HOLZ TECHNIC

DECLARATION OF PERFORMANCE

Regulation (EU) no 305/2011

P-NEX_DOP_210984

1. Unique identification code of the product-type:

Rotho Blaas Injection System POLY-FIX (P-NEX)

2. Intended use/es:

Bonded anchor
for fixing and/or supporting to concrete, structural elements (which contributes to the stability of the construction works) or heavy units.

3. Manufacturer:

Rotho Blaas srl - via dell'Adige 2/1 - 39040 Cortaccia (BZ) – Italy

4. Authorised representative:

not relevant

5. System/s of AVCP:

System 1

6a. Harmonised standard:

not relevant

6b. European Assessment Document:

EAD 330499-01-0601 (2020-04)

European Technical Assessment:

ETA 21/0984 (25/11/2021)

Technical Assessment Body:

Technical and Test Institute for Construction Prague

Notified Body/ies:

Technische Universität Darmstadt Fachbereich Bau- und Umweltingenieurwissenschaften Institut für Stahlbau und Werkstoffmechanik (NB 2873)

7. Declared performance/s:

Mechanical resistance and stability (BWR 1)

Essential characteristics	**Performance**
Characteristic resistance to tension load (static and quasi-static loading)	Table C1), C2)
Characteristic resistance to shear load (static and quasi-static loading)	Table C3)
Displacements (static and quasi-static loading).	Table C4), C5)
Durability	Installation Information - Intended use

Hygiene, health and environment (BWR 3)

Essential characteristics	**Performance**
Content, emission and/or release of dangerous substances.	No performance determined.

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

The original document is in English. Versions in other languages have been translated from this document.

Signed for and on behalf of the manufacturer by:

Luca Sestigiani
Technical Director

Cortaccia, 21.01.2022

This document consists of pages 7
EN

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01.2022

Table C1: Characteristic values for steel tension resistance and steel shear resistance of threaded rods									
Size				**M 8**	**M 10**	**M 12**	**M 16**	**M 20**	**M 24**
Cross section area		A_s	[mm^2]	36,6	58	84,3	157	245	353
Characteristic tension resistance, Steel failure [1]									
Steel, Property class 4.6 and 4.8		$N_{Rk,s}$	[kN]	15(13)	23(21)	34	63	98	141
Steel, Property class 5.6 and 5.8		$N_{Rk,s}$	[kN]	18(17)	29(27)	42	78	122	176
Steel, Property class 8.8		$N_{Rk,s}$	[kN]	29(27)	46(43)	67	125	196	282
Stainless steel A2, A4 and HCR, Property class 50		$N_{Rk,s}$	[kN]	18	29	42	79	123	177
Stainless steel A2, A4 and HCR, Property class 70		$N_{Rk,s}$	[kN]	26	41	59	110	171	247
Stainless steel A4 and HCR, Property class 80		$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Characteristic tension resistance, Partial safety factor [2]									
Steel, Property class 4.6		$\gamma_{Ms,N}$	[-]	2,0					
Steel, Property class 4.8		$\gamma_{Ms,N}$	[-]	1,5					
Steel, Property class 5.6		$\gamma_{Ms,N}$	[-]	2,0					
Steel, Property class 5.8		$\gamma_{Ms,N}$	[-]	1,5					
Steel, Property class 8.8		$\gamma_{Ms,N}$	[-]	1,5					
Stainless steel A2, A4 and HCR, Property class 50		$\gamma_{Ms,N}$	[-]	2,86					
Stainless steel A2, A4 and HCR, Property class 70		$\gamma_{Ms,N}$	[-]	1,87					
Stainless steel A4 and HCR, Property class 80		$\gamma_{Ms,N}$	[-]	1,6					
Characteristic shear resistance, Steel failure [1]									
Without lever arm	Steel, Property class 4.6 and 4.8	$V^0_{Rk,s}$	[kN]	9 (8)	14(13)	20	38	59	85
	Steel, Property class 5.6 and 5.8	$V^0_{Rk,s}$	[kN]	9 (8)	15(13)	21	39	61	88
	Steel, Property class 8.8	$V^0_{Rk,s}$	[kN]	15(13)	23(21)	34	63	98	141
	Stainless steel A2, A4 and HCR, Property class 50	$V^0_{Rk,s}$	[kN]	9	15	21	39	61	88
	Stainless steel A2, A4 and HCR, Property class 70	$V^0_{Rk,s}$	[kN]	13	20	30	55	86	124
	Stainless steel A4 and HCR, Property class 80	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141
With lever arm	Steel, Property class 4.6 and 4.8	$M^0_{Rk,s}$	[Nm]	15(13)	30(27)	52	133	260	449
	Steel, Property class 5.6 and 5.8	$M^0_{Rk,s}$	[Nm]	19(16)	37(33)	65	166	324	560
	Steel, Property class 8.8	$M^0_{Rk,s}$	[Nm]	30(26)	60(53)	105	266	519	896
	Stainless steel A2, A4 and HCR, Property class 50	$M^0_{Rk,s}$	[Nm]	19	37	66	167	325	561
	Stainless steel A2, A4 and HCR, Property class 70	$M^0_{Rk,s}$	[Nm]	26	52	92	232	454	784
	Stainless steel A4 and HCR, Property class 80	$M^0_{Rk,s}$	[Nm]	30	59	105	266	519	896
Characteristic shear resistance, Partial safety factor [2]									
Steel, Property class 4.6		$\gamma_{Ms,V}$	[-]	1,67					
Steel, Property class 4.8		$\gamma_{Ms,V}$	[-]	1,25					
Steel, Property class 5.6		$\gamma_{Ms,V}$	[-]	1,67					
Steel, Property class 5.8		$\gamma_{Ms,V}$	[-]	1,25					
Steel, Property class 8.8		$\gamma_{Ms,V}$	[-]	1,25					
Stainless steel A2, A4 and HCR, Property class 50 50		$\gamma_{Ms,V}$	[-]	2,38					
Stainless steel A2, A4 and HCR, Property class 50 70		$\gamma_{Ms,V}$	[-]	1,56					
Stainless steel A4 and HCR, Property class 80		$\gamma_{Ms,V}$	[-]	1,33					

[1] Values are only valid for the given stress area A_s. Values in brackets are valid for undersized threaded rods with smaller stress area As for hot dipped threaded rods galvanized according to EN ISO 10684:2004+AC:2009.

[2] in absence of national regulation

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Table C2: Characteristic values of tension loads under static and quasi-static action									
Anchor size threaded rod				**M 8**	**M 10**	**M 12**	**M 16**	**M 20**	**M 24**
Steel failure									
Characteristic tension resistance		$N_{Rk,s}$	[kN]	$A_s \bullet f_{uk}$ (or see Table C1)					
Partial factor		$\gamma_{Ms,N}$	[-]	see Table C1					
Combined pull-out and concrete cone failure									
Characteristic bond resistance in uncracked concrete C20/25									
Temperature range I: 40°C/24°C	dry and wet	$\tau_{Rk,ucr}$	[N/mm²]	8,5	8,0	8,0	8,0	8,0	8,0
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	8,5	8,0	8,0	8,0	8,0	8,0
Temperature range II: 80°C/50°C	dry and wet	$\tau_{Rk,ucr}$	[N/mm²]	6,5	6,0	6,0	6,0	6,0	6,0
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	6,5	6,0	6,0	6,0	6,0	6,0
Increasing factors for uncracked concrete ψ_c		C25/30		1,04					
		C30/37		1,08					
		C35/45		1,13					
		C40/50		1,15					
		C45/55		1,17					
		C50/60		1,19					
Concrete cone failure									
Factor for uncracked concrete		$k_{ucr,N}$	[-]	11,0					
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}					
Axial distance		$s_{cr,N}$	[mm]	2 $c_{cr,N}$					
Splitting failure									
Edge distance	$h/h_{ef} \geq 2,0$	$c_{cr,sp}$	[mm]	1,0 h_{ef}					
	$2,0 > h/h_{ef} > 1,3$			$2 * h_{ef}\left(2,5 - \frac{h}{h_{ef}}\right)$					
	$h/h_{ef} \leq 1,3$			2,4 h_{ef}					
Axial distance		$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$					
Installation factor									
for dry and wet concrete		γ_{inst}	[-]	1,2					
for flooded bore hole		γ_{inst}	[-]	1,2					

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Table C3: Characteristic values of shear loads in uncracked concrete								
Anchor size threaded rod			**M 8**	**M 10**	**M 12**	**M 16**	**M 20**	**M 24**
Steel failure without lever arm								
Characteristic shear resistance Steel, strength class 4.6, 4.8 and 5.6, 5.8	$V^0_{Rk,s}$	[kN]	$0,6 \bullet A_s \bullet f_{uk}$ (or see Table C1)					
Characteristic shear resistance Steel, strength class 8.8, Stainless Steel A2, A4 and HCR, all classes	$V^0_{Rk,s}$	[kN]	$0,5 \bullet A_s \bullet f_{uk}$ (or see Table C1)					
Partial factor	$\gamma_{Ms,V}$	[-]	see Table C1					
Ductility factor	k_7	[-]	1,0					
Steel failure with lever arm								
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	$1,2 \bullet W_{el} \bullet f_{uk}$ (or see Table C1)					
Partial factor	$\gamma_{Ms,V}$	[-]	see Table C1					
Concrete pry-out failure								
Factor	k_8	[-]	2,0					
Installation factor	γ_{inst}	[-]	1,0					
Concrete edge failure								
Effective length of fastener	l_f	[mm]	$\min(h_{ef};\ 12\ d_{nom})$					
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16	20	24
Installation factor	γ_{inst}	[-]	1,0					

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Table C4: Displacement under tension load[1]								
Anchor size threaded rod			**M 8**	**M 10**	**M 12**	**M 16**	**M 20**	**M24**
Uncracked concrete C20/25								
Temperature range I: 40°C/24°C	δ_{N0}-factor	[mm/(N/mm²)]	0,03	0,04	0,05	0,07	0,08	0,10
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,07	0,08	0,08	0,08	0,08	0,10
Temperature range II: 80°C/50°C	δ_{N0}-factor	[mm/(N/mm²)]	0,02	0,03	0,03	0,04	0,04	0,05
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,15	0,17	0,17	0,17	0,17	0,17

[1] Calculation of the displacement
$\delta_{N0} = \delta_{N0}$-factor $\cdot \tau$; τ: action bond stress for tension
$\delta_{N\infty} = \delta_{N\infty}$-factor $\cdot \tau$;

Table C5: Displacement under shear load[1]								
Anchor size threaded rod			**M 8**	**M 10**	**M 12**	**M 16**	**M 20**	**M24**
Uncracked concrete C20/25								
All temperature ranges	δ_{V0}-factor	[mm/kN]	0,02	0,02	0,01	0,01	0,01	0,01
	$\delta_{V\infty}$-factor	[mm/kN]	0,03	0,02	0,02	0,01	0,01	0,01

[2] Calculation of the displacement
$\delta_{V0} = \delta_{V0}$-factor $\cdot V$; V: action shear load
$\delta_{V\infty} = \delta_{V\infty}$-factor $\cdot V$;

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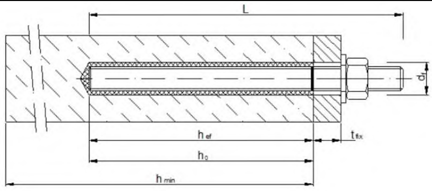
INSTALLATION INFORMATION - INTENDED USE

a) Context of use

Anchorages subject to:	- Static and quasi-static loads: Threaded rod M8 to M24
Base materials:	- Reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013+A1:2016. - Strength classes C20/25 to C50/60 according to EN 206:2013+A1:2016. - Uncracked concrete: Threaded rod M8 to M24.
Use conditions (Environmental conditions):	- Structures subject to dry internal conditions (all materials) - For all other conditions according to EN 1993-1-4 corresponding to corrosion resistance class: - Stainless steel class A2 according to Annex A 4, Table A1: CRC II - Stainless steel class A4 according to Annex A 4, Table A1: CRC III - High corrosion resistance steel HCR according to Annex A 4, Table A1: CRC V
Installation:	- Hole drilling by hammer or compressed air drill mode - Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site. - Direction: D3 - Downward and horizontal and upwards (e.g. overhead) installation.

b) Installation instructions



threaded rod

Table B1: Installation parameters for threaded rod

Anchor size			**M 8**	**M 10**	**M 12**	**M 16**	**M 20**	**M 24**
Diameter of element	d = dnom	[mm]	8	10	12	16	20	24
Nominal drill hole diameter	d0	[mm]	10	12	14	18	24	28
Effective embedment depth	hef,min	[mm]	60	60	70	80	90	96
	hef,max	[mm]	160	200	240	320	400	480
Diameter of clearance hole in the fixture[1)]	Prepositioned installation df	[mm]	9	12	14	18	22	26
	Push through installation df	[mm]	12	14	16	20	24	30
Maximum torque moment	Tinst ≤	[Nm]	10	20	40	80	120	160
Thickness of fixture	tfix,min >	[mm]	0					
	tfix,max <	[mm]	1500					
Minimum thickness of member	hmin	[mm]	hef + 30 mm ≥ 100			hef + 2d0		
Minimum spacing	smin	[mm]	40	50	60	80	100	120
Minimum edge distance	cmin	[mm]	40	50	60	80	100	120

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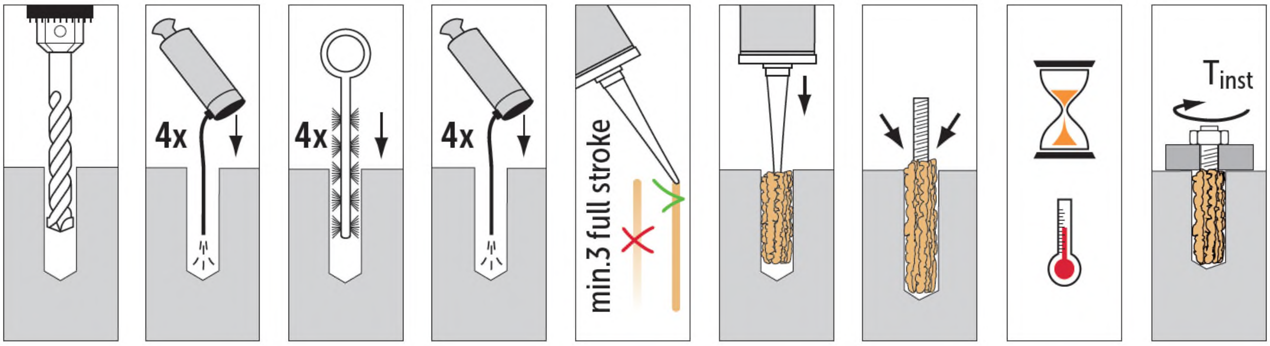

Concrete temperature	Minimum curing time		Hand pump	Steel brush
	POLY-FIX			
	Max. working time	Min. curing time		
-5 to -1 °C	90 min	6 h		
0 to +4 °C	45 min	3 h		
+5 to +9 °C	25 min	2 h		
+10 to +14 °C	20 min	100 min		
+15 to +19 °C	15 min	80 min		
+20 to +29 °C	6 min	45 min		
+30 to +34 °C	4 min	25 min		
+35 to +39 °C	2 min	20 min		
Cartridge temperature	+5°C to +40°C			

DECLARATION OF PERFORMANCE

Regulation (EU) no 305/2011

P-NEX_DOP_210983

1. Unique identification code of the product-type:

Rotho Blaas Injection System POLY-FIX (P-NEX)

2. Intended use/es:

Injection anchors
for fixing and/or supporting to masonry, structural elements (which contributes to the stability of the construction works) or heavy units.

3. Manufacturer:

Rotho Blaas srl - via dell'Adige 2/1 - 39040 Cortaccia (BZ) – Italy

4. Authorised representative:

not relevant

5. System/s of AVCP:

System 1

6a. Harmonised standard:

not relevant

6b. European Assessment Document:

EAD 330076-00-0604 (2017)

European Technical Assessment:

ETA 21/0983 (25/11/2021)

Technical Assessment Body:

Technical and Test Institute for Construction Prague

Notified Body/ies:

Technische Universität Darmstadt Fachbereich Bau- und Umweltingenieurwissenschaften Institut für Stahlbau und Werkstoffmechanik (NB 2873)

7. Declared performance/s:

Mechanical resistance and stability (BWR 1)

Essential characteristics	**Performance**
Characteristic resistance to tension and shear load (static and quasi-static loading)	Table C1) to C19)
Displacements (static and quasi-static loading)	Table C2), C37)
Β-factor	Table C38)
Durability	Installation Information - Intended use

Safety in case of fire (BWR 2)

Essential characteristics	**Performance**
Reaction to fire	Anchorages satisfy requirements for Class A1

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

The original document is in English. Versions in other languages have been translated from this document.

Signed for and on behalf of the manufacturer by:

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Luca Sestigiani
Technical Director

Cortaccia, 21.01.2022

This document consists of pages 33
EN

Table C1: Characteristic tension, shear resistance and bending moment of threaded rod						
Size			**M8**	**M10**	**M12**	**M16**
Characteristic tension resistance						
steel, property class 4.6 2)	$N_{Rk,s}$	[kN]	15 (13)	23 (21)	34	63
	$\gamma_{Ms}{}^{1)}$	[-]	2,0			
steel, property class 4.8 2)	$N_{Rk,s}$	[kN]	15 (13)	23 (21)	34	63
	$\gamma_{Ms}{}^{1)}$	[-]	1,5			
steel, property class 5.6 2)	$N_{Rk,s}$	[kN]	18 (17)	29 (27)	42	79
	$\gamma_{Ms}{}^{1)}$	[-]	2,0			
steel, property class 5.8 2)	$N_{Rk,s}$	[kN]	18 (17)	29 (27)	42	79
	$\gamma_{Ms}{}^{1)}$	[-]	1,5			
steel, property class 8.8 2)	$N_{Rk,s}$	[kN]	29 (27)	46 (43)	67	126
	$\gamma_{Ms}{}^{1)}$	[-]	1,5			
Stainless steel A2 / A4 / HCR, property class 70	$N_{Rk,s}$	[kN]	26	41	59	110
	$\gamma_{Ms}{}^{1)}$	[-]	1,87			
Stainless steel A4 / HCR, property class 80	$N_{Rk,s}$	[kN]	29	46	67	126
	$\gamma_{Ms}{}^{1)}$	[-]	1,6			
Characteristic shear resistance						
steel, property class 4.6 2)	$V_{Rk,s}$	[kN]	7 (7)	12 (11)	17	31
	$\gamma_{Ms}{}^{1)}$	[-]	1,67			
steel, property class 4.8 2)	$V_{Rk,s}$	[kN]	7 (7)	12 (11)	17	31
	$\gamma_{Ms}{}^{1)}$	[-]	1,25			
steel, property class 5.6 2)	$V_{Rk,s}$	[kN]	9 (8)	15 (13)	21	39
	$\gamma_{Ms}{}^{1)}$	[-]	1,67			
steel, property class 5.8 2)	$V_{Rk,s}$	[kN]	9 (8)	15 (13)	21	39
	$\gamma_{Ms}{}^{1)}$	[-]	1,25			
steel, property class 8.8 2)	$V_{Rk,s}$	[kN]	15 (13)	23 (21)	34	63
	$\gamma_{Ms}{}^{1)}$	[-]	1,25			
Stainless steel A2 / A4 / HCR, property class 70	$V_{Rk,s}$	[kN]	13	20	30	55
	$\gamma_{Ms}{}^{1)}$	[-]	1,56			
Stainless steel A4 / HCR, property class 80	$V_{Rk,s}$	[kN]	15	23	34	63
	$\gamma_{Ms}{}^{1)}$	[-]	1,33			
Characteristic bending moment						
steel, property class 4.6 2)	$M_{Rk,s}$	[Nm]	15 (13)	30 (27)	52	133
	$\gamma_{Ms}{}^{1)}$	[-]	1,67			
steel, property class 4.8 2)	$M_{Rk,s}$	[Nm]	15 (13)	30 (27)	52	133
	$\gamma_{Ms}{}^{1)}$	[-]	1,25			
steel, property class 5.6 2)	$M_{Rk,s}$	[Nm]	19 (16)	37 (33)	65	166
	$\gamma_{Ms}{}^{1)}$	[-]	1,67			
steel, property class 5.8 2)	$M_{Rk,s}$	[Nm]	19 (16)	37 (33)	65	166
	$\gamma_{Ms}{}^{1)}$	[-]	1,25			
steel, property class 8.8 2)	$M_{Rk,s}$	[Nm]	30 (26)	60 (53)	105	266
	$\gamma_{Ms}{}^{1)}$	[-]	1,25			
Stainless steel A2 / A4 / HCR, property class 70	$M_{Rk,s}$	[Nm]	26	52	92	232
	$\gamma_{Ms}{}^{1)}$	[-]	1,56			
Stainless steel A4 / HCR, property class 80	$M_{Rk,s}$	[Nm]	30	60	105	266
	$\gamma_{Ms}{}^{1)}$	[-]	1,33			

1)In absence of national regulations

2)Values in brackets valid for hot dipped galvanized undersized threaded rods with smaller stress area As according to EN ISO 10684:2004+AC:2009

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Table C2: Characteristic values of resistance under tension and shear loads: Autoclaved Aerated Concrete AAC2						
Anchor size	Effective anchorage depth	Characteristic resistance				
		Use conditions				
		d/d		w/d w/w		d/d w/d w/w
		40°C / 24°C	80°C / 50°C	40°C / 24°C	80°C / 50°C	For all temperature range
	hef	N_{Rk} 1)	N_{Rk} 1)	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
	[mm]	[kN]				
Compressive strength fb ≥ 2 N/mm²						
M8	80	0,9	0,9	0,9	0,9	1,5
M10	90	0,9	0,9	0,9	0,75	2,0
M12	100	1,5	1,5	1,2	0,9	2,5
M16	100	1,5	1,5	1,2	0,9	3,5

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C3: Displacement: Autoclaved Aerated Concrete AAC2						
Effective anchorage depth **hef**	**N**	**δN₀**	**δN∞**	**V**	**δV₀**	**δV∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,29	0,58	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	1,23	1,84
90		0,23	0,46		0,87	1,31
100		0,39	0,79		1,29	1,94

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Table C4: Characteristic values of resistance under tension and shear loads: Autoclaved Aerated Concrete AAC4

Anchor size	Effective anchorage depth	Characteristic resistance – Use conditions: d/d 40°C / 24°C	d/d 80°C / 50°C	w/d w/w 40°C / 24°C	w/d w/w 80°C / 50°C	d/d w/d w/w For all temperature range
	hef	N_{Rk} 1)	N_{Rk} 1)	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
	[mm]	[kN]				
Compressive strength fb ≥ 4 N/mm²						
M8	80	0,9	0,9	0,9	0,9	1,5
M10	90	2,5	2,0	1,5	1,5	2,0
M12	100	2,5	2,0	2,0	1,5	2,5
M16	100	3,5	3,0	2,0	2,0	3,5

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C5: Displacement: Autoclaved Aerated Concrete AAC4

Effective anchorage depth hef	**N**	**δN₀**	**δN∞**	**V**	**δV₀**	**δV∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,23	0,47	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	1,23	1,84
90		0,58	1,17		0,87	1,31
100		0,10	0,21		1,29	1,94

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Table C6: Characteristic values of resistance under tension and shear loads: Autoclaved Aerated Concrete AAC6						
Anchor size	Effective anchorage depth	**Characteristic resistance**				
		Use conditions				
		d/d		**w/d w/w**		**d/d w/d w/w**
		40°C / 24°C	80°C / 50°C	40°C / 24°C	80°C / 50°C	For all temperature range
	h_{ef}	N_{Rk} 1)	N_{Rk} 1)	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
	[mm]	[kN]				
Compressive strength fb ≥ 6 N/mm²						
M8	80	2,0	2,0	2,0	2,0	5,5
M10	90	3,0	2,5	2,5	2,0	9,0
M12	100	4,5	3,5	3,0	2,5	9,0
M16	100	5,5	4,5	3,5	3,0	11,0

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C 2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C7: Displacement: Autoclaved Aerated Concrete AAC6						
Effective anchorage depth h_{ef}	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,54	1,09	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	0,32	0,48
90		0,85	1,69		1,49	2,23
100		0,10	0,19		1,67	2,50

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Table C8: Characteristic values of resistance under tension and shear loads: Calcium silicate solid brick KS-NF					
Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance Use conditions d/d; w/d; w/w		
			40°C / 24°C	80°C / 50°C	For all temperature
		h_{ef}	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb≥10 N/mm²					
M8	-	80	3,0	2,0	3,0
M10	-	90	3,0	2,0	3,0
M12	-	100	4,0	2,5	3,5
M16	-	100	3,0	2,0	3,5
M8	IH 12x80	80	2,5	2,0	2,5
	IH 16x85	85	2,5	2,0	3,0
	IH 16x130/330	130	4,0	2,5	4,0
M10	IH 16x85	85	2,5	2,0	3,0
	IH 16x130/330	130	4,5	3,0	4,0
M12/M16	IH 20x85	85	2,5	2,0	3,0
	IH 20x130 / IH 20x200	130/200	4,5	2,5	4,0
Compressive strength fb≥20 N/mm²					
M8	-	80	4,5	3,0	4,5
M10	-	90	4,5	3,0	4,5
M12	-	100	5,5	3,5	5,0
M16	-	100	4,5	3,0	5,0
M8	IH 12x80	80	4,0	2,5	4,0
	IH 16x85	85	4,0	2,5	4,5
	IH 16x130/330	130	6,0	3,5	5,5
M10	IH 16x85	85	4,0	2,5	4,5
	IH 16x130/330	130	6,0	4,0	5,5
M12/M16	IH 20x85	85	4,0	2,5	5,0
	IH 20x130 / IH 20x200	130/200	6,0	4,0	5,5
Compressive strength fb≥27 N/mm²					
M8	-	80	5,5	3,5	5,0
M10	-	90	5,5	3,5	5,5
M12	-	100	6,5	4,5	6,0
M16	-	100	5,5	3,5	6,0
M8	IH 12x80	80	4,5	3,0	4,5
	IH 16x85	85	4,5	3,0	5,5
	IH 16x130/330	130	6,5	4,5	6,5
M10	IH 16x85	85	4,5	3,0	5,5
	IH 16x130/330	130	6,5	4,5	6,5
M12/M16	IH 20x85	85	4,5	3,0	5,5
	IH 20x130 / IH 20x200	130/200	6,5	4,5	6,5

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

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Table C9: Displacement: Calcium silicate solid brick KS-NF						
Effective anchorage depth **hef**	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,08	0,16	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	3,07	4,61
85		0,26	0,52		1,46	2,19
90		0,09	0,18		1,50	2,25
100		0,10	0,20		1,03	1,53
130; 200		0,22	0,44		1,16	1,74

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Table C10: Characteristic values of resistance under tension and shear loads: Calcium silicate hollow brick KS L-3DF

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance – Use conditions d/d; w/d; w/w		
			40°C / 24°C	80°C / 50°C	For all temperature
		h_{ef}	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb≥8 N/mm²					
M8	IH 12x80	80	1,5	0,9	2,0
	IH 16x85	85	1,5	0,9	2,5
	IH 16x130	130	2,5	1,5	3,0
	IH 16x130/330	130	2,5	1,5	3,0
M10	IH 16x85	85	1,5	0,9	2,5
	IH 16x130	130	2,5	1,5	3,0
	IH 16x130/330	130	2,5	1,5	3,0
M12	IH 20x85	85	1,5	0,9	3,0
	IH 20x130 / IH 20x200	130/200	2,5	1,5	3,0
M16	IH 20x85	85	1,5	0,9	3,0
	IH 20x130 / IH 20x200	130/200	2,5	1,5	4,0
Compressive strength fb≥12 N/mm²					
M8	IH 12x80	80	2,0	1,2	2,5
	IH 16x85	85	2,0	1,2	3,5
	IH 16x130	130	3,5	2,0	4,5
	IH 16x130/330	130	3,5	2,0	4,5
M10	IH 16x85	85	2,0	1,2	3,5
	IH 16x130	130	3,5	2,0	4,5
	IH 16x130/330	130	3,5	2,0	4,5
M12	IH 20x85	85	2,0	1,2	3,5
	IH 20x130 / IH 20x200	130/200	3,5	2,0	4,5
M16	IH 20x85	85	2,0	1,2	3,5
	IH 20x130 / IH 20x200	130/200	3,5	2,0	5,0
Compressive strength fb≥14 N/mm²					
M8	IH 12x80	80	2,5	1,5	3,0
	IH 16x85	85	2,5	1,5	4,0
	IH 16x130	130	4,0	3,0	5,0
	IH 16x130/330	130	4,0	3,0	5,0
M10	IH 16x85	85	2,5	1,5	4,0
	IH 16x130	130	4,0	3,0	5,0
	IH 16x130/330	130	4,0	3,0	5,0
M12	IH 20x85	85	2,5	1,5	4,5
	IH 20x130 / IH 20x200	130/200	4,0	3,0	5,0
M16	IH 20x85	85	2,5	1,5	4,5
	IH 20x130 / IH 20x200	130/200	4,0	3,0	6,0

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

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Table C11: Displacement: Calcium silicate hollow brick KS-L-3DF						
Effective anchorage depth hef	**N**	**δN0**	**δN∞**	**V**	**δV0**	**δV∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,36	0,73	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	0,82	1,23
85		1,62	3,24		1,83	2,75
130; 200		1,70	3,40		1,98	2,98

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Table C12: Characteristic values of resistance under tension and shear loads: Calcium silicate hollow brick KS L-12DF					
Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb ≥ 10 N/mm²					
M8	IH 12x80	80	0,4	0,3	3,0
	IH 16x85	85	1,2	0,9	6,0
	IH 16x130	130	3,5	2,5	7,0
	IH 16x130/330	130	3,5	2,5	7,0
M10	IH 16x85	85	1,2	0,9	6,0
	IH 16x130	130	3,5	2,5	7,0
	IH 16x130/330	130	3,5	2,5	7,0
M12 / M16	IH 20x85	85	1,2	0,9	6,0
	IH 20x130 / IH 20x200	130 / 200	3,5	2,5	7,0
Compressive strength fb ≥ 12 N/mm²					
M8	IH 12x80	80	0,4	0,3	3,5
	IH 16x85	85	1,5	0,9	7,0
	IH 16x130	130	4,5	3,0	8,0
	IH 16x130/330	130	4,5	3,0	8,0
M10	IH 16x85	85	1,5	0,9	7,0
	IH 16x130	130	4,5	3,0	8,0
	IH 16x130/330	130	4,5	3,0	8,0
M12 / M16	IH 20x85	85	1,5	0,9	7,0
	IH 20x130 / IH 20x200	130 / 200	4,5	3,0	8,0
Compressive strength fb ≥ 16 N/mm²					
M8	IH 12x80	80	0,5	0,4	4,0
	IH 16x85	85	2,0	1,2	9,0
	IH 16x130	130	5,5	3,5	10,0
	IH 16x130/330	130	5,5	3,5	10,0
M10	IH 16x85	85	2,0	1,2	9,0
	IH 16x130	130	5,5	3,5	10,0
	IH 16x130/330	130	5,5	3,5	10,0
M12 / M16	IH 20x85	85	2,0	1,2	8,5
	IH 20x130 / IH 20x200	130 / 200	5,5	3,5	10,0

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

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Table C13: Displacement: Calcium silicate hollow brick KS-L-12DF						
Effective anchorage depth **hef**	**N**	**δN0**	**δN∞**	**V**	**δV0**	**δV∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,21	0,42	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	1,77	2,66
85		0,13	0,26		3,89	5,83
130		0,22	0,44		4,35	6,52

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Table C14: Characteristic values of resistance under tension and shear loads: Clay solid brick Mz-DF					
Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use conditions d/d; w/d; w/w		
			40˚C / 24˚C	80˚C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb ≥ 10 N/mm2					
M8	-	80	1,5	1,2	3,0
M10	-	90	1,5	1,2	3,5
M12	-	100	1,5	0,9	5,0
M16	-	100	2,5	1,5	5,0
M8	IH 12x80	80	2,0	1,5	3,0
	IH 16x85	85	2,0	1,5	3,0
	IH 16x130 / IH 16x130/330	130	3,0	2,0	3,0
M10	IH 16x85	85	2,0	1,5	3,5
	IH 16x130 / IH 16x130/330	130	3,0	2,0	3,5
M12 / M16	IH 20x85	85	2,0	1,5	3,5
	IH 20x130 / IH 20x200	130 / 200	3,0	2,0	3,5
Compressive strength fb ≥ 20 N/mm2					
M8	-	80	2,5	1,5	4,5
M10	-	90	2,5	1,5	5,5
M12	-	100	2,0	1,5	7,5
M16	-	100	3,5	2,5	7,5
M8	IH 12x80	80	3,0	2,0	4,0
	IH 16x85	85	3,0	2,0	4,5
	IH 16x130 / IH 16x130/330	130	4,0	2,5	4,5
M10	IH 16x85	85	3,0	2,0	5,0
	IH 16x130 / IH 16x130/330	130	4,5	3,0	5,0
M12 / M16	IH 20x85	85	3,0	2,0	5,0
	IH 20x130 / IH 20x200	130 / 200	4,5	3,0	5,0
Compressive strength fb ≥ 28 N/mm2					
M8	-	80	3,0	2,0	5,5
M10	-	90	3,0	2,0	6,5
M12	-	100	2,5	1,5	9,0
M16	-	100	4,5	3,0	9,0
M8	IH 12x80	80	3,5	2,5	5,0
	IH 16x85	85	3,5	2,5	5,0
	IH 16x130 / IH 16x130/330	130	5,0	3,5	5,0
M10	IH 16x85	85	3,5	2,5	6,0
	IH 16x130 / IH 16x130/330	130	5,0	3,5	6,0
M12 / M16	IH 20x85	85	3,5	2,5	6,0
	IH 20x130 / IH 20x200	130 / 200	5,0	3,5	6,0

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

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Table C15: Displacement: Clay solid brick Mz-DF

Effective anchorage depth hef	N	δN$_0$	δN$_\infty$	V	δV$_0$	δV$_\infty$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,12	0,24	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	2,27	3,41
85		0,13	0,26		1,22	1,83
90		0,06	0,13		0,71	1,06
100		0,18	0,35		0,43	0,64
130; 200		0,42	0,85		1,22	1,83

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Table C16: Characteristic values of resistance under tension and shear loads: Clay hollow brick HLz-16DF

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use conditions d/d; w/d; w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb ≥ 6 N/mm2					
M8	IH 12x80	80	1,2	0,75	2,5
	IH 16x85	85	1,5	1,2	4,0
	IH 16x130	130	2,5	1,5	4,0
	IH 16x130/330	130	2,5	1,5	4,0
M10	IH 16x85	85	1,5	1,2	4,0
	IH 16x130	130	2,5	1,5	6,0
	IH 16x130/330	130	2,5	1,5	6,0
M12 / M16	IH 20x85	85	2,0	1,5	4,0
	IH 20x130 / IH 20x200	130/ 200	2,5	1,5	6,0
Compressive strength fb ≥ 9 N/mm2					
M8	IH 12x80	80	1,2	0,9	3,0
	IH 16x85	85	2,0	1,5	4,5
	IH 16x130	130	3,0	2,0	5,0
	IH 16x130/330	130	3,0	2,0	5,0
M10	IH 16x85	85	2,0	1,5	5,0
	IH 16x130	130	3,0	2,0	7,0
	IH 16x130/330	130	3,0	2,0	7,0
M12 / M16	IH 20x85	85	2,5	2,0	5,0
	IH 20x130 / IH 20x200	130/ 200	3,0	2,0	7,0
Compressive strength fb ≥ 12 N/mm2					
M8	IH 12x80	80	1,5	1,2	3,5
	IH 16x85	85	2,5	1,5	5,5
	IH 16x130	130	3,5	2,5	6,0
	IH 16x130/330	130	3,5	2,5	6,0
M10	IH 16x85	85	2,5	1,5	6,0
	IH 16x130	130	3,5	2,5	8,0
	IH 16x130/330	130	3,5	2,5	8,0
M12 / M16	IH 20x85	85	3,5	2,0	6,0
	IH 20x130 / IH 20x200	130/ 200	3,5	2,5	8,0
Compressive strength fb ≥ 14 N/mm2					
M8	IH 12x80	80	1,5	1,2	4,0
	IH 16x85	85	2,5	2,0	6,0
	IH 16x130	130	3,5	2,5	6,5
	IH 16x130/330	130	3,5	2,5	6,5
M10	IH 16x85	85	2,5	2,0	6,0
	IH 16x130	130	3,5	2,5	9,0
	IH 16x130/330	130	3,5	2,5	9,0
M12 / M16	IH 20x85	85	3,5	2,0	6,0
	IH 20x130 / IH 20x200	130/ 200	3,5	2,5	9,0

Table C17: Displacement: Clay hollow brick HLz-16DF						
Effective anchorage depth **hef**	**N**	**δN$_0$**	**δN$_\infty$**	**V**	**δV$_0$**	**δV$_\infty$**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,27	0,55	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	1,02	1,53
85		0,55	1,10		2,14	3,22
130; 200		0,19	0,38		2,26	3,39

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Table C18: Characteristic values of resistance under tension and shear loads: Clay hollow brick Porotherm Homebric

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
			N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb ≥ 6 N/mm²					
M8	IH 12x80	80	0,9	0,75	2,0
	IH 16x85	85	1,2	0,75	2,0
	IH 16x130	130	1,5	0,9	2,5
	IH 16x130/330	130	1,5	0,9	2,5
M10	IH 16x85	85	1,2	0,75	2,0
	IH 16x130	130	1,5	0,9	2,5
	IH 16x130/330	130	1,5	0,9	2,5
M12	IH 20x85	85	1,2	0,75	3,0
	IH 20x130	130	1,5	0,9	3,0
M16	IH 20x85	85	1,2	0,75	3,0
	IH 20x130	130	1,5	0,9	3,0
Compressive strength fb ≥ 8 N/mm²					
M8	IH 12x80	80	1,2	0,9	2,5
	IH 16x85	85	1,2	0,9	2,5
	IH 16x130	130	1,5	1,2	3,0
	IH 16x130/330	130	1,5	1,2	3,0
M10	IH 16x85	85	1,2	0,9	2,5
	IH 16x130	130	1,5	1,2	3,0
	IH 16x130/330	130	1,5	1,2	3,0
M12	IH 20x85	85	1,2	0,9	3,5
	IH 20x130	130	1,5	1,2	3,5
M16	IH 20x85	85	1,2	0,9	3,5
	IH 20x130	130	1,5	1,2	3,5
Compressive strength fb ≥ 10 N/mm²					
M8	IH 12x80	80	1,2	0,9	3,0
	IH 16x85	85	1,5	0,9	3,0
	IH 16x130	130	2,0	1,2	3,5
	IH 16x130/330	130	2,0	1,2	3,5
M10	IH 16x85	85	1,5	0,9	3,0
	IH 16x130	130	2,0	1,2	3,5
	IH 16x130/330	130	2,0	1,2	3,5
M12	IH 20x85	85	1,5	0,9	4,0
	IH 20x130	130	2,0	1,2	4,0
M16	IH 20x85	85	1,5	0,9	4,0
	IH 20x130	130	2,0	1,2	4,0

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Table C19: Displacement: Clay hollow brick Porotherm Homebric						
Effective anchorage depth hef	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,65	1,29	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	1,26	1,89
85		0,52	1,04		1,89	2,84
130		0,45	0,90		1,48	2,23

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Table C20: Characteristic values of resistance under tension and shear loads: Clay hollow brick BGV Thermo

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb ≥ 4 N/mm²					
M8	IH 12x80	80	0,5	0,4	2,0
	IH 16x85	85	0,75	0,5	2,0
	IH 16x130	130	0,9	0,75	2,5
	IH 16x130/330	130	0,9	0,75	2,5
M10	IH 16x85	85	0,75	0,5	2,0
	IH 16x130	130	1,2	0,75	2,5
	IH 16x130/330	130	1,2	0,75	2,5
M12	IH 20x85	85	0,75	0,5	2,0
	IH 20x130	130	1,2	0,75	2,5
M16	IH 20x85	85	0,9	0,6	2,0
	IH 20x130	130	1,2	0,75	2,5
Compressive strength fb ≥ 6 N/mm²					
M8	IH 12x80	80	0,6	0,5	2,0
	IH 16x85	85	0,9	0,6	2,5
	IH 16x130	130	1,2	0,9	3,0
	IH 16x130/330	130	1,2	0,9	3,0
M10	IH 16x85	85	0,9	0,6	2,5
	IH 16x130	130	1,5	0,9	3,0
	IH 16x130/330	130	1,5	0,9	3,0
M12	IH 20x85	85	0,9	0,6	3,0
	IH 20x130	130	1,5	0,9	3,0
M16	IH 20x85	85	1,2	0,75	3,0
	IH 20x130	130	1,5	0,9	3,0
Compressive strength fb ≥ 10 N/mm²					
M8	IH 12x80	80	0,9	0,6	3,0
	IH 16x85	85	1,2	0,9	3,5
	IH 16x130	130	1,5	1,2	4,0
	IH 16x130/330	130	1,5	1,2	4,0
M10	IH 16x85	85	1,2	0,9	3,5
	IH 16x130	130	1,5	1,2	4,0
	IH 16x130/330	130	1,5	1,2	4,0
M12	IH 20x85	85	1,2	0,75	3,5
	IH 20x130	130	1,5	1,2	4,0
M16	IH 20x85	85	1,5	0,9	3,5
	IH 20x130	130	1,5	1,2	4,0

Table C21: Displacement: Clay hollow brick BGV Thermo						
Effective anchorage depth **hef**	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,27	0,54	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	1,21	1,81
85		0,39	0,77		2,00	3,01
130		0,16	0,32		1,60	2,39

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Table C22: Characteristic values of resistance under tension and shear loads: Clay hollow brick Calibric Th					
Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb ≥ 6 N/mm²					
M8	IH 12x80	80	0,75	0,5	2,5
	IH 16x85	85	0,75	0,5	3,5
	IH 16x130	130	0,9	0,6	3,5
	IH 16x130/330	130	0,9	0,6	3,5
M10	IH 16x85	85	0,75	0,5	3,5
	IH 16x130	130	0,9	0,6	3,5
	IH 16x130/330	130	0,9	0,6	3,5
M12	IH 20x85	85	0,75	0,5	6,0
	IH 20x130	130	0,9	0,6	6,0
M16	IH 20x85	85	1,2	0,75	6,0
	IH 20x130	130	1,2	0,75	6,0
Compressive strength fb ≥ 9 N/mm²					
M8	IH 12x80	80	0,9	0,6	3,5
	IH 16x85	85	0,9	0,6	4,5
	IH 16x130	130	1,2	0,75	4,5
	IH 16x130/330	130	1,2	0,75	4,5
M10	IH 16x85	85	0,9	0,6	4,5
	IH 16x130	130	1,2	0,9	4,5
	IH 16x130/330	130	1,2	0,9	4,5
M12	IH 20x85	85	0,9	0,6	7,5
	IH 20x130	130	1,2	0,9	7,5
M16	IH 20x85	85	1,5	0,9	7,5
	IH 20x130	130	1,5	0,9	7,5
Compressive strength fb ≥ 12 N/mm²					
M8	IH 12x80	80	0,9	0,75	4,0
	IH 16x85	85	0,9	0,75	5,5
	IH 16x130	130	1,2	0,9	5,5
	IH 16x130/330	130	1,2	0,9	5,5
M10	IH 16x85	85	0,9	0,75	5,5
	IH 16x130	130	1,5	0,9	5,5
	IH 16x130/330	130	1,5	0,9	5,5
M12	IH 20x85	85	0,9	0,75	8,5
	IH 20x130	130	1,5	0,9	8,5
M16	IH 20x85	85	1,5	1,2	8,5
	IH 20x130	130	1,5	1,2	8,5

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Table C23: Displacement: Clay hollow brick Calibric Th						
Effective anchorage depth hef	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,48	0,96	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	1,18	1,78
85		0,49	0,98		2,20	3,30
130		0,37	0,74		2,31	3,46

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Table C24: Characteristic values of resistance under tension and shear loads: Clay hollow brick Urbanbric					
Anchorsize	Sleeve	Effective anchorage depth	**Characteristic resistance**		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb ≥ 6 N/mm²					
M8	IH 12x80	80	0,9	0,75	3,0
M8 / M10	IH 16x85	85	1,2	0,75	3,5
	IH 16x130	130	1,5	1,2	3,5
	IH 16x130/330	130	1,5	1,2	3,5
M12 / M16	IH 20x85	85	1,2	0,75	4,0
	IH 20x130	130	1,5	1,2	4,0
Compressive strength fb ≥ 9 N/mm²					
M8	IH 12x80	80	1,2	0,9	3,5
M8 / M10	IH 16x85	85	1,5	0,9	4,0
	IH 16x130	130	2,0	1,5	4,5
	IH 16x130/330	130	2,0	1,5	4,5
M12 / M16	IH 20x85	85	1,5	0,9	5,0
	IH 20x130	130	2,0	1,5	5,0

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C25: Displacement: Clay hollow brick Urbanbric						
Effective anchorage depth hef	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,34	0,67	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	0,71	1,06
85		0,52	1,04		1,37	2,06
130		0,62	1,24		1,62	2,44

Table C26: Characteristic values of resistance under tension and shear loads: Clay hollow brick Blocchi Leggeri					
Anchorsize	Sleeve	Effective anchorage depth	**Characteristic resistance**		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb ≥ 4 N/mm2					
M8	IH 12x80	80	0,4	0,3	2,0
M8 / M10	IH 16x85	85	0,4	0,3	2,0
	IH 16x130	130	0,5	0,3	2,0
	IH 16x130/330	130	0,5	0,3	2,0
M12 / M16	IH 20x85	85	0,4	0,3	2,0
	IH 20x130	130	0,5	0,3	2,0
	IH 20x200	200	0,5	0,3	2,0
Compressive strength fb ≥ 6 N/mm2					
M8	IH 12x80	80	0,5	0,3	2,0
M8 / M10	IH 16x85	85	0,5	0,3	2,0
	IH 16x130	130	0,6	0,4	2,0
	IH 16x130/330	130	0,6	0,4	2,0
M12 / M16	IH 20x85	85	0,5	0,3	2,5
	IH 20x130	130	0,6	0,4	2,5
	IH 20x200	200	0,6	0,4	2,5
Compressive strength fb ≥ 8 N/mm2					
M8	IH 12x80	80	0,6	0,4	2,5
M8 / M10	IH 16x85	85	0,6	0,4	2,5
	IH 16x130	130	0,6	0,5	2,5
	IH 16x130/330	130	0,6	0,5	2,5
M12 / M16	IH 20x85	85	0,6	0,4	3,0
	IH 20x130	130	0,6	0,5	3,0
	IH 20x200	200	0,6	0,5	3,0

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

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Table C27: Displacement: Clay hollow brick Blocchi Leggeri						
Effective anchorage depth **hef**	**N**	**δN$_0$**	**δN$_\infty$**	**V**	**δV$_0$**	**δV$_\infty$**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,32	0,64	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	1,16	1,74
85		0,26	0,53		2,52	3,78
130; 200		0,32	0,64		2,52	3,78

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Table C28: Characteristic values of resistance under tension and shear loads: Clay hollow brick Doppio Uni					
Anchorsize	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength fb ≥ 10 N/mm²					
M8	IH 12x80	80	0,9	0,6	2,0
M8 / M10	IH 16x85	85	0,9	0,6	2,0
	IH 16x130	130	0,9	0,6	2,0
	IH 16x130/330	130	0,9	0,6	2,0
M12 / M16	IH 20x85	85	1,2	0,75	2,0
	IH 20x130	130	1,2	0,75	2,0
	IH 20x200	200	1,2	0,75	2,0
Compressive strength fb ≥ 16 N/mm²					
M8	IH 12x80	80	0,9	0,75	2,5
M8 / M10	IH 16x85	85	1,2	0,9	2,5
	IH 16x130	130	1,2	0,9	2,5
	IH 16x130/330	130	1,2	0,9	2,5
M12 / M16	IH 20x85	85	1,5	0,9	2,5
	IH 20x130	130	1,5	0,9	2,5
	IH 20x200	200	1,5	0,9	2,5
Compressive strength fb ≥ 20 N/mm²					
M8	IH 12x80	80	1,2	0,75	3,0
M8 / M10	IH 16x85	85	1,2	0,9	3,0
	IH 16x130	130	1,5	0,9	3,0
	IH 16x130/330	130	1,5	0,9	3,0
M12 / M16	IH 20x85	85	1,5	0,9	3,0
	IH 20x130	130	1,5	0,9	3,0
	IH 20x200	200	1,5	0,9	3,0
Compressive strength fb ≥ 28 N/mm²					
M8	IH 12x80	80	1,5	0,9	3,5
M8 / M10	IH 16x85	85	1,5	1,2	3,5
	IH 16x130	130	1,5	1,2	3,5
	IH 16x130/330	130	1,5	1,2	3,5
M12 / M16	IH 20x85	85	2,0	1,2	3,5
	IH 20x130	130	2,0	1,2	3,5
	IH 20x200	200	2,0	1,2	3,5

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

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Table C29: Displacement: Clay hollow brick Doppio Uni						
Effective anchorage depth **hef**	**N**	**δN0**	**δN∞**	**V**	**δV0**	**δV∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,54	1,08	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	1,63	2,45
85		0,17	0,34		1,75	2,63
130; 200		0,54	1,08		1,75	2,63

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Table C30: Characteristic values of resistance under tension and shear loads: Hollow Light weight concrete Bloc creux B40					
Anchorsize	Sleeve	Effective anchorage depth	**Characteristic resistance**		
			Use conditions d/d w/d w/w		
			40˚C / 24˚C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength $f_b \geq 4$ N/mm²					
M8	IH 12x80	80	0,4	0,3	1,2
	IH 16x85	85	0,6	0,5	3,0
	IH 16x130	130	2,0	1,5	3,5
	IH 16x130/330	130	2,0	1,5	3,5
M10	IH 16x85	85	0,6	0,5	3,0
	IH 16x130	130	2,0	1,5	3,5
	IH 16x130/330	130	2,0	1,5	3,5
M12	IH 20x85	85	0,9	0,6	3,0
	IH 20x130	130	2,0	1,5	3,5
M16	IH 20x85	85	0,9	0,6	3,0
	IH 20x130	130	2,0	1,5	3,5

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054

2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C31: Displacement: Hollow Light weight concrete Bloc creux B40						
Effective anchorage depth hef	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,14	0,29	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	0,25	0,37
85		0,45	0,90		0,98	1,47
130		0,61	1,22		1,10	1,65

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Table C32: Characteristic values of resistance under tension and shear loads: Solid light weight concrete brick					
Anchorsize	Sleeve	Effective anchorage depth	**Characteristic resistance**		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength $f_b \geq 2$ N/mm²					
M8	-	80	2,0	1,5	3,0
M10	-	90	2,0	1,5	3,5
M12	-	100	2,0	1,5	4,0
M16	-	100	2,0	1,5	4,0

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C33: Displacement: Solid light weight concrete brick						
Effective anchorage depth hef	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,64	1,28	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	0,50	0,75
90		0,70	1,41		0,68	1,03
100		0,21	0,42		0,54	0,81

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Table C34: Characteristic values of resistance under tension and shear loads: Hollow light weight concrete brick Leca Lex harkko RUH-200					
Anchorsize	Sleeve	Effective anchorage depth	**Characteristic resistance**		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength $f_b \geq 2{,}7$ N/mm²					
M8	IH 12x80	80	2,0	1,2	2,5
	IH 16x85	85	2,0	1,2	3,5
	IH 16x130	130	2,5	1,5	3,5
	IH 16x130/330	130	2,5	1,5	3,5
M10	IH 16x85	85	2,0	1,5	3,5
	IH 16x130	130	2,5	1,5	3,5
	IH 16x130/330	130	2,5	1,5	3,5
M12	IH 20x85	85	2,5	1,5	3,5
	IH 20x130	130	2,5	1,5	3,5
M16	IH 20x85	85	2,5	1,5	3,5
	IH 20x130	130	2,5	1,5	3,5

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C35: Displacement: Hollow light weight concrete brick Leca Lex harkko RUH-200						
Effective anchorage depth hef	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1{,}4 \cdot \gamma_M}$	0,11	0,22	$\frac{V_{Rk}}{1{,}4 \cdot \gamma_M}$	0,47	0,70
85		0,11	0,23		0,38	0,57
130		0,10	0,20		0,56	0,85

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Table C36: Characteristic values of resistance under tension and shear loads: Solid light weight concrete brick Leca Lex harkko RUH-200 kulma					
Anchorsize	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use conditions d/d w/d w/w		
			40°C / 24°C	80°C / 50°C	For all temperature range
		hef	N_{Rk} 1)	N_{Rk} 1)	$V_{Rk,b}$ 2)
		[mm]	[kN]		
Compressive strength $f_b \geq 3,0$ N/mm²					
M8	-	80	2,0	1,2	3,0
M10	-	90	3,0	2,0	4,0
M12	-	100	3,0	2,0	4,0
M16	-	100	3,0	2,0	4,0
M8	IH 12x80	80	2,0	1,2	3,0
	IH 16x85	85	2,0	1,5	3,5
	IH 16x130	130	3,0	2,0	4,0
	IH 16x130/330	130	3,0	2,0	4,0
M10	IH 16x85	85	2,0	1,5	3,5
	IH 16x130	130	3,0	2,0	4,0
	IH 16x130/330	130	3,0	2,0	4,0
M12 / M16	IH 20x85	85	2,0	1,5	4,5
	IH 20x130	130	3,0	2,0	4,5

1) For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b}$; $N_{Rk,s}$ according to Table C2 Annex C2; Calculation $N_{Rk,pb}$ see TR 054
2) For $V_{Rk,s}$ see Annex C2, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ see TR 054

Table C37: Displacement: Hollow light weight concrete brick Leca Lex harkko RUH-200 kulma						
Effective anchorage depth hef	**N**	**δN_0**	**δN_∞**	**V**	**δV_0**	**δV_∞**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \cdot \gamma_M}$	0,09	0,18	$\frac{V_{Rk}}{1,4 \cdot \gamma_M}$	0,48	0,72
85		0,07	0,15		0,77	1,15
90		0,13	0,26		0,26	0,39
100		0,13	0,23		0,36	0,54
130		0,10	0,21		0,68	1,01

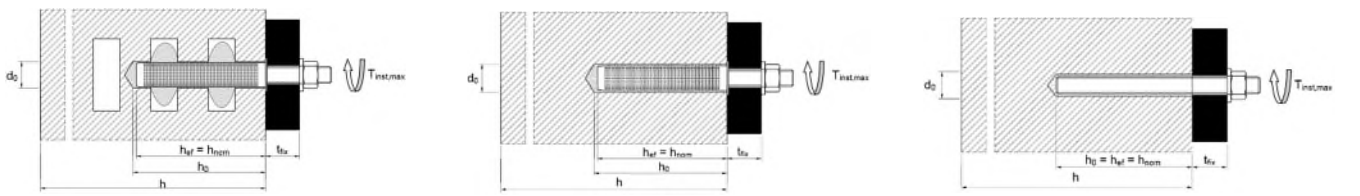
Table C38: β-factors for job-site testing under tension loading				
Brick type	Installation & Use conditions	Anchor size	β-factor	
			Ta: 24°C / 40°C	Tb: 50°C / 80°C
AAC2; AAC4; AAC6	d/d	M8	0,82	0,70
		M10		
		M12	0,70	0,60
		M16		
	w/w	M8	0,82	0,70
		M10	0,63	0,54
		M12	0,48	0,41
		M16		
KS-NF	d/d w/d w/w	For all anchors	0,72	0,50
KS L-3DF				
KS L-12DF				
Mz-DF				
HLz-16DF				
Porotherm Homebrick				
BGV Thermo				
Calibric Th				
Urbanbric				
Blocchi Leggeri				
Doppio Uni				
Hollow light weight concrete Bloc creux B40				
Solid light weight concrete				
Hollow light weight Leca Lex harkko RUH-200				
Solid light weight Leca Lex RUH-200 Kulma				

INSTALLATION INFORMATION - INTENDED USE

c) Context of use

Anchorages subject to:	- Static and quasi-static loads
Base materials:	- Autoclaved Aerated Concrete (Masonry group d) to Annex B2 - Solid brick masonry (Masonry group b), according to Annex B2 to B4 - Hollow brick masonry (Masonry group c), according to Annex B2 to B4 - Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2010. - Joints of the masonry must be visible and filled with mortar. - 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 EOTA Technical Report TR 053 under consideration of the β-factor to Annex C1, Table C1
Use conditions (Environmental conditions):	- Dry and wet structures (regarding injection mortar). - (X1) Structures subject to dry internal conditions (zinc coated steel, stainless steel A2 resp. A4 or high corrosion resistant steel). - (X2) 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 A4 or high corrosion resistant steel). - (X3) Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant steel).
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.

d) Installation instructions



Hollow bricks: threaded rod with sleeve | Solid bricks: threaded rod with sleeve | Hollow bricks: threaded rod without sleeve

Table B1: Installation parameters in Autoclaved Aerated Concrete ACC and solid masonry (without

Threaded rod			**M8**	**M10**	**M12**	**M16**
Nominal drill hole diameter	d_0	[mm]	10	12	14	18
Drill hole depth	h_0	[mm]	80	90	100	100
Effective anchorage depth	$h_{ef} = h_{nom}$	[mm]	80	90	100	100
Minimum wall thickness	h_{min}	[mm]	h_{ef} + 30			
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	12	14	18
Diameter of Steel brush	$d_b \geq$	[mm]	BRU10	BRU12	BRU14	BRU18
			12	14	16	20
Minimum diameter of steel brush	$d_{b,min}$	[mm]	10,5	12,5	14,5	18,5
Max torque moment	T_{inst}	[Nm]	See parameters of brick Annex C4 to Annex C39			

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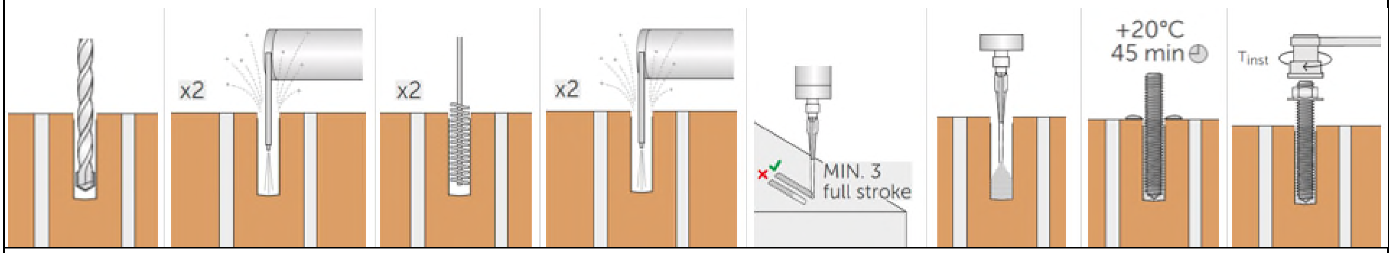
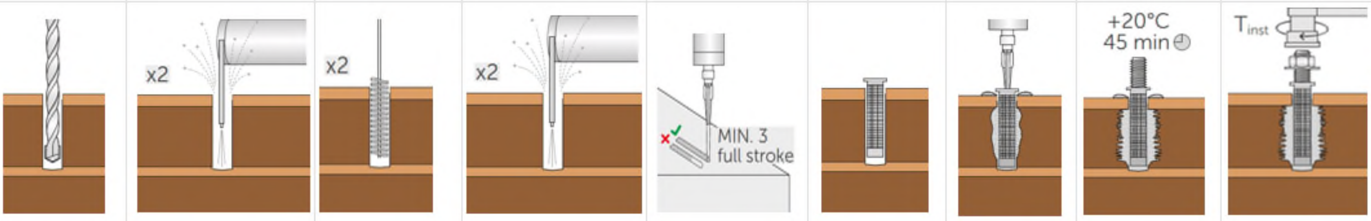
Table B2: Installation parameters in Solid and hollow masonry (with sleeve)									
Threaded rod			**M8**	**M8 / M10**			**M12 / M16**		
Sleeve		[mm]	**IH12x80**	**IH16x85**	**IH16x130**	**IH16x130/ 330**	**IH20x85**	**IH20x130**	**IH20x200**
Nominal drill hole diameter	d_0	[mm]	12	16	16	16	20	20	20
Drill hole depth	h_o	[mm]	85	90	135	135 $+t_{fix}$[1)]	90	135	205
Effective anchorage depth	$h_{ef} = h_{nom}$	[mm]	80	85	130	130	85	130	200
Minimum wall thickness	h_{min}	[mm]	115	115	195	195	115	195	240
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	9 (M8) / 12 (M10)			14 (M12) / 18 (M16)		
Diameter of brush	$d_b \geq$	[mm]	BRU12	BRU16			BRU20		
			14	18			22		
Minimum diameter of brush	$d_{b,min}$	[mm]	12,5	16,5			20,5		
Max torque moment	T_{inst}	[Nm]	See parameters of brick Annex C4 to Annex C39						

Solid masonry



Hollow masonry



Temperature in the base material	**Minimum curing time**		Hand pump	Steel brush
	POLY-FIX			
	Max. working time	Min. curing time		
0°C to +4°C	45 min	3 h		
+5°C to +9°C	25 min	2 h		
+10°C to +14°C	20 min	100 min		
+15°C to 19°C	15 min	80 min		
+20°C to +29°C	6 min	45 min		
+30°C to +34°C	4 min	25 min		
+35°C to +39°C	2 min	20 min		
Cartridge temperature	+5˚C to +40˚C			