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Declaration of Performance

No. **DPGEB1027** v2

1. Unique identification code of the product-type: **Extreme Hybrid XTR**

2. Intended uses:

Intended use of the construction product according to ETA 22/0214	
Generic type	Bonded injection type anchor for use in non-cracked and cracked concrete
Anchorages subject to	Static and quasi-static loads: threaded rod M8, M10, M12, M16, M20, M24 reinforcing bar Ø8, Ø10, Ø12, Ø14, Ø16, Ø20, Ø25 Seismic actions for Performance Category C1: threaded rod M8, M10, M12, M16 Seismic actions for Performance Category C2: threaded rod M12, M16 (steel class 8.8, stainless steel class ≥ 70) Working life 50 years
Base materials	- Compacted reinforced or unreinforced normal weight concrete without fibres according to EN 206-1:2013+A1:2016 - Strength class C20/25 to C50/60 according to EN 206-1:2013+A1:2016 - Non-cracked concrete threaded rod M8, M10, M12, M16, M20, M24 reinforcing bar Ø8, Ø10, Ø12, Ø14, Ø16, Ø20, Ø25 - Cracked concrete threaded rod M8, M10, M12, M16
Service temperature	I: -40 °C to +40 °C (max. short term temperature +40 °C and max. long term temperature +24 °C) II: -40 °C to +80 °C (max. short term temperature +80 °C and max. long term temperature +50 °C)
Environmental conditions	- Structures subject to dry internal conditions zinc plated, hot-dip galvanised or sherardized steel class 4.6, 4.8, 5.6, 5.8 or 8.8 stainless steel A2, class 50 or 70 stainless steel A4, class 50, 70 or 80 high corrosion resistant steel, class 50, 70 or 80 - Other conditions, corresponding to Corrosion Resistance Class (CRC) according to EN 1993-1-4:2006+A1:2015 stainless steel A2, class 50 or 70: CRC II stainless steel A4, class 50, 70 or 80: CRC III high corrosion resistant steel, class 50, 70 or 80: CRC V
Concrete conditions	Installation in dry or wet (water saturated) concrete or flooded bore holes (not sea water)
Installation	Perforation by hammer drill or compressed air drill mode Installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on job site Overhead installation allowed.
Design	Fasteners designed under the responsibility of an engineer experienced in anchorages and concrete work. Fasteners designed in accordance to EN 1992-4:2018 and Technical Report TR 055, Edition February 2018. Verifiable calculation notes and drawings prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings. Anchorages under seismic actions (cracked concrete) designed in accordance with EN 1992-4.

Intended use of the construction product according to ETA 22/0213	
Generic type	Injection system for post-installed connections of reinforcing bars in existing structures
Anchorages subject to	Static and quasi-static loads: reinforcing bar Ø8, Ø10, Ø12, Ø14, Ø16, Ø20, Ø25 Working life 50 years
Base materials	- Reinforced or unreinforced normal weight concrete according to EN 206:2013+A1:2016 - Strength class C12/15 to C50/60 according to EN 206:2013+A1:2016 - Non-carbonated concrete - Maximum chloride content 0.40% (CL 0.40) according to EN 206:2013+A1:2016
Service temperature	-40 °C to +80 °C (max. short term temperature +80 °C and max. long term temperature +50 °C)
Concrete condition	Installation in dry or wet concrete
Installation	Dry or wet concrete. Installation in flooded holes is not allowed. Overhead installation allowed. Hole drilling by hammer drill (HD) or compressed air drill mode (CD) The installation of post-installed rebars shall be done only by suitable trained installer and under supervision on site. The conditions under which an installer may be considered as suitable trained and the conditions for supervision on site are up to the Member States in which the installation is done. Check the position of the existing rebars.
Design	Anchorages designed under the responsibility of an engineer experienced in anchorages and concrete work. Verifiable calculation notes and drawings prepared taking account of the forces to be transmitted. Design according to EN 1992-1-1:2004+AC:2010, EN 1992-1-2:2004+AC:2008. The actual position of the reinforcement in the existing structure shall be determined on the basis of the construction documentation and taken into account when designing.

Intended use of the construction product according to ETA 22/0211	
Generic type	Bonded injection type anchor for use in masonry
Anchorages subject to	Static and quasi-static loads M8 to M16 (with and without perforated sleeve) Working life 50 years

Base materials
b: solid masonry

type acc. to EN 771-1,2 and 3	**min. density ρ**[kg/dm3]	**min.compr. Strength f_b** [N/mm2]	**example manufacturer**	**L/W/H** [mm]	**drilling method**
b1: Solid clay bricks Mz-DF	1,64	10	Unipor (DE)	240/115/55	Hammer drilling
b2: Calcium silicate solid brick KSV-NF	2,0	10	Wemding (DE)	240/115/71	Hammer drilling
b3: Solid light weight concrete	0,63	2	Bisotherm (DE)	300/123/248	Rotary drilling
b4: Solid light weight concrete Leca Lex harkko RUH-200 kulma	0,78	3	Saint-Gobain Weber (Fin)	498/200/195	Rotary drilling

c: hollow masonry

type acc. to EN 771-1,2 and 3	**min. density ρ[kg/dm3]**	**min. compr. Strength f_b** [N/mm2]	**example manufacturer**	**L/W/H** [mm]	**drilling method**
c1: Calcium silicate hollow brick KS L-3DF	1,4	8	Wemding (DE)	240/175/113	Rotary drilling
c2: Calcium silicate hollow brick KS L-12DF	1,4	10	Wemding (DE)	498/175/238	Rotary drilling
c3: Clay hollow brick HLz-16DF	0,83	15	Unipor (DE)	497/238/240	Rotary drilling
c4: Clay hollow brick Porotherm Homebric	0,68	6	Wienerberger (FR)	500/200/299	Rotary drilling
c5: Clay hollow brick BGV Thermo	0,62	4	Leroux (FR)	500/200/314	Rotary drilling
c6: Clay hollow brick Calibric Th	0,62	6	Terreal (FR)	500/200/314	Rotary drilling
c7: Clay hollow brick Urbanbric	0,74	6	Imerys (FR)	560/200/274	Rotary drilling
c8: Clay hollow brick Blocchi Leggeri	0,55	4	Wienerberger (IT)	250/120/250	Rotary drilling
c9: Clay hollow brick Doppio Uni	0,92	10	Wienerberger (IT)	250/120/120	Rotary drilling
c10: Hollow light weight concrete Bloc creux B40	0,8	4	Sepa (FR)	494/200/190	Rotary drilling
c11: Hollow light weight concrete Leca Lex harkko RUH-200	0,7	2,7	Saint-Gobain Weber (Fin)	498/200/195	Rotary drilling

d: Autoclaved Aerated Concrete

type acc. to EN 771-1,2 and 3	**min. density ρ**[kg/dm3]	**min. compr. Strength f_b** [N/mm2]	**example manufacturer**	**L/W/H** [mm]	**drilling method**
d1: Autoclaved Aerated Concrete AAC2	0,35	2	Ytong (CZ)	599/375/249	Rotary drilling
d2: Autoclaved Aerated Concrete AAC4	0,50	4	Ytong (CZ)	499/375/249	Rotary drilling
d3: Autoclaved Aerated Concrete AAC6	0,60	6	Porit (DE)	499/240/249	Rotary drilling

Service temperature	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)
Environmental conditions	- 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 category	Condition d/d: Installation and use in dry masonry Condition w/w: Installation and use in dry or wet masonry (incl. w/d installation in wet masonry and use in dry masonry)
Installation	Anchor Installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
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 EOTA TR 054, Edition April 2016, Design method A under the responsibility of an engineer experienced in anchorages and masonry work.

3. Manufacturer: **G&B Fissaggi S.r.l.** C.so Savona 22, Villastellone (TO), Italia

5. System of AVCP: 1

6b.
European Assessment Document: EAD 330499-01-0601 “Bonded fasteners for use in concrete”
European Technical Assessment: ETA 22/0214
Technical Assessment Body: TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Notified Body: 1020 TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.

European Assessment Document: EAD 330087-01-0601
European Technical Assessment: ETA 22/0213
Technical Assessment Body: TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Notified Body: 1020 TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.

European Assessment Document: EAD 330076-01-0604
European Technical Assessment: ETA 22/0211
Technical Assessment Body: TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Notified Body: 1020 TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.

7. Declared performances

7.1 Declared performances according to EAD 330499-01-0601, ETA 22/0214

7.1.1 Threaded rod diameter			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Essential characteristics			**Performance**					
Installation parameters								
d	Nominal diameter of bar	[mm]	8	10	12	16	20	24
d_0	Nominal drill hole diameter	[mm]	10	12	14	18	24	28
d_b	Diameter of the steel brush	[mm]	12	14	16	20	26	30
d_{fix}	Diameter of clearance hole in the fixture - Prepositioned installation	[mm]	9	12	14	18	22	26
	Diameter of clearance hole in the fixture - Push through installation	[mm]	12	14	16	20	24	30
$h_{ef,min}$	Minimum effective anchorage depth	[mm]	60	60	70	80	90	96
$h_{ef,max}$	Maximum effective anchorage depth	[mm]	160	200	240	320	400	480
h_1	Depth of the drilling hole	[mm]	h_{ef}					
h_{min}	Minimum thickness of the concrete member	[mm]	h_{ef} + 30 ≥ 100			h_{ef} + 2d_0		
T_{inst}	Maximum installation torque	[Nm]	10	20	40	80	120	160
s_{min}	Minimum spacing	[mm]	40	50	60	80	100	120
c_{min}	Minimum edge distance	[mm]	40	50	60	80	100	120

7.1.1 Threaded rod diameter				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Essential characteristics				**Performance**					
Tension steel failure mode									
$N_{Rk,s}$ $N_{Rk,s,seis,C1}$ $N_{Rk,s,seis,C2}$	Characteristic tension resistance of steel		[kN]	$A_s \cdot f_{uk}$					
Combined pull-out and concrete failure mode									
Characteristic bond resistance									
non-cracked concrete	T_I: 40°C/24°C	$\tau_{Rk,ucr}$	[N/mm²]	8,5	8,0	8,0	8,0	8,0	8,0
	T_{II}: 80°C/50°C	$\tau_{Rk,ucr}$	[N/mm²]	6,5	6,0	6,0	6,0	6,0	6,0
cracked concrete	T_I: 40°C/24°C	$\tau_{Rk,cr}$	[N/mm²]	4,5	4,5	4,5	4,5	NPD	
		$\tau_{Rk,cr,seis,C1}$	[N/mm²]	2,30	2,25	2,30	2,20	NPD	
		$\tau_{Rk,cr,seis,C2}$	[N/mm²]	NPD		0,75	0,95	NPD	
	T_{II}: 80°C/50°C	$\tau_{Rk,cr}$	[N/mm²]	3,5	3,5	3,5	3,5	NPD	
		$\tau_{Rk,cr,seis,C1}$	[N/mm²]	1,85	1,80	1,80	1,75	NPD	
		$\tau_{Rk,cr,seis,C2}$	[N/mm²]	NPD		0,60	0,75	NPD	
ψ_c	Increasing factor for non-cracked concrete		[-]	$(f_{ck} / 20)^{0,2}$					
	Increasing factor for cracked concrete, static actions		[-]	$(f_{ck} / 20)^{0,1}$					
	Increasing factor for cracked concrete, seismic actions		[-]	1,0					
Concrete cone failure mode									
$k_{ucr,N}$	Factor for non-cracked concrete		[-]	11,0					
$k_{cr,N}$	Factor for cracked concrete		[-]	7,7					
$s_{cr,N}$	Critical spacing		[mm]	$3,0\ h_{ef}$					
$c_{cr,N}$	Critical edge distance		[mm]	$1,5\ h_{ef}$					
Splitting failure mode									
$s_{cr,sp}$	Critical spacing for splitting		[mm]	$2\ c_{cr,sp}$					
$c_{cr,sp}$	Critical edge distance for splitting for $h/h_{ef} \geq 2,0$		[mm]	$1,0\ h_{ef}$					
	Critical edge distance for splitting for $2,0 > h/h_{ef} > 1,3$		[mm]	$2 \times h_{ef}\left(2,5 - \frac{h}{h_{ef}}\right)$					
	Critical edge distance for splitting for $h/h_{ef} \leq 1,3$		[mm]	$2,4\ h_{ef}$					
Installation safety factor									
γ_{inst}	Installation safety factor		[-]	1,2					
Shear steel failure mode without lever arm									
$V^0_{Rk,s}$	Characteristic shear resistance of steel, class 4.6, 4.8, 5.6, 5.8		[kN]	$0,6 \cdot A_s \cdot f_{uk}$					
$V^0_{Rk,s}$	Characteristic shear resistance of steel, strength class 8.8, stainless steel A2, A4, HCR, all classes		[kN]	$0,5 \cdot A_s \cdot f_{uk}$					
$V^0_{Rk,s,seis,C1}$	Characteristic shear resistance of steel under seismic actions cat. C1		[kN]	$0,7 \cdot V^0_{Rk,s}$				NPD	

7.1.1 Threaded rod diameter				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Essential characteristics				**Performance**					
$V^0_{Rk,s,seis,C2}$	Characteristic shear resistance of steel under seismic actions cat. C2 (steel class 8.8, stainless steel A2, A4 and HCR class ≥ 70)		[kN]	NPD		$0,7 \cdot V^0_{Rk,s}$		NPD	
α_{gap}	Factor for annular gap		[-]	0,5 (1,0 for filled annular gap)					
k_7	Ductility factor		[-]	1,0					
Shear steel failure mode with lever arm									
$M^0_{Rk,s}$	Characteristic bending moment		[Nm]	$1,2 \times W_{el} \times f_{uk}$					
$M^0_{Rk,s,seis,C1}$ $M^0_{Rk,s,seis,C2}$	Characteristic bending moment of steel under seismic actions		[Nm]	NPD					
Concrete pry-out failure mode									
k_8	Factor for resistance to pry-out failure		[-]	2,0					
γ_{inst}	Installation safety factor		[-]	1,0					
Concrete edge failure mode									
l_f	Effective length of fastener		[mm]	$\min(h_{ef}; 12 \cdot d_{nom})$					
d_{nom}	Outside diameter of fastener		[mm]	8	10	12	16	20	24
γ_{inst}	Installation safety factor		[-]	1,0					
Displacement on tension load, non-cracked concrete									
δ_{N0}-factor	T_I: 40°C/24°C	Short term	[mm/(N/mm²)]	0,03	0,04	0,05	0,07	0,08	0,10
$\delta_{N\infty}$-factor		Long term		0,07	0,08	0,08	0,08	0,08	0,10
δ_{N0}-factor	T_{II}: 80°C/50°C	Short term	[mm/(N/mm²)]	0,02	0,03	0,03	0,04	0,04	0,05
$\delta_{N\infty}$-factor		Long term		0,15	0,17	0,17	0,17	0,17	0,17
Displacement on tension load, cracked concrete									
δ_{N0}-factor	T_I: 40°C/24°C	Short term	[mm/(N/mm²)]	0,07	0,08	0,07	0,08	NPD	
$\delta_{N\infty}$-factor		Long term		0,13	0,11	0,11	0,10		
δ_{N0}-factor	T_{II}: 80°C/50°C	Short term	[mm/(N/mm²)]	0,09	0,08	0,07	0,09		
$\delta_{N\infty}$-factor		Long term		0,17	0,14	0,14	0,13		
Displacement on shear load, non-cracked concrete									
δ_{N0}-factor	All temperature ranges	Short term	[mm/(N/mm²)]	0,02	0,02	0,01	0,01	0,01	0,01
$\delta_{N\infty}$-factor		Long term		0,03	0,02	0,02	0,01	0,01	0,01
Displacement on shear load, cracked concrete									
δ_{N0}-factor	All temperature ranges	Short term	[mm/(N/mm²)]	0,05	0,04	0,03	0,01	NPD	
$\delta_{N\infty}$-factor		Long term		0,07	0,06	0,04	0,02		

7.1.2 Reinforcing bar diameter			**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**
Essential characteristics			**Performance**						
Installation parameters									
d	Nominal diameter of bar	[mm]	8	10	12	14	16	20	25
d_0	Nominal diameter of drill bit	[mm]	12	14	16	18	20	25	32
d_b	Diameter of the steel brush	[mm]	14	16	18	20	22	27	34
$h_{ef,min}$	Minimum effective anchorage depth	[mm]	60	60	70	75	80	90	100
$h_{ef,max}$	Maximum effective anchorage depth	[mm]	160	200	240	280	320	400	500

7.1.2 Reinforcing bar diameter				**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**
h_1	Depth of the drilling hole		[mm]	h_{ef}						
h_{min}	Minimum thickness of the concrete member		[mm]	h_{ef} + 30 ≥ 100	$h_{ef} + 2d_0$					
s_{min}	Minimum spacing		[mm]	40	50	60	70	80	100	130
c_{min}	Minimum edge distance		[mm]	40	50	60	70	80	100	130
Tension steel failure mode										
$N_{Rk,s}$	Characteristic tension resistance of steel		[kN]	A_s x f_{uk}						
Combined pull-out and concrete failure mode										
Characteristic bond resistance in non-cracked concrete C20/25										
$\tau_{Rk,ucr}$	Dry and wet concrete	T_I: 40°C/24°C	[N/mm²]	7,0	7,0	7,0	7,0	6,5	6,5	6,5
		T_{II}: 80°C/50°C		5,5	5,5	5,5	5,5	5,5	5,0	5,0
	Flooded bore hole	T_I: 40°C/24°C		7,0	7,0	7,0	7,0	6,5	6,5	6,5
		T_{II}: 80°C/50°C		5,5	5,5	5,5	5,5	5,5	5,0	5,0
ψ_c	Increasing factor for non-cracked concrete		[-]	$(f_{ck} / 20)^{0,1}$						
Concrete cone failure mode										
$k_{ucr,N}$	Factor for non-cracked concrete		[-]	11,0						
$s_{cr,N}$	Critical spacing		[mm]	3,0 h_{ef}						
$c_{cr,N}$	Critical edge distance		[mm]	1,5 h_{ef}						
Splitting failure mode										
$s_{cr,sp}$	Critical spacing for splitting		[mm]	2 $c_{cr,sp}$						
$c_{cr,sp}$	Critical edge distance for splitting for $h/h_{ef} \geq 2.0$		[mm]	1,0 h_{ef}						
	Critical edge distance for splitting for $2.0 > h/h_{ef} > 1.3$		[mm]	$2 \times h_{ef}\left(2{,}5 - \frac{h}{h_{ef}}\right)$						
	Critical edge distance for splitting for $h/h_{ef} \leq 1.3$		[mm]	2,4 h_{ef}						
Installation safety factor										
γ_{inst}	Safety factor, dry and wet concrete		[-]	1,2						
	Safety factor, flooded holes		[-]							
Shear steel failure mode without lever arm										
$V_{Rk,s}$	Characteristic shear resistance of steel		[kN]	$0{,}5 \cdot A_s \cdot f_{uk}$						
k_7	Ductility factor		[-]	1.0						
Shear steel failure mode with lever arm										
$M^0_{Rk,s}$	Characteristic bending resistance of steel		[Nm]	$1.2 \cdot W_{el} \cdot f_{uk}$						
Concrete pry-out failure mode										
k_8	Factor for resistance to pry-out failure		[mm]	2,0						
γ_{inst}	Installation safety factor		[-]	1,0						
Concrete edge failure mode										
l_f	Effective length of anchor		[mm]	min (h_{ef}; 12 x d_{nom})						min (h_{ef}; 300 mm)
d_{nom}	Outside diameter of anchor		[mm]	8	10	12	14	16	20	25
γ_{inst}	Installation safety factor		[-]	1,0						
Displacement on tension load, non-cracked concrete										
δ_{N0}	T_I: 40°C/24°C	Short term	[mm/(N/mm²)]	0,03	0,06	0,02	0,03	0,05	0,06	0,06
$\delta_{N\infty}$		Long term		0,08	0,08	0,08	0,08	0,08	0,08	0,08
δ_{N0}	T_{II}: 80°C/50°C	Short term	[mm/(N/mm²)]	0,03	0,06	0,02	0,03	0,05	0,06	0,06

7.1.2 Reinforcing bar diameter				**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**
$\delta_{V\infty}$		Long term		0,15	0,15	0,15	0,15	0,16	0,16	0,16
$\delta_{V\infty}$	For all temperature range	Short term	[mm/(N/mm²)]	0,04	0,04	0,01	0,01	0,01	0,01	0,01
δ_{V0}		Long term		0,05	0,06	0,02	0,02	0,02	0,02	0,02

7.2 Declared performances according to EAD 330087-01-0601, ETA 22/0213

7.2.1 Reinforcing bar diameter				**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**
Essential Characteristics				**Performance**						
Installation parameters										
d_s	Nominal diameter of bar		[mm]	8	10	12	14	16	20	25
d_0	Nominal diameter of drill bit	HD	[mm]	12	14	16	18	20	25	32
		CD		-	-				26	
min c	Minimum concrete cover	hammer drilling without drilling aid	[mm]	$30 + 0{,}06 \cdot l_v \geq 2 \cdot d_s$						
		hammer drilling with drilling aid	[mm]	$30 + 0{,}02 \cdot l_v \geq 2 \cdot d_s$						
		compressed air drilling without drilling aid	[mm]	$50 + 0{,}08 \cdot l_v$						
		compressed air drilling with drilling aid	[mm]	$50 + 0{,}02 \cdot l_v$						
α_{lb}	Amplification factor		[-]	1,5						
$l_{v,max}$	Maximum anchorage depth [mm]	All cartridge sizes < 825 ml	Hand or battery tool	700						500
			Pneumatic tool	800	1000					700
		Cartridge size 823 ml	Pneumatic tool	800	1000					
Bond resistance										
f_{bd}	Design ultimate bond resistance for all drilling methods and good conditions	C12/15	[N/mm²]	1,6						1,6
		C16/20	[N/mm²]	2,0						2,0
		C20/25	[N/mm²]	2,3						2,3
		C25/30	[N/mm²]	2,7						2,7
		C30/37	[N/mm²]	3,0						3,0
		C35/45	[N/mm²]	3,4						3,4
		C40/50	[N/mm²]	3,7						3,7
		C45/55	[N/mm²]	4,0						4,0
		C50/60	[N/mm²]	4,3						4,0
k_b	Reduction factor	C12/15	[N/mm²]	1,0						1,0
		C16/20	[N/mm²]							
		C20/25	[N/mm²]							
		C25/30	[N/mm²]							
		C30/37	[N/mm²]							
		C35/45	[N/mm²]							

7.2.1 Reinforcing bar diameter				**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**
Essential Characteristics				**Performance**						
Installation parameters										
		C40/50	[N/mm²]							
		C45/55	[N/mm²]							
		C50/60	[N/mm²]							0,93

7.3 Declared performances according to EAD 330076-01-0604, ETA 22/0211

7.3.1 *Installation parameters in Autoclaved Aerated Concrete AAC and solid masonry (without sleeve)*

Anchor size				**M8**	**M10**	**M12**	**M16**
$d=d_{nom}$	Outer diameter of anchor		[mm]	8	10	12	16
d_0	Nominal drill hole diameter		[mm]	10	12	14	18
h_0	Drill hole depth		[mm]	80	90	100	100
h_{ef}	Effective anchorage depth		[mm]	80	90	100	100
h_{min}	Minimum wall thickness		[mm]	h_{ef} + 30			
$d_f \leq$	Diameter of clearance hole in the fixture	Prepositioned installation	[mm]	9	12	14	18
d_f		Push through installation	[mm]	12	14	16	20

7.3.2 *Installation parameters in solid and hollow masonry (with sleeve)*

Anchor size				**M8**	**M8-M10**			**M12-M16**		
d_s	Sleeve diameter		[mm]	12	16	16	16	20	20	20
l_s	Sleeve length		[mm]	80	85	130	130 330/ 200	85	130	200
d_0	Nominal diameter of drill bit		[mm]	12	16	16	16	20	20	20
$h_{ef}=h_0$	Effective anchorage depth		[mm]	80	85	130	130	85	130	200
h_{nom}	Installation depth of sleeve		[mm]	80	85	130	130	85	130	200
$d_f \leq$	Diameter of clearance hole in the fixture	Prepositioned installation	[mm]	9	9 (M8) / 12 (M10)			14 (M12) / 18 (M16)		
d_f		Push through installation	[mm]	14	18			22		

7.3.3 Performance in Brick Type b1 (Solid clay bricks Mz-DF)

Edge and spacing distances

Anchor size	**Sleeve**	**Embedment depth**	**Edge distance**	**Spacing**	**Maximum installa-tion torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{minll} = s_{min} \perp$	max T_{inst}
		[mm]			[Nm]
M8	**-**	80	120	240	6
	BR 12x80	80	120	240	
	BR 16x85	85	127	255	
M10	**-**	90	135	270	10
M12 / M16	**-**	100	150	300	
M10	BR 16x85	85	127	255	8
	BR 16x130	130	195	390	
	BR 16x130/330	130	195	390	
M12 / M16	BR 20x85	85	127	255	
	BR 20x130	130	195	390	
	BR 20x200	200	300	600	

Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,12	0,24	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	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

Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance Use category d/dw/d w/w		
			T_a=40°C/24°C	T_b: 80°C/50°C	For all temperature range
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 10$ 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	BR 12x80	80	2,0	1,5	3,0
	BR 16x85	85	2,0	1,5	3,0
	BR 16x130/330	130	3,0	2,0	3,0
M10	BR 16x85	85	2,0	1,5	3,5
	BR 16x130/330	130	3,0	2,0	3,5
M12 / M16	BR 20x85	85	2,0	1,5	3,5
	BR 20x130/200	130 / 200	3,0	2,0	3,5
Compressive strength $f_b \geq 20$ 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	BR 12x80	80	3,0	2,0	4,0
	BR 16x85	85	3,0	2,0	4,5
	BR 16x130/330	130	4,0	2,5	4,5
M10	BR 16x85	85	3,0	2,0	5,0
	BR 16x130/330	130	4,5	3,0	5,0
M12 / M16	BR 20x85	85	3,0	2,0	5,0
	BR 20x130/200	130 / 200	4,5	3,0	5,0
Compressive strength $f_b \geq 28$ 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	BR 12x80	80	3,5	2,5	5,0
	BR 16x85	85	3,5	2,5	5,0
	BR 16x130/330	130	5,0	3,5	5,0
M10	BR 16x85	85	3,5	2,5	6,0
	BR 16x130/330	130	5,0	3,5	6,0
M12 / M16	BR 20x85	85	3,5	2,5	6,0
	BR 20x130/200	130 / 200	5,0	3,5	6,0

7.3.4 Performance in Brick Type b2 (Calcium silicate solid brick KSV-NF)

Edge and spacing distances

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing	Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{minII} = s_{min} \perp$	max T_{inst}
		[mm]			[Nm]
M8	-	80	120	240	10
M10	-	90	135	270	20
M12 / M16	-	100	150	300	
M8	BR 12x80	80	120	240	10
	BR 16x85	85	127	255	
M10	BR 16x85	85	127	255	20
M8 / M10	BR 16x130	130	195	390	
	BR16x130/330	130	195	390	
M12 / M16	BR 20x85	85	127	255	
	BR 20x130	130	195	390	
	BR 20x200	200	300	600	

Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,08	0,16	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	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

Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category d/dw/d w/w		
			T_a=40°C/24°C	T_b: 80°C/50°C	For all temperature range
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 10$ 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	BR 12x80	80	2,5	2,0	2,5
	BR 16x85	85	2,5	2,0	3,0
	BR16x130/330	130	4,0	2,5	4,0
M10	BR 16x85	85	2,5	2,0	3,0
	BR16x130/330	130	4,5	3,0	4,0
M12 / M16	BR 20x85	85	2,5	2,0	3,0
	BR20x130/200	130 / 200	4,5	2,5	4,0
Compressive strength $f_b \geq 20$ 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	BR 12x80	80	4,0	2,5	4,0
	BR 16x85	85	4,0	2,5	4,5
	BR16x130/330	130	6,0	3,5	5,5
M10	BR 16x85	85	4,0	2,5	4,5
	BR16x130/330	130	6,0	4,0	5,5
M12 / M16	BR 20x85	85	4,0	2,5	5,0
	BR20x130/200	130 / 200	6,0	4,0	5,5
Compressive strength $f_b \geq 27$ 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	BR 12x80	80	4,5	3,0	4,5
	BR 16x85	85	4,5	3,0	5,5
	BR16x130/330	130	6,5	4,5	6,5
M10	BR 16x85	85	4,5	3,0	5,5
	BR16x130/330	130	6,5	4,5	6,5
M12 / M16	BR 20x85	85	4,5	3,0	5,5
	BR20x130/200	130 / 200	6,5	4,5	6,5

7.3.5 Performance in Brick Type b3 (Solid light weight concrete)

Edge and spacing distances

Anchor size	**Sleeve**	**Embedment depth**	**Edge distance**	**Spacing**	**Maximum installation torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{minII} = s_{min} \perp$	max T_{inst}
		[mm]			[Nm]
M8	**-**	80	120	240	6
M10	**-**	90	135	270	
M12	**-**	100	150	300	10
M16	**-**	100	150	300	14

Displacement

h_{ef}	**N**	δ_{N0}	$\delta_{N\infty}$	**V**	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,64	1,28	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,50	0,75
90		0,70	1,41		0,68	1,03
100		0,21	0,42		0,54	0,81

Characteristic values of resistance under tension and shear loads

Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[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

7.3.6 Performance in Brick Type b4 (Solid light weight concrete Leca Lex harkko RUH-200 kulma)

Edge and spacing distances

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing	Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{minII} = s_{min\perp}$	max T_{inst}
		[mm]			[Nm]
M8	-	80	120	240	6
M10	-	90	135	270	12
M12	-	100	150	300	14
M16	-	100	150	300	16
M8	BR 12x80	80	120	240	8
M8 / M10	BR 16x85	85	127	255	
	BR 16x130	130	195	390	16
	BR16x130/330	130	195	390	16
M12 / M16	BR 20x85	85	127	255	12
	BR 20x130	130	195	390	16

Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,09	0,18	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	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

Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance Use category d/d w/d w/w		
			T_a=40°C/24°C	T_b: 80°C/50°C	For all temperature range
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[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	BR 12x80	80	2,0	1,2	3,0
	BR 16x85	85	2,0	1,5	3,5
	BR 16x130	130	3,0	2,0	4,0
	BR 16x130/330	130	3,0	2,0	4,0
M10	BR 16x85	85	2,0	1,5	3,5
	BR 16x130	130	3,0	2,0	4,0
	BR 16x130/330	130	3,0	2,0	4,0
M12 / M16	BR 20x85	85	2,0	1,5	4,5
	BR 20x130	130	3,0	2,0	4,5

7.3.7 Performance in Brick Type c1 (Calcium silicate hollow brick KS L-3DF)

Edge and spacing distances

Anchor size	Sleeve	Embedment depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	240	113	8
M8 / M10	BR 16x85	85				
	BR 16x130	130				
	BR 16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				
	BR 20x200	200				

Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,36	0,73	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,82	1,23
85		1,62	3,24		1,83	2,75
130 ; 200		1,70	3,40		1,98	2,98

Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance Use category d/d w/d w/w		
			T_a=40°C/24°C	T_b: 80°C/50°C	For all temperature range
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 8$ N/mm²					
M8	BR 12x80	80	1,5	0,9	2,0
	BR 16x85	85	1,5	0,9	2,5
	BR 16x130	130	2,5	1,5	3,0
	BR 16x130/330	130	2,5	1,5	3,0
M10	BR 16x85	85	1,5	0,9	2,5
	BR 16x130	130	2,5	1,5	3,0
	BR 16x130/330	130	2,5	1,5	3,0
M12	BR 20x85	85	1,5	0,9	3,0
	BR 20x130/200	130/200	2,5	1,5	3,0
M16	BR 20x85	85	1,5	0,9	3,0
	BR 20x130/200	130/200	2,5	1,5	4,0
Compressive strength $f_b \geq 12$ N/mm²					
M8	BR 12x80	80	2,0	1,2	2,5
	BR 16x85	85	2,0	1,2	3,5
	BR 16x130	130	3,5	2,0	4,5
	BR 16x130/330	130	3,5	2,0	4,5
M10	BR 16x85	85	2,0	1,2	3,5
	BR 16x130	130	3,5	2,0	4,5
	BR 16x130/330	130	3,5	2,0	4,5
M12	BR 20x85	85	2,0	1,2	3,5
	BR 20x130/200	130/200	3,5	2,0	4,5
M16	BR 20x85	85	2,0	1,2	3,5
	BR 20x130/200	130/200	3,5	2,0	5,0
Compressive strength $f_b \geq 14$ N/mm²					
	BR 12x80	80	2,5	1,5	3,0

Characteristic values of resistance under tension and shear loads					
Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
M8	BR 16x85	85	2,5	1,5	4,0
	BR 16x130	130	4,0	3,0	5,0
	BR 16x130/330	130	4,0	3,0	5,0
M10	BR 16x85	85	2,5	1,5	4,0
	BR 16x130	130	4,0	3,0	5,0
	BR 16x130/330	130	4,0	3,0	5,0
M12	BR 20x85	85	2,5	1,5	4,5
	BR 20x130/200	130/200	4,0	3,0	5,0
M16	BR 20x85	85	2,5	1,5	4,5
	BR 20x130/200	130/200	4,0	3,0	6,0

7.3.8 Performance in Brick Type c2 (Calcium silicate hollow brick KS L-12DF)

Edge and spacing distances						
Anchor size	**Sleeve**	**Embedment depth**	**Edge distance**	**Spacing**		**Maximum installation torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ \parallel}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	498	238	2
M8 / M10	BR 16x85	85				4
	BR 16x130	130				
	BR16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				

Displacement						
h_{ef}	**N**	δ_{N0}	$\delta_{N\infty}$	**V**	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,21	0,42	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,77	2,66
85		0,13	0,26		3,89	5,83
130		0,22	0,44		4,35	6,52

Characteristic values of resistance under tension and shear loads					
Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 10$ N/mm²					
M8	BR 12x80	80	0,4	0,3	3,0
	BR 16x85	85	1,2	0,9	6,0
	BR 16x130	130	3,5	2,5	7,0
	BR 16x130/330	130	3,5	2,5	7,0
M10	BR 16x85	85	1,2	0,9	6,0
	BR 16x130	130	3,5	2,5	7,0
	BR 16x130/330	130	3,5	2,5	7,0
M12 / M16	BR 20x85	85	1,2	0,9	6,0
	BR 20x130/200	130/200	3,5	2,5	7,0

Compressive strength $f_b \geq 12$ N/mm²					
M8	BR 12x80	80	0,4	0,3	3,5
	BR 16x85	85	1,5	0,9	7,0
	BR 16x130	130	4,5	3,0	8,0
	BR 16x130/330	130	4,5	3,0	8,0
M10	BR 16x85	85	1,5	0,9	7,0
	BR 16x130	130	4,5	3,0	8,0
	BR 16x130/330	130	4,5	3,0	8,0
M12 / M16	BR 20x85	85	1,5	0,9	7,0
	BR 20x130/200	130/200	4,5	3,0	8,0
Compressive strength $f_b \geq 16$ N/mm²					
M8	BR 12x80	80	0,5	0,4	4,0
	BR 16x85	85	2,0	1,2	9,0
	BR 16x130	130	5,5	3,5	10,0
	BR 16x130/330	130	5,5	3,5	10,0
M10	BR 16x85	85	2,0	1,2	9,0
	BR 16x130	130	5,5	3,5	10,0
	BR 16x130/330	130	5,5	3,5	10,0
M12 / M16	BR 20x85	85	2,0	1,2	8,5
	BR 20x130/200	130/200	5,5	3,5	10,0

7.3.9 Performance in Brick Type c3 (Clay hollow brick HLz-16DF)

Edge and spacing distances

Anchor size	**Sleeve**	**Embement depth**	**Edge distance**	**Spacing**		**Maximum installation torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	497	238	6
M8 / M10	BR 16x85	85				
	BR 16x130	130				
	BR16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				
	BR 20x200	200				

Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,27	0,55	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,02	1,53
85		0,55	1,10		2,14	3,22
130 ; 200		0,19	0,38		2,26	3,39

Characteristic values of resistance under tension and shear loads

Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 6$ N/mm²					
M8	BR 12x80	80	1,2	0,75	2,5
	BR 16x85	85	1,5	1,2	4,0
	BR 16x130	130	2,5	1,5	4,0

	BR 16x130/330	130	2,5	1,5	4,0
M10	BR 16x85	85	1,5	1,2	4,0
	BR 16x130	130	2,5	1,5	6,0
	BR 16x130/330	130	2,5	1,5	6,0
M12 / M16	BR 20x85	85	2,0	1,5	4,0
	BR 20x130/200	130/200	2,5	1,5	6,0
Compressive strength $f_b \geq 9$ N/mm²					
M8	BR 12x80	80	1,2	0,9	3,0
	BR 16x85	85	2,0	1,5	4,5
	BR 16x130	130	3,0	2,0	5,0
	BR 16x130/330	130	3,0	2,0	5,0
M10	BR 16x85	85	2,0	1,5	5,0
	BR 16x130	130	3,0	2,0	7,0
	BR 16x130/330	130	3,0	2,0	7,0
M12 / M16	BR 20x85	85	2,5	2,0	5,0
	BR 20x130/200	130/200	3,0	2,0	7,0
Compressive strength $f_b \geq 12$ N/mm²					
M8	BR 12x80	80	1,5	1,2	3,5
	BR 16x85	85	2,5	1,5	5,5
	BR 16x130	130	3,5	2,5	6,0
	BR 16x130/330	130	3,5	2,5	6,0
M10	BR 16x85	85	2,5	1,5	6,0
	BR 16x130	130	3,5	2,5	8,0
	BR 16x130/330	130	3,5	2,5	8,0
M12 / M16	BR 20x85	85	3,5	2,0	6,0
	BR 20x130/200	130/200	3,5	2,5	8,0
Compressive strength $f_b \geq 14$ N/mm²					
M8	BR 12x80	80	1,5	1,2	4,0
	BR 16x85	85	2,5	2,0	6,0
	BR 16x130	130	3,5	2,5	6,5
	BR 16x130/330	130	3,5	2,5	6,5
M10	BR 16x85	85	2,5	2,0	6,0
	BR 16x130	130	3,5	2,5	9,0
	BR 16x130/330	130	3,5	2,5	9,0
M12 / M16	BR 20x85	85	3,5	2,0	6,0
	BR 20x130/200	130/200	3,5	2,5	9,0

7.3.10 Performance in Brick Type c4 (Clay hollow brick Porotherm Homebric)

Edge and spacing distances

Anchor size	**Sleeve**	**Embement depth**	**Edge distance**	**Spacing**		**Maximum installation torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min} \perp$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	500	299	2
M8 / M10	BR 16x85	85				6
	BR 16x130	130				
	BR16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				

Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	N_{Rk}	0,65	1,29	V_{Rk}	1,26	1,89
85		0,52	1,04		1,89	2,84

130	1,4 • γ_M	0,45	0,90	1,4 • γ_M	1,48	2,23

Characteristic values of resistance under tension and shear loads					
Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 6$ N/mm²					
M8	BR 12x80	80	0,9	0,75	2,0
	BR 16x85	85	1,2	0,75	2,0
	BR 16x130	130	1,5	0,9	2,5
	BR16x130/330	130	1,5	0,9	2,5
M10	BR 16x85	85	1,2	0,75	2,0
	BR 16x130	130	1,5	0,9	2,5
	BR16x130/330	130	1,5	0,9	2,5
M12	BR 20x85	85	1,2	0,75	3,0
	BR 20x130	130	1,5	0,9	3,0
M16	BR 20x85	85	1,2	0,75	3,0
	BR 20x130	130	1,5	0,9	3,0
Compressive strength $f_b \geq 8$ N/mm²					
M8	BR 12x80	80	1,2	0,9	2,5
	BR 16x85	85	1,2	0,9	2,5
	BR 16x130	130	1,5	1,2	3,0
	BR16x130/330	130	1,5	1,2	3,0
M10	BR 16x85	85	1,2	0,9	2,5
	BR 16x130	130	1,5	1,2	3,0
	BR16x130/330	130	1,5	1,2	3,0
M12	BR 20x85	85	1,2	0,9	3,5
	BR 20x130	130	1,5	1,2	3,5
M16	BR 20x85	85	1,2	0,9	3,5
	BR 20x130	130	1,5	1,2	3,5
Compressive strength $f_b \geq 10$ N/mm²					
M8	BR 12x80	80	1,2	0,9	3,0
	BR 16x85	85	1,5	0,9	3,0
	BR 16x130	130	2,0	1,2	3,5
	BR16x130/330	130	2,0	1,2	3,5
M10	BR 16x85	85	1,5	0,9	3,0
	BR 16x130	130	2,0	1,2	3,5
	BR16x130/330	130	2,0	1,2	3,5
M12	BR 20x85	85	1,5	0,9	4,0
	BR 20x130	130	2,0	1,2	4,0
M16	BR 20x85	85	1,5	0,9	4,0
	BR 20x130	130	2,0	1,2	4,0

7.3.11 Performance in Brick Type c5 (Clay hollow brick BGV Thermo)

Edge and spacing distances

Anchor size	Sleeve	Embement depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	500	314	2
M8 / M10	BR 16x85	85				4
	BR 16x130	130				
	BR16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				

Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,27	0,54	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,21	1,81
85		0,39	0,77		2,00	3,01
130		0,16	0,32		1,60	2,39

Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	T_b: 80°C/50°C	For all temperature range
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 4$ N/mm²					
M8	BR 12x80	80	0,5	0,4	2,0
	BR 16x85	85	0,75	0,5	2,0
	BR 16x130	130	0,9	0,75	2,5
	BR16x130/330	130	0,9	0,75	2,5
M10	BR 16x85	85	0,75	0,5	2,0
	BR 16x130	130	1,2	0,75	2,5
	BR16x130/330	130	1,2	0,75	2,5
M12	BR 20x85	85	0,75	0,5	2,0
	BR 20x130	130	1,2	0,75	2,5
M16	BR 20x85	85	0,9	0,6	2,0
	BR 20x130	130	1,2	0,75	2,5
Compressive strength $f_b \geq 6$ N/mm²					
M8	BR 12x80	80	0,6	0,5	2,0
	BR 16x85	85	0,9	0,6	2,5
	BR 16x130	130	1,2	0,9	3,0
	BR16x130/330	130	1,2	0,9	3,0
M10	BR 16x85	85	0,9	0,6	2,5
	BR 16x130	130	1,5	0,9	3,0
	BR16x130/330	130	1,5	0,9	3,0
M12	BR 20x85	85	0,9	0,6	3,0
	BR 20x130	130	1,5	0,9	3,0
M16	BR 20x85	85	1,2	0,75	3,0
	BR 20x130	130	1,5	0,9	3,0
Compressive strength $f_b \geq 10$ N/mm²					

M8	BR 12x80	80	0,9	0,6	3,0
	BR 16x85	85	1,2	0,9	3,5
	BR 16x130	130	1,5	1,2	4,0
	BR16x130/330	130	1,5	1,2	4,0
M10	BR 16x85	85	1,2	0,9	3,5
	BR 16x130	130	1,5	1,2	4,0
	BR16x130/330	130	1,5	1,2	4,0
M12	BR 20x85	85	1,2	0,75	3,5
	BR 20x130	130	1,5	1,2	4,0
M16	BR 20x85	85	1,5	0,9	3,5
	BR 20x130	130	1,5	1,2	4,0

7.3.12 Performance in Brick Type c6 (Clay hollow brick Calibric Th)

Edge and spacing distances

Anchor size	**Sleeve**	**Embement depth**	**Edge distance**	**Spacing**		**Maximum installation torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min} \perp$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	500	314	2
M8 / M10	BR 16x85	85				
	BR 16x130	130				
	BR 16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				

Displacement

h_{ef}	**N**	δ_{N0}	$\delta_{N\infty}$	**V**	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,48	0,96	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,18	1,78
85		0,49	0,98		2,20	3,30
130		0,37	0,74		2,31	3,46

Characteristic values of resistance under tension and shear loads

Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 6$ N/mm²					
M8	BR 12x80	80	0,75	0,5	2,5
	BR 16x85	85	0,75	0,5	3,5
	BR 16x130	130	0,9	0,6	3,5
	BR16x130/330	130	0,9	0,6	3,5
M10	BR 16x85	85	0,75	0,5	3,5
	BR 16x130	130	0,9	0,6	3,5
	BR16x130/330	130	0,9	0,6	3,5
M12	BR 20x85	85	0,75	0,5	6,0
	BR 20x130	130	0,9	0,6	6,0
M16	BR 20x85	85	1,2	0,75	6,0
	BR 20x130	130	1,2	0,75	6,0
Compressive strength $f_b \geq 9$ N/mm²					
	BR 12x80	80	0,9	0,6	3,5
	BR 16x85	85	0,9	0,6	4,5

M8	BR 16x130	130	1,2	0,75	4,5
	BR16x130/330	130	1,2	0,75	4,5
M10	BR 16x85	85	0,9	0,6	4,5
	BR 16x130	130	1,2	0,9	4,5
	BR16x130/330	130	1,2	0,9	4,5
M12	BR 20x85	85	0,9	0,6	7,5
	BR 20x130	130	1,2	0,9	7,5
M16	BR 20x85	85	1,5	0,9	7,5
	BR 20x130	130	1,5	0,9	7,5
Compressive strength $f_b \geq 12$ N/mm²					
M8	BR 12x80	80	0,9	0,75	4,0
	BR 16x85	85	0,9	0,75	5,5
	BR 16x130	130	1,2	0,9	5,5
	BR16x130/330	130	1,2	0,9	5,5
M10	BR 16x85	85	0,9	0,75	5,5
	BR 16x130	130	1,5	0,9	5,5
	BR16x130/330	130	1,5	0,9	5,5
M12	BR 20x85	85	0,9	0,75	8,5
	BR 20x130	130	1,5	0,9	8,5
M16	BR 20x85	85	1,5	1,2	8,5
	BR 20x130	130	1,5	1,2	8,5

7.3.13 Performance in Brick Type c7 (Clay hollow brick Urbanbric)

Edge and spacing distances

Anchor size	**Sleeve**	**Embement depth**	**Edge distance**	**Spacing**		**Maximum installation torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ \parallel}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	560	274	2
M8 / M10	BR 16x85	85				
	BR 16x130	130				
	BR16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				

Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,34	0,67	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,71	1,06
85		0,52	1,04		1,37	2,06
130		0,62	1,24		1,62	2,44

Characteristic values of resistance under tension and shear loads

Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 6$ N/mm²					
M8	BR 12x80	80	0,9	0,75	3,0
M8 / M10	BR 16x85	85	1,2	0,75	3,5
	BR 16x130	130	1,5	1,2	3,5

	BR 16x130/330	130	1,5	1,2	3,5
M12 / M16	BR 20x85	85	1,2	0,75	4,0
	BR 20x130	130	1,5	1,2	4,0
Compressive strength $f_b \geq 9$ N/mm²					
M8	BR 12x80	80	1,2	0,9	3,5
M8 / M10	BR 16x85	85	1,5	0,9	4,0
	BR 16x130	130	2,0	1,5	4,5
	BR 16x130/330	130	2,0	1,5	4,5
M12 / M16	BR 20x85	85	1,5	0,9	5,0
	BR 20x130	130	2,0	1,5	5,0

7.3.14 Performance in Brick Type c8 (Clay hollow brick Blocchi Leggeri)

Edge and spacing distances

Anchor size	**Sleeve**	**Embedment depth**	**Edge distance**	**Spacing**		**Maximum installation torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ \parallel}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	250	250	4
M8 / M10	BR 16x85	85				
	BR 16x130	130				
	BR16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				
	BR 20x200	200				

Displacement

h_{ef}	**N**	δ_{N0}	$\delta_{N\infty}$	**V**	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,32	0,64	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,16	1,74
85		0,26	0,53		2,52	3,78
130 ; 200		0,32	0,64		2,52	3,78

Characteristic values of resistance under tension and shear loads

Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 4$ N/mm²					
M8	BR 12x80	80	0,4	0,3	2,0
M8 / M10	BR 16x85	85	0,4	0,3	2,0
	BR 16x130	130	0,5	0,3	2,0
	BR 16x130/330	130	0,5	0,3	2,0
M12 / M16	BR 20x85	85	0,4	0,3	2,0
	BR 20x130	130	0,5	0,3	2,0
	BR 20x200	200	0,5	0,3	2,0
Compressive strength $f_b \geq 6$ N/mm²					
M8	BR 12x80	80	0,5	0,3	2,0
M8 / M10	BR 16x85	85	0,5	0,3	2,0
	BR 16x130	130	0,6	0,4	2,0
	BR 16x130/330	130	0,6	0,4	2,0
M12 / M16	BR 20x85	85	0,5	0,3	2,5
	BR 20x130	130	0,6	0,4	2,5
	BR 20x200	200	0,6	0,4	2,5

Compressive strength $f_b \geq 8$ N/mm²					
M8	BR 12x80	80	0,6	0,4	2,5
M8 / M10	BR 16x85	85	0,6	0,4	2,5
	BR 16x130	130	0,6	0,5	2,5
	BR 16x130/330	130	0,6	0,5	2,5
M12 / M16	BR 20x85	85	0,6	0,4	3,0
	BR 20x130	130	0,6	0,5	3,0
	BR 20x200	200	0,6	0,5	3,0

7.3.15 Performance in Brick Type c9 (Clay hollow brick Doppio Uni)

Edge and spacing distances

Anchor size	**Sleeve**	**Embedment depth**	**Edge distance**	**Spacing**		**Maximum installation torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min} \perp$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	250	120	4
M8 / M10	BR 16x85	85				
	BR 16x130	130				
	BR16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				
	BR 20x200	200				

Displacement

h_{ef}	**N**	δ_{N0}	$\delta_{N\infty}$	**V**	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,54	1,08	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,63	2,45
85		0,17	0,34		1,75	2,63
130 ; 200		0,54	1,08		1,75	2,63

Characteristic values of resistance under tension and shear loads					
Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 10$ N/mm²					
M8	BR 12x80	80	0,9	0,6	2,0
M8 / M10	BR 16x85	85	0,9	0,6	2,0
	BR 16x130	130	0,9	0,6	2,0
	BR 16x130/330	130	0,9	0,6	2,0
M12 / M16	BR 20x85	85	1,2	0,75	2,0
	BR 20x130	130	1,2	0,75	2,0
	BR 20x200	200	1,2	0,75	2,0
Compressive strength $f_b \geq 16$ N/mm²					
M8	BR 12x80	80	0,9	0,75	2,5
M8 / M10	BR 16x85	85	1,2	0,9	2,5
	BR 16x130	130	1,2	0,9	2,5
	BR 16x130/330	130	1,2	0,9	2,5
M12 / M16	BR 20x85	85	1,5	0,9	2,5
	BR 20x130	130	1,5	0,9	2,5
	BR 20x200	200	1,5	0,9	2,5
Compressive strength $f_b \geq 20$ N/mm²					

M8	BR 12x80	80	1,2	0,75	3,0
M8 / M10	BR 16x85	85	1,2	0,9	3,0
	BR 16x130	130	1,5	0,9	3,0
	BR 16x130/330	130	1,5	0,9	3,0
M12 / M16	BR 20x85	85	1,5	0,9	3,0
	BR 20x130	130	1,5	0,9	3,0
	BR 20x200	200	1,5	0,9	3,0
Compressive strength $f_b \geq 28$ N/mm²					
M8	BR 12x80	80	1,5	0,9	3,5
M8 / M10	BR 16x85	85	1,5	1,2	3,5
	BR 16x130	130	1,5	1,2	3,5
	BR 16x130/330	130	1,5	1,2	3,5
M12 / M16	BR 20x85	85	2,0	1,2	3,5
	BR 20x130	130	2,0	1,2	3,5
	BR 20x200	200	2,0	1,2	3,5

7.3.16 Performance in Brick Type c10 (Hollow light weight concrete Bloc creux B40)

Edge and spacing distances

Anchor size	**Sleeve**	**Embedment depth**	**Edge distance**	**Spacing**		**Maximum installation torque**
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ \parallel}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	100	494	190	2
M8 / M10	BR 16x85	85				
	BR 16x130	130				
	BR16x130/330	130				
M12 / M16	BR 20x85	85	120			
	BR 20x130	130				

Displacement

h_{ef}	**N**	δ_{N0}	$\delta_{N\infty}$	**V**	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,14	0,29	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,25	0,37
85		0,45	0,90		0,98	1,47
130		0,61	1,22		1,10	1,65

Characteristic values of resistance under tension and shear loads

Anchor size	**Sleeve**	**Effective anchorage depth**	**Characteristic resistance**		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	**T_b: 80°C/50°C**	**For all temperature range**
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 4$ N/mm²					
M8	BR 12x80	80	0,4	0,3	1,2
	BR 16x85	85	0,6	0,5	3,0
	BR 16x130	130	2,0	1,5	3,5
	BR16x130/330	130	2,0	1,5	3,5
M10	BR 16x85	85	0,6	0,5	3,0
	BR 16x130	130	2,0	1,5	3,5
	BR16x130/330	130	2,0	1,5	3,5
M12	BR 20x85	85	0,9	0,6	3,0
	BR 20x130	130	2,0	1,5	3,5
M16	BR 20x85	85	0,9	0,6	3,0
	BR 20x130	130	2,0	1,5	3,5

7.3.17 Performance in Brick Type c11 (Hollow light weight concrete Leca Lex harkko RUH-200)

Edge and spacing distances

Anchor size	Sleeve	Embement depth	Edge distance	Spacing		Maximum installation torque
		h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II}$	$s_{min\ \perp}$	max T_{inst}
		[mm]				[Nm]
M8	BR 12x80	80	120	498	195	8
M8 / M10	BR 16x85	85	127			
	BR 16x130	130	195			
	BR16x130/330	130	195			
M12 / M16	BR 20x85	85	127			
	BR 20x130	130	195			

Displacement

h_{ef}	N	δ_{N0}	$\delta_{N\infty}$	V	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,11	0,22	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,47	0,70
85		0,11	0,23		0,38	0,57
130		0,10	0,20		0,56	0,85

Characteristic values of resistance under tension and shear loads

Anchor size	Sleeve	Effective anchorage depth	Characteristic resistance		
			Use category d/d w/d w/w		
			T_a=40°C/24°C	T_b: 80°C/50°C	For all temperature range
		h_{ef}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
		[mm]	[kN]		
Compressive strength $f_b \geq 2,7$ N/mm²					
M8	BR 12x80	80	2,0	1,2	2,5
	BR 16x85	85	2,0	1,2	3,5
	BR 16x130	130	2,5	1,5	3,5
	BR16x130/330	130	2,5	1,5	3,5
M10	BR 16x85	85	2,0	1,5	3,5
	BR 16x130	130	2,5	1,5	3,5
	BR16x130/330	130	2,5	1,5	3,5
M12	BR 20x85	85	2,5	1,5	3,5
	BR 20x130	130	2,5	1,5	3,5
M16	BR 20x85	85	2,5	1,5	3,5
	BR 20x130	130	2,5	1,5	3,5

7.3.18 Performance in Brick Type d1 (Autoclaved Aerated Concrete AAC2)

Edge and spacing distances

Anchor size	Embedment depth	Edge distance	Spacing	Maximum installation torque
	h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\ II} = s_{min\ \perp}$	max T_{inst}
	[mm]			[Nm]
M8	80	120	240	2
M10	90	135	270	
M12	100	150	300	

M16	100	150	300	

Displacement						
h_{ef}	**N**	**δ_{N0}**	**$\delta_{N\infty}$**	**V**	**δ_{V0}**	**$\delta_{V\infty}$**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,29	0,58	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,23	1,84
90		0,23	0,46		0,87	1,31
100		0,39	0,79		1,29	1,94

Characteristic values of resistance under tension and shear loads						
Anchor size	**Effective anchorage depth**	**Characteristic resistance**				
		Use category				
		d/d		**w/d w/w**		**d/d w/d w/w**
		T_a=40°C/24°C	**T_b=80°C/50°C**	**T_a=40°C/24°C**	**T_b=80°C/50°C**	**For all temperature range**
	h_{ef}	N_{Rk}	N_{Rk}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
	[mm]	[kN]				
Compressive strength $f_b \geq 2$ 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

7.3.19 Performance in Brick Type d2 (Autoclaved Aerated Concrete AAC4)

Edge and spacing distances				
Anchor size	**Embedment depth**	**Edge distance**	**Spacing**	**Maximum installation torque**
	h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\,II} = s_{min\,\perp}$	max T_{inst}
	[mm]			[Nm]
M8	80	120	240	2
M10	90	135	270	
M12	100	150	300	
M16	100	150	300	

Displacement						
h_{ef}	**N**	**δ_{N0}**	**$\delta_{N\infty}$**	**V**	**δ_{V0}**	**$\delta_{V\infty}$**
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,23	0,47	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	1,23	1,84
90		0,58	1,17		0,87	1,31
100		0,10	0,21		1,29	1,94

Characteristic values of resistance under tension and shear loads						
Anchor size	**Effective anchorage depth**	**Characteristic resistance**				
		Use category				
		d/d		**w/d w/w**		**d/d w/d w/w**
		T_a=40°C/24°C	**T_b=80°C/50°C**	**T_a=40°C/24°C**	**T_b=80°C/50°C**	**For all Temperature range**
	h_{ef}	N_{Rk}	N_{Rk}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
	[mm]	[kN]				
Compressive strength $f_b \geq 4$ 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

7.3.20 Performance in Brick Type d3 (Autoclaved Aerated Concrete AAC6)

Edge and spacing distances

Anchor size	**Embedment depth**	**Edge distance**	**Spacing**	**Maximum installation torque**
	h_{ef}	$c_{min} = c_{cr}$	$s_{cr} = s_{min\,II} = s_{min\,\perp}$	max T_{inst}
	[mm]			[Nm]
M8	80	120	240	2
M10	90	135	270	
M12	100	150	300	
M16	100	150	300	

Displacement

h_{ef}	**N**	δ_{N0}	$\delta_{N\infty}$	**V**	δ_{V0}	$\delta_{V\infty}$
[mm]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
80	$\frac{N_{Rk}}{1,4 \bullet \gamma_M}$	0,54	1,09	$\frac{V_{Rk}}{1,4 \bullet \gamma_M}$	0,32	0,48
90		0,85	1,69		1,49	2,23
100		0,10	0,19		1,67	2,50

Characteristic values of resistance under tension and shear loads

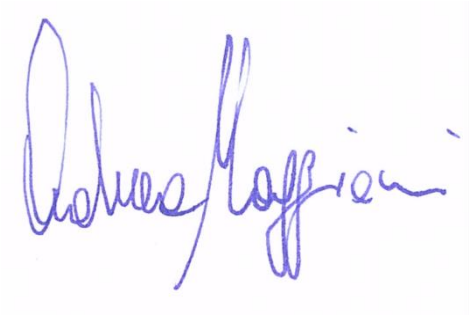
Anchor size	**Effective anchorage depth**	**Characteristic resistance**				
		Use category				
		d/d		**w/d w/w**		**d/d w/d w/w**
		T_a=40°C/24°C	**T_b:80°C/50°C**	**T_a=40°C/24°C**	**T_b: 80°C/50°C**	**For all temperature range**
	h_{ef}	N_{Rk}	N_{Rk}	N_{Rk}	N_{Rk}	$V_{Rk,b}$
	[mm]	[kN]				
Compressive strength $f_b \geq 6$ 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

7.3.21 β-factors for job-site testing under tension loading

Brick	**Installation & Use conditions**	**Anchor size**	**β-factor**	
			T_a: 40°C / 24°C	**T_b: 80°C / 50°C**
	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		
All others bricks	d/d w/d w/w	For all anchors	0,72	0,50

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

Signed for and on behalf of the manufacturer by:



Andrea Maggioni, General manager

Villastellone, 13 November 2022

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