊥} S _{min,II} S _{min,⊥} I20x85; SH20 to Technical	S x130 and SH20x200 Report TR 054 or group in case of ter with c ≥ 60	[-] [mm] [mm] [mm] [mm] [mm]	with s ≥ 100	100 (120) ¹ 60 250 120 100 120)	



Co	onfiguration	with c ≥		with s ≥			
II: anchors plac parallel to horizo joint	ced	C _{cr}		250	α _{g,V,II}	[]	2,0
⊥: anchors pla perpendicular horizontal joi	to V	C _{cr}		120	$\alpha_{g,V,\perp}$	[-]	2,0
Table C100:	Group factor for anch	or group in case o	of shear loadi	ng perpendic	ular to free e	dge	
Co	onfiguration	with c ≥		with s ≥			
II: anchors plac parallel to horizo joint		C _{cr}		250	α _{g,V,II}	. 1	2,0
⊥: anchors pla perpendicular horizontal joi	to V-++	C _{cr}		120	$\alpha_{g,V,\perp}$	[-]	2,0
Anabarata		Effective anchorage depth		Character Use	Use category d/d w/d w/w		
Anchor size	Sleeve	anchorage depth	40°C/24°C	80°C/50°C	w/w		For All
							range
		h _{ef}		$N_{Rk,b} = N_{Rk,p}$	Î)		V _{Rk,b} ²⁾³⁾
		[mm]			[kN]		
	1	Compressive stre	ength $f_b \ge 10$ N	N/mm²			
M8	12x80	80	_				
M8 / M10/	16x85	85	-				
IG-M6	16x130	130	0,6	0,6	0,5		1,5
M12 / M16 /	20x85	85	-				10000
G-M8 / IG-M10	20x130	130 200	_				
	20x200	Compressive stre	$h_{\rm nath} f > 16$ M	l/mm ²	1.		
M8	12x80	80					
M8 / M10/	16x85	85	-				
IG-M6	16x130	130					
	20x85	85	0,75	0,75	0,6		2,0
M12/M16/	20×130	130	1				
G-M8 / IG-M10	20x200	200	1				
²⁾ Calculat	are valid for c_{cr} and c_{min} ion of $V_{Rk,c}$ see Technical les are valid for steel 5.6		.6 and 4.8 multi	ply $V_{Rk,b}$ by 0,8			
	tion system ONE, ON						



For All emperature range V _{Rk,b} ²⁾³⁾
emperature range
emperature range
emperature range
emperature range
V _{Rk,b} ^{2/3)}
2,0
2,0
2,5
δ _{V∞}
[mm]
0,45



∑ [kg/dm ³] ≥ [N/mm ²] [mm]	Bloc creux B40 0,8 4 EN 771-3 e.g. Sepa (FR)					
≥ [N/mm ²]	4 EN 771-3			The second second second second		Manager Man
	EN 771-3					
[mm]					IN THE REAL	CONT.
[mm]						2
[]	494 x 200 x 190			and the second	Name + Nongro	Strategy Strategy
	Rotary					
	494			17		
		17				
C _{cr}		[-] [mm] [mm]		All sizes 100 (120) ¹ 100 (120) ¹		
C _{cr} C _{min} ²⁾ S _{cr,II}		[-] [mm] [mm]		100 (120) ¹ 100 (120) ¹ 494		
C _{cr} C _{min} ²⁾		[-] [mm] [mm]		100 (120) ¹ 100 (120) ¹		
C _{cr} C _{min} ²⁾ S _{cr,II} S _{cr,⊥} S _{min} 0x85 and SH2 o Technical Re	eport TR 054 • group in case of t	[-] [mm] [mm] [mm] [mm]		100 (120) ¹ 100 (120) ¹ 494 190		
C _{cr} C _{min} ²⁾ S _{cr,II} S _{cr,⊥} S _{min} 0x85 and SH2 o Technical Re	eport TR 054 r group in case of t with c ≥	[-] [mm] [mm] [mm] [mm]	with s ≥	100 (120) ¹ 100 (120) ¹ 494 190		
C _{cr} C _{min} ²⁾ S _{cr,II} S _{cr,⊥} S _{min} 0x85 and SH2 o Technical Re	eport TR 054 r group in case of t with c ≥ 100	[-] [mm] [mm] [mm] [mm]	with s ≥ 100	100 (120) ¹ 100 (120) ¹ 494 190		1,5
C _{cr} C _{min} ²⁾ S _{cr,II} S _{cr,⊥} S _{min} 0x85 and SH2 o Technical Re	eport TR 054 group in case of t with c ≥ 100 C _{cr}	[-] [mm] [mm] [mm] [mm]	with s ≥ 100 494	100 (120) ¹ 100 (120) ¹ 494 190 100		2,0
C _{cr} C _{min} ²⁾ S _{cr,II} S _{cr,⊥} S _{min} 0x85 and SH2 o Technical Re	eport TR 054 r group in case of t with c ≥ 100	[-] [mm] [mm] [mm] [mm]	with s ≥ 100	100 (120) ¹ 100 (120) ¹ 494 190 100		
		494	494			



	Configuratio	on		with c ≥		with s ≥			
II: anchors	placed		50			100			1,1
parallel to he joint		V ••		Ccr				, V ,II	2,0
⊥: anchors				100		100		[-]	1,1
perpendic	ular to	V 💲						$\alpha_{g,V,\perp}$	
horizonta	ljoint			Ccr		190			2,0
Table C108	B: Group f	actor for anc	hor group	in case of	shear load	ding perpe	ndicular to	free edge	
	Configuratio	on		with c ≥		with s ≥			
II: anchors placed parallel to horizontal joint ↓: anchors placed perpendicular to horizontal joint ↓		C _{cr}			494	αg	,v,ii	2,0	
			Ccr			190 α		,v,⊥ [-]	2,0
					Char	sistance ory		اء/ لم	
Anchor size	Sleeve	Effective anchorage depth	d/d			w/d w/w			d/d w/d w/w
					120°C/72°C	40°C/24°C	80°C/50°C	120°C/72°C	range
		h _{ef}		$N_{Rk,b} = N_{Rk,c}$	1) ວ		$V_{Rk,b} = N_{Rk,c}$	1) >	V _{Rk,b} ²⁾³⁾
		[mm]	Compre	ecivo etro	ngth f _b ≥4	[kN]			
M8	12x80	80	1,2	0,9	0,75	0,9	0,9	0,75	3,0
M8 / M10/	16x85	85	1,2	0,9	0,75	1,2	0,9	0,75	3,0
IG-M6	16x130	130	1,2	0,9	0,75	1,2	0,9	0,75	3,0
/12 / M16 /	20x85	85	1,2	0,9	0,75	1,2	0,9	0,75	3,0
IG-M8 / IG-M10	20x130	130	1,2	0,9	0,75	1,2	0,9	0,75	3,0
¹⁾ Valu ²⁾ Calc V _{Rk,t} ³⁾ The	ulation of V _R	for c _{cr} and c _{min} _{k,c} see Technica alid for steel 5.6 ements					-	vith c ≥ 250 n	וm: V _{Rk,c,ll} =
Anchor size	Sleeve	Effective anchorag depth h _{ef}	e N	δ _N / N	δ _{N0}	δ _{N∞}	V	δ _{vo}	δ _{V∞}
		[mm]	[kN]	[mm/kN]	[mm]	[mm]	[kN]	[mm]	[mm]
All sizes	All sizes	All sizes	0,34	0,90	0,31	0,62	0,86	0,9	1,35
				r masonry					



Brick type	Solid light weight of	rick		AL CONTRACTOR				
Bulk density	ρ [kg/dm³]	0,6						
	^s _b ≥ [N/mm ²]	2			index 9			
Code		EN 771-3						
Producer (country code)		e.g. Bisotherm (DI	E)			Contraction of the second		
Brick dimensions	[mm]	300 x 123 x 248				in the line		
Drilling method		Rotary						
Table C112: Installatio	on parameter							
Anchor size			[-]		All sizes			
Edge distance Minimum edge distance	C _{cr}		[mm] [mm]		1,5*h _{ef} 60			
Spacing	C _{min} S _{cr}		[mm]		60 3*h _{ef}			
Minimum spacing					120			
II: anchors placed parallel to horizontal		90		120	α _{g,N,II}		1,1	
Configuration		with c ≥		with s ≥				
parallel to horizontal		• 1,5*hef		3*h _{ef}	$\alpha_{g,N,II}$		2,0	
⊥: anchors placed		124	120			[-]	1,1	
perpendicular to horizontal joint		1,5*hef		3*h _{ef}	$\alpha_{g,N,\perp}$		2,0	
Table C114: Group fact	tor for ancho	or group in case of	shear load	ding parallel to with s ≥	free edge			
Configuration		with c >		WILLIS /				
Configuration		with c ≥					0.6	
Configuration II: anchors placed parallel to horizontal joint		with c ≥ 60 90		120 120	α _{g,V,II}		0,6 2,0	
II: anchors placed parallel to horizontal joint		60		120	α _{g,V,II}	[-]		
II: anchors placed parallel to horizontal		60 90		120 120	α _{g,V,I}	[-]	2,0 0,6	
II: anchors placed parallel to horizontal joint ⊥: anchors placed perpendicular to horizontal joint Table C115: Group fact	v •••	60 90 60 124 or group in case of	shear load	120 120 120 120 120	αg,v,⊥		2,0	
II: anchors placed parallel to horizontal joint ⊥: anchors placed perpendicular to horizontal joint Table C115: Group fact Configuration	tor for ancho	60 90 60 124 or group in case of with c ≥	shear load	120 120 120 120 ding perpendic with s ≥	αg,v,⊥		2,0 0,6 2,0	
II: anchors placed parallel to horizontal joint L: anchors placed perpendicular to horizontal joint Table C115: Group fact Configuration II: anchors placed parallel to horizontal	tor for ancho	60 90 60 124 or group in case of with c ≥ 60	shear load	120 120 120 120 ding perpendic with s ≥ 120	αg,v,⊥		2,0 0,6 2,0	
II: anchors placed parallel to horizontal joint ⊥: anchors placed perpendicular to horizontal joint Table C115: Group fact Configuration II: anchors placed	tor for ancho	60 90 60 124 or group in case of with c ≥ 60 90	shear load	120 120 120 120 ding perpendic with s ≥ 120 120	ular to free	edge	2,0 0,6 2,0 0,6 2,0	
II: anchors placed parallel to horizontal joint ⊥: anchors placed perpendicular to horizontal joint Table C115: Group fact Configuration II: anchors placed parallel to horizontal joint ⊥: anchors placed	tor for ancho	60 90 60 124 or group in case of with c ≥ 60 90 60	shear load	120 120 120 120 120 ding perpendic with s ≥ 120 120 120	ular to free		2,0 0,6 2,0 0,6 2,0 0,6	
II: anchors placed parallel to horizontal joint ⊥: anchors placed perpendicular to horizontal joint Table C115: Group fact Configuration II: anchors placed parallel to horizontal joint ⊥: anchors placed parallel to horizontal	tor for ancho	60 90 60 124 or group in case of with c ≥ 60 90 60 1,5*hef	shear load	120 120 120 120 ding perpendic with s ≥ 120 120 120 120	ular to free	edge	2,0 0,6 2,0 0,6 2,0 0,6 1,0	
II: anchors placed parallel to horizontal joint ⊥: anchors placed perpendicular to horizontal joint Table C115: Group fact Configuration II: anchors placed parallel to horizontal joint ⊥: anchors placed	tor for ancho	60 90 60 124 or group in case of with c ≥ 60 90 60	shear load	120 120 120 120 120 ding perpendic with s ≥ 120 120 120	$\alpha_{g,V,\perp}$	edge	2,0 0,6 2,0 0,6 2,0 0,6 1,0	
II: anchors placed parallel to horizontal joint ⊥: anchors placed perpendicular to horizontal joint Table C115: Group fact Configuration II: anchors placed parallel to horizontal joint ⊥: anchors placed parallel to horizontal	tor for ancho	60 90 60 124 or group in case of with c ≥ 60 90 60 1,5*hef	shear load	120 120 120 120 ding perpendic with s ≥ 120 120 120 120	$\alpha_{g,V,\perp}$	edge	2,0 0,6 2,0 0,6 2,0 0,6	
II: anchors placed parallel to horizontal joint ⊥: anchors placed perpendicular to horizontal joint Table C115: Group fact Configuration II: anchors placed parallel to horizontal joint ⊥: anchors placed parallel to horizontal		60 90 60 124 or group in case of with c ≥ 60 90 60 1,5*hef 1,5*hef	shear load	120 120 120 120 ding perpendic with s ≥ 120 120 120 120	$\alpha_{g,V,\perp}$	edge	2,0 0,6 2,0 0,6 2,0 0,6 1,0	

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		Effective anchorage eve depth	Characteristic resistance								
			Use category d/d								
Anchor)	d/d			w/d w/w				
size	Sleeve		40°C/24°C	80°C/50°	C 120°C/72	°C 40°C/24°	C 80°C/50°C	120°C/72°C	For all temperature range		
		h _{ef}		$N_{Rk,b} = N_R$	1) kp		$N_{Rk,b} = N_{Rk,p}^{1)}$				
		[mm]			K,D	[kN]					
	<u> </u>	[]	Con	npressive	strenath f	≥ 2 N/mm ²					
M8	-	80	3,0	2,5	2,0	2,5	2,0	1,5	3,0		
M8 / M10/ IG-M6	-	90	3,0	3,0	2,0	2,5	2,5	2,0	3,0		
M10 / IG-M8	-	100	3,5	3,0	2,5	3,0	2,5	2,0	3,0		
M16 / IG-M10	-	100	3,0	3,0	2,0	3,0	3,0	2,0	3,0		
M8	12x80	80	2,5	2,5	2,0	2,5	2,0	1,5	3,0		
M8 / M10/	16x85	85	3,0	2,5	2,0	3,0	2,5	2,0	3,0		
IG-M6	16x130	130	3,0	2,5	2,0	3,0	2,5	2,0	3,0		
V12 / M16 / IG-M8 /		85 130	2,5	2,5	2,0	2,5	2,5	2,0	3,0		
IG-M10	20x130 20x200	200	2,5 2,5	2,5 2,5	2,0	2,5	2,5 2,5	2,0 2,0	<u>3,0</u> 3,0		
²⁾ For ca	alculation of alues are v	f V _{Rk,c} see E		ex C	-		y 0,8				
	size		Effective anchorage	Νδ	5 _N / N	δ _{N0} δ	N∞ V	δ_{V0}	δ _{V∞}		
Anchor		Sleeve	depth h _{ef}								
Anchor		Sleeve	depth h _{ef} [mm]	[kN] [m	ım/kN] [ı	nm] [n	וm] [kN] [mm]	[mm]		
M8		-] [mm]	[mm]		
M8 M8 / M IG-M	10/ 6		[mm] 80 90	0,86	0,50 (0,43 0	,86] [mm]	[mm]		
M8 M8 / M IG-M M10 / IC	10/ 6 3-M8		[mm] 80 90 100	0,86	0,50 (),43 0),35 0	,86] [mm]	[mm]		
M8 M8 / M IG-M M10 / IG M16 / IG	10/ 6 3-M8 3-M10	-	[mm] 80 90	0,86	0,50 (),43 0),35 0	,86] [mm]	[mm]		
M8 M8 / M IG-M M10 / IC	10/ 6 3-M8 3-M10		[mm] 80 90 100 100 80	0,86 1,00 0,86	0,50 (0,35 (0,43 0 0,35 0 0,30 0	,86		[mm] 0,38		
M8 M8 / M IG-M M10 / IG M16 / IG M8 M8 / M	10/ 6 3-M8 i-M10		[mm] 80 90 100 100	0,86 1,00 0,86	0,50 (0,35 (0,43 0 0,35 0 0,30 0	,86 ,70 ,60				
M8 M8 / M IG-M M10 / IG M16 / IG M8	10/ 6 3-M8 3-M10 10/		[mm] 80 90 100 100 80	0,86 1,00 0,86	0,50 (0,35 (0,43 0 0,35 0 0,30 0	,86 ,70 ,60				
M8 M8 / M IG-M M10 / IG M16 / IG M8 M8 / M IG-M	10/ 6 3-M8 3-M10 10/ 6		[mm] 80 90 100 100 80 85	0,86	0,50 (0,35 (0,50 (0,50 (0,43 0 0,35 0 0,30 0 0,36 0	,86 ,70 ,60				
M8 M8 / M IG-M M10 / IG M16 / IG M8 M8 / M	10/ 6 3-M8 i-M10 10/ 6 116 /		[mm] 80 90 100 100 80 85 130	0,86	0,50 (0,35 (0,50 (0,50 (0,43 0 0,35 0 0,30 0 0,36 0	,86 ,70 ,60 ,71 0,9				

ESSVE Injection system ONE, ONE ICE for masonry

Performances solid light weight concrete brick - LAC Characteristic values of resistance under tension and shear load Displacements Annex C 45