



DECLARATION OF PERFORMANCE

DoP 0202

for Upat injection system UPM 44 (Metal injection anchors for use in masonry)

EN

1. Unique identification code of the product-type:

2. Intended use/es: Post-installed fastening in masonry units, see appendix, especially annexes B1- B12.

3. Manufacturer: fischerwerke GmbH & Co. KG, Otto-Hahn-Straße 15, 79211 Denzlingen, Germany

4. Authorised representative:

5. System/s of AVCP:

6. European Assessment Document: ETAG 029, April 2013, used as EAD

European Technical Assessment: ETA-15/0555; 2015-09-11

Technical Assessment Body: DIBt- Deutsches Institut für Bautechnik

Notified body/ies: 2873 TU Darmstadt

7. Declared performance/s:

Mechanical resistance and stability (BWR 1)

Characteristic values for resistance:

Reduction factor: Annex C78

Characteristic resistance of a single anchor under tension loading: see appendix, especially annexes B2, C2, C4, C7, C9, C11, C14, C17, C20, C23, C26, C29, C32, C35, C37, C39, C41, C44, C46, C49, C51, C54, C57, C59, C61, C64, C66, C69, C72, C75

Characteristic resistance of an anchor group under tension loading: Annex C77

Characteristic resistance of a single anchor under shear loading: see appendix, especially annexes B2, C2, C4, C7, C9, C12, C15, C18, C21, C24, C27, C30, C33, C35, C37, C39, C42, C44, C47, C49, C52, C55, C57, C59, C62, C64, C67, C70, C73, C75

Characteristic resistance of an anchor group under shear loading without and with edge influence: Annex C77

Characteristic edge distance and spacing: see appendix, especially annexes C1, C3, C5, C6, C8, C10, C13, C16, C19, C22, C25, C28, C31, C34, C36, C38, C40, C43, C45, C48, C50, C53, C56, C58, C60, C63, C65, C68, C71, C74, C77

Minimum edge distance and spacing: see appendix, especially annexes C1, C3, C5, C6, C8, C10, C13, C16, C19, C22, C25, C28, C31, C34, C36, C38, C40, C43, C45, C48, C50, C53, C56, C58, C60, C63, C65, C68, C71, C74, C77

Group factor under tension and shear loading: see appendix, especially annexes C1, C3, C5, C6, C8, C10, C13, C16, C19, C22, C25, C28, C31, C34, C36, C38, C40, C43, C45, C48, C50, C53, C56, C58, C60, C63, C65, C68, C71, C74, C77

Minimum member thickness: see appendix, especially annexes C1, C3, C5, C8, C10, C13, C16, C19, C22, C25, C28, C31, C34, C36, C38, C40, C43, C45, C48, C50, C53, C56, C58, C60, C63, C65, C68

Durability: Annexes A4, B1 Displacements : Annex C78

Safety in case of fire (BWR 2)

Reaction to fire: Class (A1)

Hygiene, health and the environment (BWR 3)

Content, emission and/or release of dangerous substances: NPD

8. <u>Appropriate Technical Documentation and/or Specific Technical Documentation:</u>

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

Signed for and on behalf of the manufacturer by:

Dr. Oliver Geibig, Managing Director Business Units & Engineering

Tumlingen, 2021-01-15

Jürgen Grün, Managing Director Chemistry & Quality

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

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

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Specific Part

1 Technical description of the product

The Upat injection system UPM 44 for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with Upat injection mortar UPM 44, UPM 44 Express and UPM 44 Relax, a perforated sieve sleeve and an anchor rod with hexagon nut and washer or an internal threaded rod in the range of M6 to M16. The steel elements are made of zinc coated steel, stainless steel or high corrosion resistant steel.

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

The product description is given in Annex A.

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

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

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

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads	See Annex C 1 – C 75
Characteristic resistance for bending moments	See Annex C 76
Displacements under shear and tension loads	See Annex C 78
Reduction Factor for job site tests (β-Factor)	See Annex C 78
Edge distances and spacing	See Annex C 1 – C 75

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances there may be requirements (e.g. transposed European legislation and national laws, regulations and administrative provisions) applicable to the products falling within the scope of this European Technical Assessment. In order to meet the provisions of Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

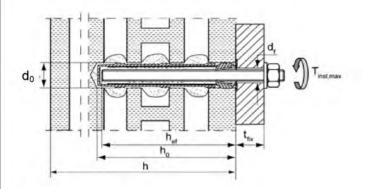
4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with guideline for European technical approval ETAG 029, April 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011, the applicable European legal act is: [97/177/EC].

The system to be applied is: 1

Installation conditions part 1

Threaded rods with perforated sleeve UPM SH K; Installation in perforated and solid brick masonry



Pre-positioned anchorage

UPM SH 12x50 K

UPM SH 12x85 K

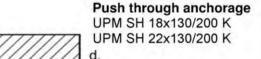
UPM SH 16x85 K

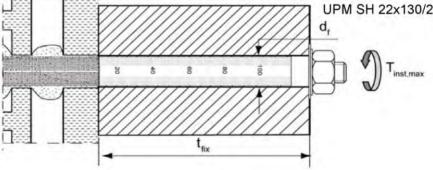
UPM SH 16x130 K

UPM SH 20x85 K

UPM SH 20x130 K

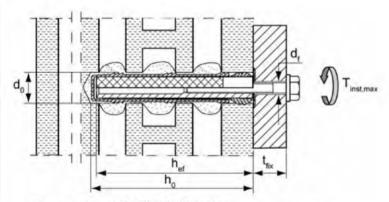
UPM SH 20x200 K





Internal threaded anchor UPM-I with perforated sleeve UPM SH K;Installation in perforated and solid brick masonry

Pre-positioned anchorage



do = nominal drill bit diameter

d_f = diameter of clearance hole in the fixture

T_{inst max} = maximum torque moment

h = thickness of masonry

h_{ef} = effective anchorage depth

ho = depth of drill hole

t₆₀ = thickness of fixture

Upat injection system UPM 44 masonry

Product description

Installation conditions part 1, in perforated brick

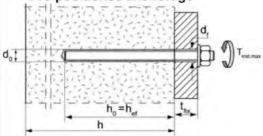
Annex A 1

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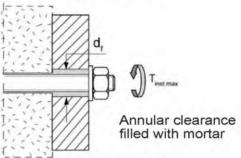
Installation conditions part 2

Threaded rods without perforated sleeve UPM SH K; installation in solid brick masonry and autoclaved aerated concrete

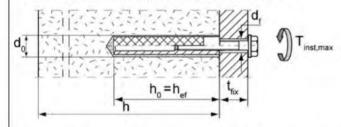
Pre-positioned anchorage



Push-through anchorage



Internal threaded anchors UPM-I without perforated sleeve UPM SH K; installation in solid brick masonry and autoclaved aerated concrete

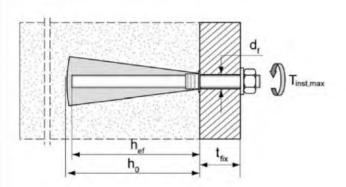


Threaded rods and internal threaded anchors UPM-I without perforated sleeve UPM SH K; installation in autoclaved aerated concrete (installation with special conic drill bit PBB)

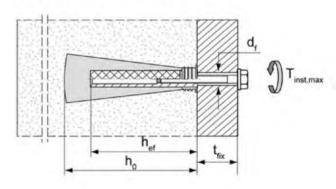
Threaded rods M8, M10, M12

Internal threaded anchor UPM-I M6 and UPM-I M8

Pre-positioned anchorage



Pre-positioned anchorage



d₀ = nominal drill bit diameter

d_f = diameter of clearance hole in the fixture

T_{inst max} = maximum torque moment

h = thickness of masonry

h_{ef} = effective anchorage depth

 h_0 = depth of drill hole t_{fix} = thickness of fixture

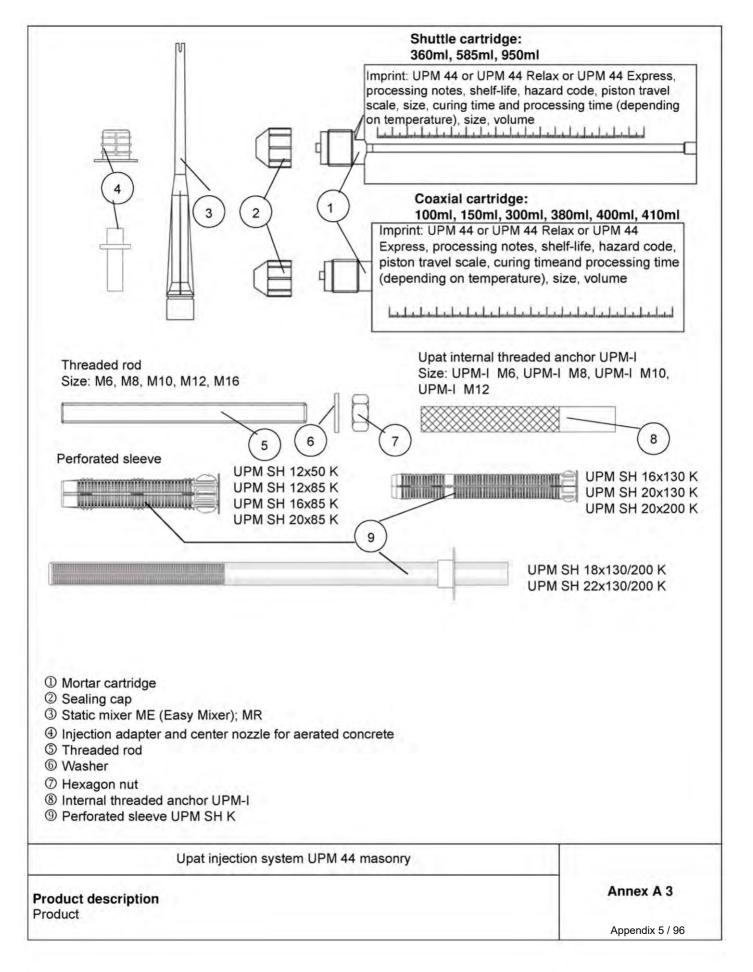
Upat injection system UPM 44 masonry

Product description

Installation conditions part 2, in solid bricks

Annex A 2

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Part	Designation		Material						
1	Mortar cartridge	Mortar, hardener; filler							
		Steel, zinc plated	Stainless steel A4	High corrosion- resistant steel C					
5	Threaded rod	Property class 5.8 or 8.8; EN ISO 898-1: 2013 zinc plated ≥ 5µm, EN ISO 4042:1999 A2K or hot-dip galvanised EN ISO 10684:2004 f _{uk} ≤ 1000 N/mm ² A ₅ > 8% fracture elongation	Property class 50, 70 or 80 EN ISO 3506:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062 EN 10088-1:2014 $f_{uk} \le 1000 \text{ N/mm}^2$ $A_5 > 8\% \text{ fracture}$ elongation	Property class 50 or 80 EN ISO 3506:2009 or property class 70 with f_{yk} = 560 N/mm ² 1.4565; 1.4529 EN 10088-1:2014 $f_{uk} \le 1000 \text{ N/mm}^2$ $A_5 > 8\% \text{ fracture}$ elongation					
6	Washer ISO 7089:2000	zinc plated ≥ 5µm, EN ISO 4042:1999 A2K or hot-dip galvanised EN ISO 10684:2004	1.4401; 1.4404; 1.4578;1.4571; 1.4439; 1.4362 EN 10088-1:2014	1.4565;1.4529 EN 10088-1:2014					
7	Hexagon nut	Property class 5 or 8; EN ISO 898-2:2013 zinc plated ≥ 5µm, ISO 4042:1999 A2K or hot-dip galvanised ISO 10684:2004	Property class 50, 70 or 80 EN ISO 3506:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 50, 70 o 80 EN ISO 3506:2009 1.4565; 1.4529 EN 10088-1:2014					
8	Internal threaded anchor UPM-I	Property class 5.8; EN 10277-1:2008-06 zinc plated ≥ 5µm, ISO 4042:1999 A2K	Property class 70 EN ISO 3506:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 70 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014					
	Screw or threaded rod for internal threaded anchor UPM-I	Property class 5.8 or 8.8; EN ISO 898-1:2013 zinc plated ≥ 5µm, ISO 4042:1999 A2K	Property class 70 EN ISO 3506:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362 EN 10088-1:2014	Property class 70 EN ISO 3506-1:2009 1.4565; 1.4529 EN 10088-1:2014					
9	Perforated sleeve		PP / PE						

Upat injection system UPM 44 masonry	
Product description Materials	Annex A 4
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Specifications of intended use

Anchorages subject to:

· Static and quasi-static loads

Base materials:

- Solid brick masonry (Use category b) and autoclaved aerated concrete (Use category d), acc. to Annex B10, B11, B12
 - Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength of the masonry unit.
- Hollow brick masonry (use category c), according to Annex B10, B11
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2010
- For other bricks in solid masonry and in hollow or perforated masonry and autoclaved aerated concrete, the characteristic resistance of the anchor may be determined by job site tests according to ETAG 029, Annex B under consideration of the β-factor according to Annex C78, Table C121

Temperature Range:

- I: From 40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)
- II: From -40°C to +120°C (max. short term temperature +120°C and max. long term temperature +72°C)

Use conditions (Environmental conditions):

- Dry and wet structure (regarding injection mortar)
- Structures subject to dry internal conditions exists
 (zinc coated steel, stainless steel or high corrosion resistant steel)
- Structures subject to external atmospheric exposure including industrial and marine environment or exposure to permanently damp internal condition, if no particular aggressive conditions exist 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)

Upat injection system UPM 44 masonry	
Intended Use Specifications	Annex B 1
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Specifications of intended use

Design:

 The anchorages have to be designed in accordance with the ETAG 029, Annex C, Design method A under the responsibility of an engineer experienced in anchorages and masonry work

Applies to all bricks, if no other values are specified:

$$N_{Rk} = N_{Rk,s} = N_{Rk,p} = N_{Rk,b} = N_{Rk,pb}$$

$$V_{Rk} = V_{Rk,s} = V_{Rk,b} = V_{Rk,c} = V_{Rk,pb}$$

Verifiable calculation notes and drawings have to be 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

Installation:

- · Category d/d: -Installation and use in dry structures
- Category w/w: -Installation and use in dry and wet structures
- · Hole drilling by hammer drill mode
- In case of aborted hole: The hole shall be filled with mortar
- Bridging of unbearing layer (e.g. plaster) see Annex B 4 (Table B3)
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site
- Fastening screws or threaded rods (including nut and washer) must comply with the appropriate material and property class of the Upat internal threaded anchor UPM-I
- minimum curing time see Annex B5. Table B6
- Commercial standard threaded rods, washers and hexagon nuts may also be used if the following requirements
 are fulfilled:

Material dimensions and mechanical properties of the metal parts according to the specifications are given in Annex A4, Table A1

Conformation of material and mechanical properties of the metal parts by inspection certificate 3.1 according to EN 10204:2004, the documents shall be stored

Marking of the threaded rod with the envisage embedment depth. This may be done by the manufacturer of the rod or by a person on job site

Upat injection system UPM 44 masonry	
Intended Use Specifications	Annex B 2
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Table B1: Installation parameters for threaded rods in solid bricks and autoclaved aerated concrete without perforated sleeves

Size		М6	M8	M10	M12	M16
Nominal drill hole diameter	d ₀ [mm]	8	10	12	14	18
Effective anchorage depth AAC cylindridrill hole hef 1)			100			
Effective anchorage depth AAC Conical drill hole h _{ef} ¹⁾	h _{0,min} [mm]	- hAz		80		15
Conical drill hole h _{ef} ¹⁾	h _{ef,min} [mm]	J(₹)	75			Ç-
Effective anchorage depth h _{ef} ¹⁾	h _{ef,min} [mm]			50		
Depth of drill hole h ₀ = h _{ef}	h _{ef,max} [mm]		h	-30, ≤20	0	
Diameter of clearance	pre-position d _f ≤[mm]	7	9	12	14	18
hole in the fixture	push through d _f ≤[mm]	9	11	14	16	20
Diameter of steel brush	d _b ≥[mm]		Se	e Table	B5	
Maximum installation torque	T _{inst,max} [Nm]		see par	ameters	of brick	

1) $h_{ef,min} \le h_{ef} \le h_{ef,max}$ is possible.

Marking

Upat threaded rods M6, M8, M10, M12, M16

Marking:

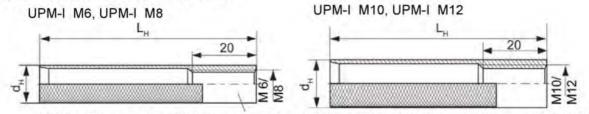
Property class 8.8 or high corrosion resistant steel, property class 80: •

Stainless steel A4, property class 50 and high corrosion resistant steel C, property class 50: ••

Table B2: Installation parameters for internal threaded anchors UPM-I in solid bricks and autoclaved aerated concrete without perforated sleeves

Size UPM-I			M6	M8	M10	M12	
Diameter of anchor	d _H	[mm]	1	1	1	5	
Nominal drill bit diameter			1	4	1	18	
Length of anchor	L _H [mm] 85			85			
Drill hole depth	$h_0 = h_{ef}$	[mm]	85				
Effective anchorage depth	h _{ef}	[mm]	85				
Effective anchorage depth AAC	h _o	[mm]	100				
Conical drill hole hef 1)	h _{ef}	[mm]	8	5		-	
Diameter of steel brush	d _b ≥	[mm]		See T	able B5		
Maximum installation torque	T _{inst,max}	[Nm]	see parameters of brick				
Diameter of clearance hole in the fixture d _f [mn		[mm]	7	9	12	14	
Screw-in depth	I _{E,min}	[mm]	6	8	10	12	
Sciew-iii deptii	I _{E.max}	[mm]		1	60		

Upat Internal threaded anchor UPM-I



Marking: Size, e.g. M8, Stainless steel: A4, e.g. M8 A4 High corrosion resistant steel: C, e.g. M8 C

Upat injection system UPM 44 masonry

Intended Use

Installation parameters threaded rods and internal threaded anchors UPM-I without perforated sleeves

Annex B 3

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Table B3: Installation parameters for threaded rods and internal threaded anchors UPM-I with perforated sleeves (pre-positioned anchorage)

Size UPM SH K		12x50	12x85	16x85	16x130 ²⁾	20x85	20x130 ²⁾	20x200 ²⁾
Nominal drill hole diameter d ₀ = D _{sleeve,nom}	d ₀ [mm]	1	2		16		20	
Depth of drill hole	h ₀ [mm]	55	90	90	135	90	135	205
Effective anchorage depth	h _{ef,min} [mm]	50	85	85	110	85	110	180
	h _{ef,max} [mm]	50	85	85	130	85	130	200
Size of threaded rod	[-]	M6 d	or M8	M8 d	or M10	1	V12 or M16	5
Size of internal threaded and	hor UPM-I	1-25		M6/M8	241	M10/M12		
Diameter of steel brush ¹⁾	d _b ≥[mm]				See Tab	le B5	•	
Maximum installation	T _{inst,max} [Nm]			see	paramete	rs of brick		

¹⁾ Only for solid areas in hollow bricks and solid bricks

Perforated sleeves

UPM SH 12x50 K; UPM SH 12x85 K; UPM SH 16x85 K; UPM SH 16x130 K;

UPM SH 20x85 K; UPM SH 20x130 K; UPM SH 20x200 K

Marking:

Size D_{sleeve,nom} x L_{sleeve}

(e.g.: 16x85)



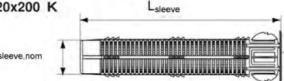
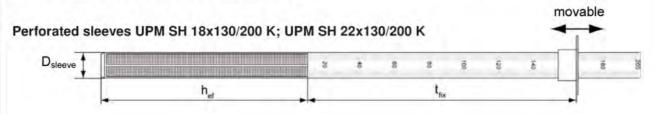


Table B4: Installation parameters for threaded rods with perforated sleeves (push through anchorage)

Size UPM SH K		18x	130/200	22x130/200	
Nominal sleeve diameter	D _{sleeve,nom} [mm]		16	20	
Nominal drill hole diameter	d ₀ [mm]		18	22	
Depth of drill hole	h₀ [mm]		135 + t _{fix}	0	
Effective anchorage depth	h _{ef} [mm]	≥130			
Diameter of steel brush 1)	d _b ≥ [mm]		See Table B	5	
Size of threaded rod	[-]	M10	M12	M16	
Maximum installation torque	T _{inst,max} [Nm]	S	see parameters of	f brick	
Thickness of fixture	t _{fix,max} [mm]	200			

Only for solid areas in hollow bricks and solid bricks



Upat injection system UPM 44 masonry

Intended Use

Installation parameters threaded rods and internal threaded anchors UPM-I with perforated sleeves

Annex B4

Marking

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²⁾ Bridging of unbearing layer (e.g. plaster) possible

Steel brush



Only for solid bricks and autoclaved aerated concrete

Table B5: Parameters of steel brush

Drill hole diameter	do	[mm]	8	10	12	14	16	18	20	22
Brush diameter	d _{b,nom}	[mm]	9	11	14	16	20	20	25	25

Table B6: Maximum processing times and minimum curing times (During the curing time of the mortar the masonry temperature may not fall below the listed minimum temperature).

Tom		hura at	Minim	um curing tim [minutes]	ie 1) t _{cure}		
Temperature at anchoring base [°C]		UPM 44 Express ³⁾	UPM 44 ²⁾	UPM 44 Relax ²⁾			
-10	to	-5	12 hours	12 hours	12 hours	12 hours	
>-5	to	±0	3 hours	24 hours			
>±0	to	+5	90	3 hours	6 hours		
>+5	to	+10	45	90	3 hours		
>+10	to	+20	30	60	2 hours		
>+20	to	+30		45	60		
>+30	to	+40		35	30		

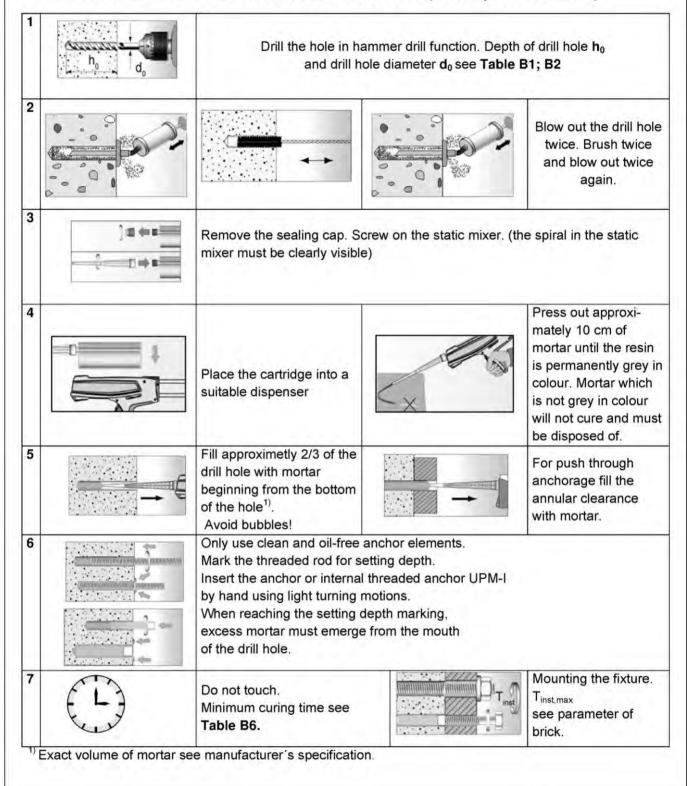
System-	Maximum processing time twork [minutes]				
temperature (mortar) [°C]	UPM 44 Express ³⁾	UPM 44 ²⁾	UPM 44 Relax ²⁾		
±0	5				
+5	5	13	20		
+10	3	9	20		
+20	1	5	10		
+30		4	6		
+40		2	4		

Upat injection system UPM 44 masonry	
Intended Use Steel brush	Annex B 5
Maximum processing times and minimum curing times	Appendix 11 / 96

For wet bricks the curing time must be doubled
 Minimum cartridge temperature +5°C
 Minimum cartridge temperature ±0°C

Installation instruction part 1

Installation in solid brick and autoclaved aerated concrete (without perforated sleeve)



Upat injection system UPM 44 masonry

Intended Use

Installation instruction (without perforated sleeve) Part 1

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Installation instruction, part 2

Installation in perforated or solid brick with perforated sleeve (pre-positioned anchorage)

1		Drill the hole (hammer drill). Depth of drill hole h ₀ and drill hole diameter d ₀ see Table B3		sleeves in solid bricks or cks, also clean the hole by g.
2	?	Remove the sealing cap mixer must be clearly vis	o. Screw on the static mixe sible)	er. (the spiral in the static
3		Place the cartridge into a suitable dispenser	X	Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.
4		Insert the perforated sleeve flush with the surface of the masonry or plaster	100	Fill the perforated sleeve completely with mortar beginning from the bottom of the hole ¹⁾ .
5		setting depth. Insert the by hand using light turni		al threaded anchor UPM-I the setting depth marking
6		Do not touch. Minimum curing time see Table B6.	Tinst	Mounting the fixture. T _{inst,max} see parameter of brick.

¹⁾ Exact volume of mortar see manufacturer's specification.

Upat injection system UPM 44 masonry

Installation instruction, part 3

Installation in perforated or solid brick with perforated sleeve (push through anchorage)

1	The Co	Push the movable stop up to the correct thickness of fixture and cut the overlap.	Drill the hole through th fixture. Depth of drill ho $(h_0 + t_{fix})$ and drill hole diameter see Table B4 .
2		Remove the sealing cap. Screw on t mixer must be clearly visible)	the static mixer. (the spiral in the static
3		Place the cartridge into a suitable dispenser	Press out approximately 10 cm of mortar until the resin is permanently gre in colour. Mortar which not grey in colour will no cure and must be disposed of.
4	-	Insert the perforated sleeveflush with the surface of the fixture into the drill hole.	Fill the sleeve with mortar beginning from the bottom of the hole. 1) For deep drill holes use an extension tube.
5		Only use clean and oil-free anchor e depth. Insert the threaded rod by har reaching the setting depth marking.	elements. Mark the threaded rod for setting and using light turning motions until
6		Do not touch. Minimum curing time see Table B6 .	Mounting the fixture. T _{inst,max} see parameter brick.

[&]quot;Exact volume of mortar see manufacturer's specification.

Installation instruction, part 4

Installation in autoclaved aerated concrete with special conic drill bit PBB (pre-positioned anchorage)

1	h ₀ = 80 mm		ill bit arrester on the used ock the clamp screw and clamp screw.				
2			Drill the cylindrical hole with rotating drill until the arrester contact the material surface.				
3		Deviate the working pov generate an conic under					
4	4x	Blow out the drill hole fo	ur times.				
5		Remove the sealing cap mixer must be clearly vis	o. Screw on the static mixe sible)	er. (the spiral in the static			
6		Place the cartridge into a suitable dispenser	X	Press out approximately 10 cm of mortar until the resin is permanently grey in colour. Mortar which is not grey in colour will not cure and must be disposed of.			
7		Put the center sleeve into the drill hole and adapt the injection adapter onto the static mixer		Fill the drill hole with injection mortar.			
8			the threaded rod for sett or internal threaded and light turning motions. W	ree anchor elements. Mark ing depth.Insert the anchor hor UPM-I by hand using hen reaching the setting nortar must emerge from the			
9		Do not touch. Minimum curing time see Table B6.		Mounting the fixture. T _{inst,max} see parameter of brick.			

Intended Use

Installation instruction (without perforated sleeve special conic drill bit PBB) Part 4

Annex B 9

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Table B7.1: Summary of German bricks and blocks

Kind of masonry	Brick format [mm]	Compressive strength [N/mm²]	Density [kg/dm ³]	Annex
Solid bricks				
Solid brick Mz EN 771-1	≥ 240x115x113	10 / 16	≥1,8	C1/C2
Solid brick Mz EN 771-1	≥ 240x115x71	10 / 20	≥1,8	C3/C4
Solid sand- lime brick KS EN 771-2	≥ 250x240x240	10 / 20 / 28	≥2,0	C5/C6/C7
Solid light-weight concrete block Vbl	≥ 372x300x254	2	≥0,6	C8/C9
Solid light-weight concrete block VbI	≥ 250x240x239	4/6/8	≥1,6	C10/C11/C12
Perforated bricks and h	ollow blocks			
Perforated brick HLz EN 771-1 e.g. Poroton	500(370)x175(240)x237	4/6/8/10/12	≥1,0	C13/C14/C15
Perforated brick HLz EN 771-1	240x115x113	6 / 10 / 16 / 20 / 28	≥1,4	C16/C17/C18
Sand- lime hollow block KSL	240x175x113	8 / 10 / 12 / 16 / 20	≥1,4	C19/C20/C21
Light-weight concrete hollow block Hbl	362x240x240	2/4	≥1,0	C22/C23/C24

Table B7.2: Summary of French bricks and blocks

Kind of masonry	Brick format [mm]	Compressive strength [N/mm²]	Density [kg/dm ³]	Annex
Perforated bricks and ho	llow blocks			
Perforated brick HLz EN 711-1	500x200x315	4/6/8	≥0,6	C25/C26/C27
Perforated brick HLz EN 711-1	500x200x300	4/6/8/10	≥0,7	C28/C29/C30
Perforated brick HLz EN 711-1	500x200x315	2/4/6/8	≥0,7	C31/C32/C33
Perforated brick HLz EN 711-1	520x200x275	4/6/8	≥0,7	C34/C35
Light-weight concrete hollow block HbI	500x200x200	2/4/6	≥1,0	C36/C37

Upat injection system UPM 44 masonry	
Intended Use Summary of especially German and French bricks and blocks	Annex B 10
Cammary of Coposition Comman and Front Short Control	Appendix 16 / 96

Table B7.3: Summary of Italian bricks

Kind of masonry	Brick format [mm]	Compressive strength [N/mm²]	Density [kg/dm ³]	Annex
Solid bricks				
Solid brick Mz EN 771-1	≥ 245x118x54	10 / 20	≥1,8	C38/C39
Perforated bricks	*			
Perforated brick HLz EN 771-1	255x120x118	2/4/6/8/10/12	≥1,0	C40/C41/C42
Perforated brick LLz EN 771-1	248x78x250	2/4/6	≥0,7	C43/C44

Table B7.4: Summary of Spanish and Portuguese bricks

Kind of masonry	Brick format [mm]	Compressive strength [N/mm²]	Density [kg/dm ³]	Annex
Perforated bricks				
Perforated brick HLz EN 771-1	275x130x94	6/8/12/16/20	≥0,8	C45/C46/C47
Perforated bricks				
Perforated brick LLz EN 771-1	128x88x275	2	≥0,8	C48/C49
Perforated brick HLz EN 771-1	190x290x220	6/8/10	≥0,7	C50/C51/C52

Table B7.5: Summary of Austrian bricks

Kind of masonry	Brick format [mm]	Compressive strength [N/mm²]	Density [kg/dm ³]	Annex
Perforated bricks				
Perforated brick HLz EN 771-1	253x300x240	2/4/6	≥0,8	C53/C54/C55

Table B 7.6: Summary of Irish and English bricks

Kind of masonry	Brick format [mm]	Compressive strength [N/mm²]	Density [kg/dm ³]	Annex
Solid blocks				0
Solid light-weight concrete brick Vbl	≥ 440x100x215	4/6/8/10	≥2,0	C56/C57
Solid light-weight concrete brick Vbl	≥ 440x95x215	6/8/10/12	≥2,0	C58/C59
Perforated blocks				i v
Light-weight concrete hollow block Hbl	440x215x215	4/6/8/10	≥1,2	C60/C61/C62

Upat injection system UPM 44 masonry	
Intended Use	Annex B 11
Summary of especially Italian, Spanish, Portuguese, Austrian, Irish an English bricks	
and blocks	Appendix 17 / 9

Table B7.7: Summary of Dutch and Danish bricks and blocks

Kind of masonry	Brick format [mm]	Compressive strength [N/mm²]	Density [kg/dm ³]	Annex
Solid bricks				4
Solid brick Mz EN 771-1	≥ 230x108x55	10 / 20	≥1,8	C63/C64
Solid sand-lime brick KS EN 771-2	≥ 997x214x538	10 / 20 / 36	≥1,8	C65/C66/C67
Perforated bricks		Ů.		•
Perforated brick HLz EN 771-1	230x108x55	2/4/6/8	≥1,4	C68/C69/C70

Table B7.8: Summary of autoclaved aerated concrete blocks

Autoclaved aerated	concrete		
Property class		Density [kg/dm ³]	Annex
2/4/6	Cylindrical drill hole	350, 500, 650	C71/C72/C73
	Conical drill hole (special drill bit PBB)	350, 500, 650	C74/C75

Upat injection system UPM 44 masonry	
Intended Use Summary of especially Danish and Dutch bricks and blocks	Annex B 12
Summary of autoclaved aerated concrete	Appendix 18 / 96

Kind of masonry: Solid brick Mz, 2 DF

Table C1: Parameters of brick

Species of brick		Solid brick Mz, 2DF	
Density	ρ.≥ [kg/dm³]	1.8	
Compressive strength	$f_b \ge [N/mm^2]$	10 or 16	
Standard or approval		EN 771-1	
Producer		e.g. Wienerberger	
Size, dimensions	[mm]	≥ 240x115x113	
Minimum thickness of masonry	h _{min} [mm]	115	



Table C2: Installation parameters for threaded rod and internal threaded anchor without perforated sleeve

Size of threaded r	od	١	<i>1</i> 16	ı	M8	N	110	N	112	N	116	UPM-I ¹⁾ M6/M8	UPM-I M10/M12
Effective anchorage depth	h _{ef} [mm]	50	100	50	100	50	100	50	100	50	100	85	85
Edge distance	c _{min} [mm]								60				
	s _{min} II [mm]							1	20				
Spacing	s _{cr} II [mm]							2	240				
Scr	$_{r}^{\perp} = s_{min}^{\perp} [mm]$							1	15				
	$\alpha_{g,N}$ II [-]							- 8	1,5				
Croup factor	$\alpha_{g,V}$ II [-]								1,4				
Group-factor	$\alpha_{g,N} \perp [-]$ $\alpha_{g,V} \perp [-]$							2	2,0				
Max. installation torque	T _{inst,max} [Nm]		4 10										

¹⁾ For UPM-I with screw M6: T_{inst,max} = 4 Nm

Table C3: Installation parameters for threaded rod and internal threaded anchor UPM-I with perforated sleeve

Size of perforated sle	eve	- 6		16x85		
Size of threaded rod		M8	M10	M6	M8	
Size of internal thread	ded anchor UPM-I			UF	PM-I	
Edge distance	c _{min} [mm]			60		
Spacing s _{cr}	s _{min} II [mm]		120			
	s _{cr} II [mm]	240				
	$s_{cr}^{\perp} = s_{min}^{\perp}[mm]$	115				
	α _{g,N} II [-]	1,5				
Group factor	$\alpha_{g,V}$ II [-]	1,4				
Group-factor	$\alpha_{g,N} \perp [-]$ $\alpha_{g,V} \perp [-]$	2				
Max. installation torqu	ue T _{inst,max} [Nm]		10	4	10	

Upat injection system UPM 44 masonry

Performances

Solid brick Mz, 2DF

Species of brick, installation parameters

Annex C 1

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Kind of masonry: Solid brick Mz 2 DF

	Table	C4:	Characteristic values	of	f resistance; tension	load	(N_{BK})
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Use category		W	/w	d,	/d
Temperature range	[°C]	50/80	72/120	50/80	72/120
Effective anchorage depth	Anchor size	ch	aracteristic v	/alues N _{Rk} [k	kN]
Compressive strength f _b = 10 l	N/mm²				
50	M6, M8, M10	1,50			
30	M12, M16	2,00	1,50	3,00	2,50
85	85 UPM-IM6/M8, UPM-I M10/M12				
100	M10	3,00	2,50	4,50	4,00
100	M12, M16	3,50	2,30	5,50	4,50
Perforated sleeve 16x85	erforated sleeve 16x85 UPM-I M6/M8, M8, M10		1,20	3,00	2,50
Compressive strength f _b = 16 f	N/mm²				
	M6, M8	2,50	2,00	4,50	4,00
50	M10	2,50	2,00	4,50	3,50
	M12, M16	3,50	2,00	5,50	4,50
85	UPM-I M6/M8,UPM-I M10/M12	3,50	2,00	5,50	4,50
	M6, M8	4,00	3,00	7,00	5,50
100	M10	4,50	4,00	7,50	6,50
	M12, M16	5,50	4,50	8,00	7,00
Perforated sleeve 16x85	UPM-I M6/M8, M8, M10	2,50	2,00	4,50	4,00

Calculation of pulling out of one brick (tension load): N_{Rk,pb} see ETAG 029, Annex C

Table C5: Characteristic values of resistance; shear load (V_{Rk})

Use category	w/w d/d		/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120
Effective anchorage depth Anchor size characteristic values			/alues V _{Rk} [k	(N]	
Compressive strength f _b = 10 N	l/mm²	>		24.00	2.02
		2			
≥ 50	M6	2	2	50	
85	UPM-I M6	2,50			
≥ 50	M8	3,00			
85	UPM-I M8	3,00			
≥ 50	M10, M12	3,50			
85	UPM-I M10/M12, M12, M16		3,	00	
Compressive strength $f_b = 16$	l/mm²				
≥ 50	M6		1	00	
85	UPM-I M6		4,	00	
≥ 50	M8		5	00	
85	UPM-I M8		5,	00	
≥ 50	M10 5,50		50		
≥ 50	M12	M12 5,50			
85	UPM I M10/M12, M12, M16		5,	00	

Calculation of pushing out of one brick (shear load): $V_{Rk,pb}$ see ETAG 029, Annex C

Upat injection system UPM 44 masonry	
Performances Solid brick Mz, 2DF	Annex C 2 Appendix 20 / 96
Characteristic values	

Kind of masonry: Solid brick Mz, NF

Table C6: Parameters of brick

Species of brick		Solid brick Mz, NF	
Density	$\rho \ge [kg/dm^3]$	1.8	
Compressive strength	$f_b \ge [N/mm^2]$	10 or 20	
Standard or approval		EN 771-1	
Producer		e.g. Wienerberger	
Size, dimensions	[mm]	≥ 240x115x71	
Minimum thickness of masonry	h _{min} [mm]	115	

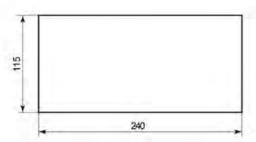


Table C7: Installation parameters (threaded rod and internal threaded anchor without perforated sleeve)

Size of threaded rod		M6 M8		M10		M12			UPM-I ¹⁾ M6/M8					
Effective anchorage	e depth	h _{ef} [mm]	50	80	50	80	200	50	80	200	50	80	200	85
Edge dista	ance	c _{min} [mm]								100			- V -	
Edge dista h _{ef} =200mr		c _{min} [mm]							- 1	150				
		s _{min} II, _N [mm]								60				
	h _{ef} =200	s _{min} II, _N [mm]								240				
Spacing		s _{min} II, _{V [} mm]							- 1	240				
		s _{cr} II [mm]								240				
	s _{cr} ±	$= s_{min} \perp [mm]$								75				
		$\alpha_{g,N}$ [-]	1,5											
Group-fac	tor	α _{g,V} II [-]								2,0				
Group-rac		$\alpha_{g,N} \perp [-]$ $\alpha_{g,V} \perp [-]$	2											
Max. installation torque T _{inst,max} [Nm]		2	4							10				

Tor UPM-I with screw M6: T_{inst,max} = 4 Nm

Performances
Solid brick Mz, NF
Species of brick, installation parameters

Annex C 3

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Kind of masonry: Solid brick Mz, NF

Table C8: Characteristic values of resistance; tension load (N_{Rk})

Use category	V	v/w	d/d		
Temperature range	50/80	72/120	50/80	72/120	
Effective anchorage depth	C	haracteristic	values N _{Rk}	[kN]	
Compressive strength f _b = 10 N/mi	m²	*			
	M6	2,50	2,00	4,00	3,50
50	M8	2,50	2,00	4,00	3,00
	M10	2,00	1,50	3,50	3,00
80	M10	3,00	2,50	5,00	4,00
200	M10	7,50	6,50	12,00	10,50
50	M12	2,00	1,50	3,00	2,50
80	M12	3,50	3,00	5,50	4,50
200	M12	5,00	4,00	8,00	6,50
85	UPM-I M6/M8	3,50	3,00	5,50	4,50
Compressive strength f _b = 20 N/mi	m²				
	M6	3,50	2,50	5,50	5,00
50	M8	3,50	2,50	5,50	4,50
The state of the s	M10	3,00	2,50	5,00	4,00
80	M10	4,50	3,50	7,00	6,00
200	M10	11,00	9,00	12,00	12,00
50	M12	3,00	2,50	4,50	4,00
80	M12	5,00	4,00	8,00	6,50
200	M12	7,00	6,00	11,50	9,50
85	UPM-I M6/M8	5,00	4,00	8,00	6,50

Calculation of pulling out of one brick (tension load): N_{Rk,pb} see ETAG 029, Annex C

Table C9: Characteristic values of resistance; shear load (V_{Rk})

Use category	w	/w	d/d			
Temperature range	50/80	72/120	50/80	72/120		
Effective anchorage depth	Anchor size	cl	haracteristic v	alues V _{Rk} [k	N]	
Compressive strength fb = 10 N/mm	n ²					
≥ 50	M6, M8		2.1	-0		
85	UPM-I M6/M8	2,50				
≥ 50 - 80	M10		4,0	00		
200	M10	8,50				
≥ 50	M12	4,00				
200	M12	11,50				
Compressive strength f _b = 20 N/mm	12					
≥ 50	M6, M8		- 4	20		
85	UPM-I M6/M8		4,0	00		
≥ 50 - 80						
200	M10	12,00				
≥ 50	M12	5,50				
200	M12	12,00				

Calculation of pushing out of one brick (shear load): V_{Rk,pb} see ETAG 029, Annex C

Upat injection system UPM 44 masonry	
Performances	Annex C 4
Solid brick Mz, NF	Appendix 22 / 96
Characteristic values	

Kind of masonry: Solid sand-lime block

Table C10: Parameters of brick

Species of brick		Solid sand-lime block
Density	$\rho \ge [kg/dm^3]$	2.0
Compressive strength	$f_b \ge [N/mm^2]$	10, 20 or 28
Standard or approval		EN 771-1
Producer		
Size, dimensions	[mm]	≥ 250x240x240
Minimum thickness of wall	h _{min} [mm]	240

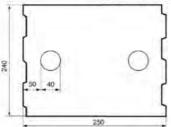


Table C11: Installation parameters for threaded rod and internal threaded anchor without perforated sleeve

Size of threaded n	od	N	16	N	18	М	10	M	12	М	16	UPM-I ¹⁾ M6/M8	UPM-I M10/M12
Effective anchorage depth	h _{ef} [mm]	50	100	50	100	50	100	50	100	50	100	85	85
Edge distance	c _{min} [mm]							1	60				
	s _{min} II [mm]	80											
Cassina	s _{cr} II [mm]	250											
Spacing -	s _{min} ⊥[mm]	80											
	s _{cr} ⊥[mm]												
	α _{g,N} II [-]	1,5											
Crave factor	α _{g,V} II [-]												
Group-factor —	α _{g,N} ⊥[-]							-	1,5				
-	α _{g,V} [⊥] [-]								1,2				
Max. installation torque	T _{inst,max} [Nm]	A = 1											

¹⁾ For UPM-I with screw M6: T_{inst,max} = 4 Nm

Upat injection system UPM 44 masonry	
Performances	Annex C 5
Solid sand-lime block	Appendix 23 / 96
Species of brick, installation parameters	

Kind of masonry: Solid sand-lime block

Table C12: Installation parameters for threaded rod and internal threaded anchor with perforated sleeve

Size of perforated sleeve	16x85					
Size of threaded rod		M8	M10	M6	M8	
Size of internal threaded	anchor UPM-I			UP	M-I	
Edge distance	c _{min} [mm]		60)		
	s _{min} II [mm]	80				
0	s _{cr} II [mm] 25			50		
Spacing	s _{min} [⊥] [mm]	80				
*	s _{cr} [⊥] [mm]		24	0		
	$\alpha_{g,N}II$ [-]	1,5				
Croup footor	α _{g,V} II [-]	1,2				
Group-factor	α _{g,N} ⊥[-]	1,5				
Š	α _{g,V} [⊥] [-]	1,2				
Max. installation torque	T _{inst,max} [Nm]	y)*	10	4	10	

Upat injection system UPM 44 masonry	
Performances	Annex C 6
Solid sand-lime block	Appendix 24 / 96
Species of brick, installation parameters	

Kind of masonry: Solid sand-lime block
Table C13: Characteristic values of resistance; tension load (N_{Rk})

Use category		W	//w	d/d			
Temperature range	[°C]	50/80	72/120	50/80	72/120		
Effective anchorage depth	Anchor size	characteristic values N _{Rk} [kN]					
Compressive strength $f_b = 10$	N/mm ²						
≥50	M6	2.00	2.50	5,00	4,50		
85	UPM-I M6	3,00	2,50	5,00	4,50		
	M8	4,00	3,50	7,00	5,50		
≥50	M10 / M12	4,50	3,50	7,00	5,50		
	M16	1					
85	UPM-I M8 UPM-I M10 / M12	3,50	3,00	5,50	4,50		
Desferated along 16:05	UPM-I M6	3,00	2,50	5,00	4,50		
Perforated sleeve 16x85	M8 / M10 /UPM-I M8	4,50	3,50	8,00	6,50		
Compressive strength $f_b = 20$	N/mm ²						
≥50	M6	4.50	3,50	7.50	0.50		
85	UPM-I M6	4,50		7,50	6,50		
	M8	6,00	5,00	10,00 (9,0) ¹	8,00		
≥50	M10 / M12	6,00	5,00	10,00 (9,0)1	8,00		
	M16			7,50			
85	UPM-I M8 UPM-I M10 / M12	5,00	4,00		6,50		
D-5	UPM-I M6	4,50	3,50	7,50	6,50		
Perforated sleeve 16x85	M8 / M10 /UPM-I M8	6,50	5,00	11,00 (9,0) ¹	9,00		
Compressive strength $f_b = 28$	N/mm ²						
≥50	M6	4.22	- 0002	1 00 00 1	- W 40		
85	UPM-I M6	5,00	4,00	8,50	8,50		
- 1	M8	8,00	7,00	12,00 (9,0)1	8,00		
≥50	M10 / M12	8,50	7,00	12,00 (9,0)1	11,50 (9,0)		
	M16						
85	UPM-I M8 UPM-I M10 / M12	7,00	6,00	11,00 (9,0) ¹	9,00		
Burnal and a second	UPM-I M6	5,00	4.00	8,50	8,50		
Perforated sleeve 16x85	M8 / M10 /UPM-I M8	8,50	7,00	12,00 (9,0) ¹	12,00 (9,0)		

¹⁾ Characteristic value of pulling out of one brick N_{Rk,pb} = 9,0 kN

Table C14: Characteristic values of resistance; shear load (V_{Rk})

Compressive strength [N/mm	2]	10	20	28			
Effective anchorage depth	Anchor size	characteristic values V _{Rk} [kN]					
≥ 50	≥ 50 M6		4.0				
85	UPM-I M6	2,5	4,0	5,0			
≥ 50	M8 / M10 / M12 /M16,			9,0			
85	UPM-I M8 UPM-I M10 / M12	4,5	6,5				
Desferated alegue 16v85	UPM-I M6	2,5	4,0	5,0			
Perforated sleeve 16x85	M8 / M10 / UPM-I M8	4,5	6,5	9,0			

Upat injection system UPM 44 masonry	
Performances	Annex C 7
Solid sand-lime block	Appendix 25 / 96
Characteristic values	

Kind of masonry: Light-weight concrete block Vbl

Table C15: Parameters of brick

Species of brick		Light-weight concrete block Vbl
Density	$\rho \ge [kg/dm^3]$	0,6
Compressive strength	$f_b \ge [N/mm^2]$	2
Standard or approval		EN 771-3
Producer	11	e.g. Sepa
Size, dimensions	[mm]	≥ 372x300x254
Minimum thickness of brick	h _{min} [mm]	300

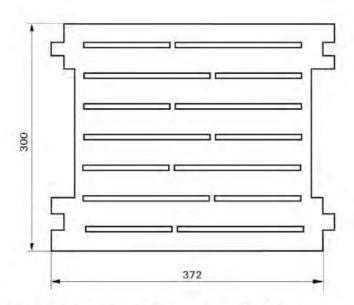


Table C16: Installation parameters for threaded rod with perforated sleeve

Size of perforated sleev	е	16:	x130	18x13	0/200	20x	130	22x130/200	20x	200
Size of threaded rod		M8	M10	M10	M12	M12	M16	M16	M12	M16
Edge distance	c _{min} [mm]					1	30			
Specing S _{cr} II = S _{min} II [370							
Spacing	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$	250								
	α _{g,N} [[-]									
Group-factor	$\alpha_{g,V}$ [-]	2,0								
Group-lactor	$\alpha_{g,N}$ \perp [-]									
	$\alpha_{g,V}^{\perp}$ [-]									
Max. installation torque	T _{inst,max} [Nm]						4			

Upat injection system UPM 44 masonry	
Performances	Annex C 8
Solid light-weight concrete block Vbl	Appendix 26 / 96
Species of brick, installation parameters	

Kind of masonry: Solid light-weight concrete block Vbl

Table C17: Characteristic values of resistance; tension load (N_{Rk})

Use category Temperature range [°C]			/w	d/d	
			72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [l	kN]
Compressive strength fb = 2 N/I	mm²				
16x130 / M8 / M10	18x130/200 / M10 / M12	2,00	1,50	2,00	2,00
20x130 / M12 / M16	22x130/200 / M16	2,50	2,50	3,00	2,50
20x200 / M12 / M16		3,50	3,00	4,00	3,00

Table C18: Characteristic values of resistance; shear load (V_{Rk})

Use category		W	/w	d/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values V _{Rk} [kN]			
Compressive strength fb = 2 N/I	nm²				
16x130 / M8 / M10	18x130/200 / M10 / M12		30	-0	
20x130 / M12 / M16			4,	50	
20x200 / M12 / M16	22x130/200 / M16	6,50			

	Upat injection system UPM 44 masonry	
Performances		
O CARLES	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

Kind of masonry: Solid light-weight concrete block VbI

Table C19: Parameters of brick

	Solid light-weight concrete block Vbl
$\rho \ge [kg/dm^3]$	1,6
$f_b \ge [N/mm^2]$	4, 6 or 8
	EN 771-3
	KLB
[mm]	≥ 250x240x239
h _{min} [mm]	240
	$f_b \ge [N/mm^2]$ [mm]

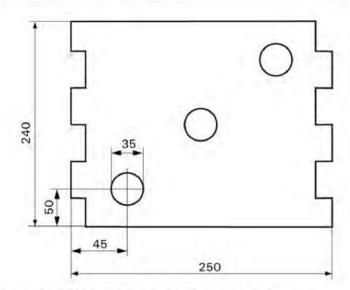


Table C20: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated	sleeve	12x50	12x85	16x85	16x130	18x13	0/200	20x85	20x130	22×130/200	20x200
Size of threaded i	rod	M6M8	M6 M8	M8M10	M8M10	M10	M12	M12 M16	M12M16	M16	M12M16
Size of internal th UPM-I	readed anchor			M6/M8				M10/M12			
Edge distance	c _{min} [mm]						13	0			- 4
Spacing —	S _{cr} II = S _{min} II		250								
Spacing —	$s_{cr} \perp = s_{min} \perp$	-	250						- 1		
	$\alpha_{g,N}$ II [-]										
Group-factor	$\alpha_{g,V}$ II [-]						2,	o.			
Oloup luctor	$\alpha_{g,N} \perp$ [-]						۷,				
	$\alpha_{g,V}^{\perp}$ [-]										
Max. installation torque	T _{inst,max} [Nm]		-				4	-			

Upat injection system UPM 44 masonry	
Performances	Annex C 10
Solid light-weight concrete block Vbl	Appendix 28 / 96
Species of brick, installation parameters	

Kind of masonry: Solid light-weight concrete block Vbl

Table C21: Characteristic values of resistance; tension load (N_{Rk})

Use category		W	/w	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values N _{Rk} [kN]				
Compressive strength $f_b = 4 N/r$	nm²					
12x50 M6 / M8		1,20	0,90	2,00	1,50	
12x85 M6 / M8		2,00	1,50	3,50	3,00	
16x85 M8 / M10 16x85 UPM-I M6 / M8	16x130 M8 / M10 18x130/200 M10 / M12	2,50	2,00	4,00	3,50	
20x85 M12 / M16 20x85 UPM-I M10 / M12	20x130 M12 / M16 20x200 M12 / M16 22x130/200 M16	3,00	2,50	5,00	4,50	
Compressive strength $f_b = 6 N/r$	nm²		75	22	100	
12x50 M6 / M8		1,50	1,50	3,00	2,50	
12x85 M6 / M8		3,00	2,50	5,00	4,00	
16x85 M8 / M10 16x85 UPM-I M6 / M8	16x130 M8 / M10 18x130/200 M10 / M12	4,00	3,00	6,50	5,50	
20x85 M12 / M16 20x85 UPM-I M10 / M12	20x130 M12 / M16 20x200 M12 / M16 22x130/200 M16	5,00	4,00	7,50	6,50	
Compressive strength f _b = 8 N/r	nm²		,	ž.		
12x50 M6 / M8		2,00	2,00	4,00	3,00	
12x85 M6 / M8		4,00	3,00	7,00	5,50	
16x85 M8 / M10 16x85 UPM-I M6 / M8	16x130 M8 / M10 18x130/200 M10 / M12	5,00	4,00	8,50	7,00	
20x85 M12 / M16 20x85 UPM-I M10 / M12	20x130 M12 / M16 20x200 M12 / M16 22x130/200 M16	6,50	5,50	9,00	8,50	

Upat injection system UPM 44 masonry	
Performances Solid light-weight concrete block Vbl Characteristic values tension load	Annex C 11 Appendix 29 / 96

Kind of masonry: Solid light-weight concrete block VbI

Table C22: Characteristic values of resistance; shear load (V_{Rk})

Use category		w	/w	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues V _{Rk} [l	kN]	
Compressive strength f _b = 4 N/I	mm ²			2 - 4 - 3 - 1 - 1		
12x50 M6 12x85 M6	16x85 / UPM-I M6		2,0	00		
12x50 M8	12x85 M8		3,0	00		
16x85 M8 / M10 UPM-I M8	16x130 M8 / M10 18x130/200 M10 / M12		3,	50		
20x85 M12 / M16 UPM-I M10 / M12	20x130 M12 / M16 20x200 M12 / M16 22x130/200 M16	4,50				
Compressive strength $f_b = 6 N/r$	mm ²					
12x50 M6 12x85 M6	16x85 / UPM-I M6	3,00				
12x50 M8	12x85 M8	4,50				
16x85 M8 / M10 UPM-I M8	16x130 M8 / M10 18x130/200 M10 / M12	5,50				
20x85 M12 / M16 UPM-I M10 / M12	20x130 M12 / M16 20x200 M12 / M16 22x130/200 M16	6,50				
Compressive strength f _b = 8 N/I	mm ²					
12x50 M6 12x85 M6	16x85 / UPM-I M6		4,0	00		
12x50 M8	12x85 M8	6,00				
16x85 M8 / M10 UPM-I M8	16x130 M8 / M10 18x130/200 M10 / M12	7,00				
20x85 M12 / M16 UPM-I M10 / M12	20x130 M12 / M16 20x200 M12 / M16 22x130/200 M16		8,8	50		

Upat injection system UPM 44 masonry	
Performances	Annex C 12
Solid light-weight concrete block Vbl	Appendix 30 / 96
Characteristic values shear load	

Kind of masonry: Perforated block form B, HLz

Table C23: Parameters of brick

Species of brick		Perforated block form B, HLz
Density	$\rho \ge [kg/dm^3]$	1,0
Compressive strength	$f_b \ge [N/mm^2]$	4, 6, 8, 10 or 12
Standard or approval		EN 771-1
Producer		e.g. Wienerberger, Poroton
Size, dimensions	[mm]	500(370)x175(240)x237
Minimum thickness of brick	h _{min} [mm]	175(240)

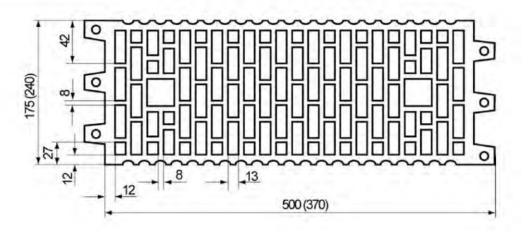


Table C24: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated s	sleeve	12	12x50		12x50		12x50 12x85		16x85 1		16x130		20x85		20x	130
Size of threaded ro	od	M6	M8	M6	M8	M8	M10	M8	M10	M12	M16	M12	M16			
Size of internal thre	eaded anchor					M6	/M8			M10.	/M12					
Edge distance	c _{min} [mm]		100													
	s _{min} II [mm]		100													
Spacing	s _{cr} II [mm]		500 (370)													
30.00	s _{min} ⊥[mm]		100													
	s _{cr} ⊥[mm]						24	10								
Group-factor —	$\alpha_{g,N} \parallel [-]$ $\alpha_{g,V} \parallel [-]$ $\alpha_{g,N} \perp [-]$ $\alpha_{g,V} \perp [-]$		1													
Max. installation torque	T _{inst,max} [Nm]						2	2								

Upat injection system UPM 44 masonry	
Performances	Annex C 13
Perforated block form B,HLz	Appendix 31 / 96
Species of brick, installation parameters	

Kind of masonry: Perforated block form B, HLz

Table C25: Characteristic values of resistance; tension load (N_{Rk})

lse category		w	/w	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]	
Compressive strength $f_b = 4 \text{ N/mm}$	12					
12x50 M6/M8	12x85 M6/M8	0,30		0,40	0,30	
16x85 M8 / M10	20x85 M12 / M16		100000			
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12	0,90	0,75	0,90	0,90	
16x130 M8/ M10			100			
20x130 M12/M16		1,20	0,90	1,20	1,20	
Compressive strength $f_b = 6 \text{ N/mm}$	n ²					
12x50 M6/M8	12x85 M6/M8	0,50	0,40	0,60	0,50	
16x85 M8 / M10	20x85 M12 / M16			1 1 2 2 2	7 7 7 7	
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12	1,50	1,20	1,50	1,20	
16x130 M8/ M10						
20x130 M12/M16	h	2,0	1,5	2,0	1,5	
Compressive strength $f_b = 8 \text{ N/mm}$	n ²					
12x50 M6/M8	12x85 M6/M8	0,75	0,60	0,75	0,60	
16x85 M8 / M10	20x85 M12 / M16	- 77				
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12	2,00	1,50	2,00	1,50	
16x130 M8/ M10						
20x130 M12/M16		2,50	2,00	2,50	2,00	
Compressive strength $f_b = 10 \text{ N/m}$	m²					
12x50 M6/M8	12x85 M6/M8	0,90	0,75	0,90	0,75	
16x85 M8 / M10	20x85 M12 / M16					
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12	2,50	2,00	2,50	2,00	
16x130 M8/ M10						
20x130 M12/M16		3,00	2,50	3,50	3,00	
Compressive strength $f_b = 12 \text{ N/m}$	m ²					
12x50 M6/M8	12x85 M6/M8	0,90	0,90	1,20	0,90	
16x85 M8 / M10	20x85 M12 / M16		7.4.5			
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12	3,00	2,50	3,00	2,50	
16x130 M8/ M10			0.35.50			
20x130 M12/M16		3,50	3,00	4,00	3,50	

Upat injection system UPM 44 masonry	
Performances	Annex C 14
Perforated block form B, HLz	Appendix 32 / 96
Characteristic values tension load	

Kind of masonry: Perforated block form B, HLz

Table C26: Characteristic values of resistance; shear load (V_{Rk)})

lse category w/w		d	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]
Compressive strength $f_b = 4 \text{ N/m}$	nm²				
12x50 M6/M8	12x85 M6 / M8			7	
16x85 M8 / M10	20x85 M12 / M16	0,50			
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12				
16x130 M8/M10	20x130 M12/M16	0,60			
Compressive strength f _b = 6 N/m	nm²				
12x50 M6/M8	12x85 M6 / M8			-	
16x85 M8 / M10	20x85 M12 / M16	0,75			
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12				
16x130 M8/M10	20x130 M12/M16	0,90			
Compressive strength fb = 8 N/m	nm²				
12x50 M6/M8	12x85 M6 / M8	0,90			
16x85 M8 / M10	20x85 M12 / M16				
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12	0,90			
16x130 M8/M10	20x130 M12/M16		1,2	20	
Compressive strength $f_b = 10 \text{ N/}$	mm²				
12x50 M6/M8	12x85 M6 / M8				
16x85 M8 / M10	20x85 M12 / M16		1,2	20	
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12	1,20			
16x130 M8/M10	20x130 M12/M16		1,5	50	
Compressive strength f _b = 12 N/	mm ²				
12x50 M6/M8	12x85 M6 / M8	1,5			
16x85 M8 / M10	20x85 M12 / M16				
16x85 UPM-I M6 / M8	20x 85 UPM-I M10 / M12	• •			
16x130 M8/M10	20x130 M12/M16		2,0	00	

Upat injection system UPM 44 masonry	
Performances	Annex C 15
Perforated block form B, HLz	Appendix 33 / 96
Characteristic values shear load	Appendix 35 / 90

Kind of masonry: Perforated brick HLz, 2DF

Table C27: Parameters of brick

Species of brick		Perforated brick HLz	
Density	$\rho \ge [kg/dm^3]$	1,4	
Compressive strength	$f_b \ge [N/mm^2]$	6, 10, 16, 20 or 28	
Standard or approval		EN 771-1	
Producer	2.70	e.g. Wienerberger	
Size, dimensions	[mm]	240x115x113	
Minimum thickness of brick	h _{min} [mm]	115	

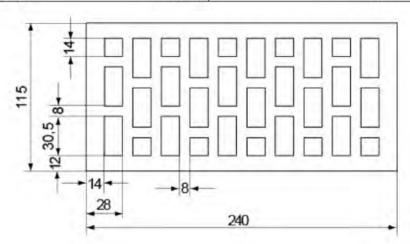


Table C28: Installation parameters for threaded rod with perforated sleeves and internal threaded anchor UPM-I with perforated sleeve

Size of perforated sleeve		12	12x50		12x85		16x85		x85	
Size of threaded ro	od	M6	M8	M6	M8	M8	M10	M12	M16	
Size of internal threaded anchor UPM-I						M6	/M8	M10	/M12	
Edge distance c _{min} [mm]					(80		l-		
Canaina	$s_{cr} II = s_{min} II [mm]$	240								
Spacing —	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$	115								
	α _{g,N} II [-]									
Group-factor —	$\alpha_{g,V} II$ [-]		2,0							
Gloup-lactor —	$\alpha_{g,N} \perp [-]$					2,0				
	α _{g,∨} ⊥[-]									
Max. installation torque	T _{inst,max} [Nm]					2				

Upat injection system t	JPM 44 masonry
Performances	
Perforated brick HLz, 2DF	
Species of brick, installation parameters	

Kind of masonry: Perforated brick HLz, 2DF

Table C29: Characteristic values of resistance; tension load (N_{Rk})

Use category		W	/w	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]	
Compressive strength $f_b = 6 \text{ N/m}$	nm²					
12x50 M6 / M8		0,75	0,60	0,75	0,60	
12x85 M6 / M8		0,90	0,90	1,20	0,90	
16x85 M8 / M10	16x85 UPM-I M6 / M8	0,75	0,60	0,75	0,60	
20x85 M12 / M16	20x85 UPM-I M10 / M12	0,90	0,75	0,90	0,75	
Compressive strength $f_b = 10 \text{ N/}$	mm²					
12x50 M6 / M8		1,20	0,90	1,20	0,90	
12x85 M6 / M8		1,50	1,50	2,00	1,50	
16x85 M8 / M10	16x85 UPM-I M6 / M8	1,20	0,90	1,20	1,20	
20x85 M12 / M16	20x85 UPM-I M10 / M12	1,50	1,20	1,50	1,20	
Compressive strength $f_b = 16 \text{ N/}$	mm²					
12x50 M6 / M8		2,00	1,50	2,00	1,50	
12x85 M6 / M8		2,50	2,00	3,00	2,50	
16x85 M8 / M10	16x85 UPM-I M6 / M8	2,00	1,50	2,00	1,50	
20x85 M12 / M16	20x85 UPM-I M10 / M12	2,00	2,00	2,50	2,00	
Compressive strength $f_b = 20 \text{ N/}$	mm²					
12x50 M6 / M8		2,50	2,00	2,50	2,00	
12x85 M6 / M8		3,50	3,00	4,00	3,00	
16x85 M8 / M10	16x85 UPM-I M6 / M8	2,50	2,00	2,50	2,00	
20x85 M12 / M16	20x85 UPM-I M10 / M12	3,00	2,50	3,00	2,50	
Compressive strength $f_b = 28 \text{ N/}$	mm²					
12x50 M6 / M8		3,00	2,50	3,50	3,00	
12x85 M6 / M8		5,00	4,00	5,50	4,50	
16x85 M8 / M10	16x85 UPM-I M6 / M8	3,50	3,00	3,50	3,00	
20x85 M12 / M16	20x85 UPM-I M10 / M12	4,00	3,50	4,50	3,50	

	Upat injection system UPM 44 masonry
Performances	

Table C30: Characteristic values of resistance; shear load (V_{Rk})

Use category		/w	d/d			
Temperature range	[°C]	50/80	72/120	50/80	72/120	
Sleeve/anchor combinations	ch	aracteristic v	alues V _{Rk} [kN]		
Compressive strength $f_b = 6 N/n$	nm²					
12x50 M6 12x85 M6		1,:	2			
12x85 M8			2,0	0		
16x85 M8 / M10 12x50 M8	16x85 UPM-I M8		1,9	5		
20x85 M12 / M16	20x85 UPM-I M10 / M12		2,	5		
Compressive strength f _b = 10 N/	mm ²					
12x50 M6 12x85 M6	16x85 UPM-I M6		2,0	0		
12x85 M8			4,0	0		
16x85 M8 / M10 12x50 M8	16x85 UPM-I M8		2,5			
20x85 M12 / M16	20x85 UPM-I M10 / M12		4,	5		
Compressive strength f _b = 16 N/	mm ²		, v			
12x50 M6 12x85 M6	16x85 UPM-I M6	3,0				
12x85 M8		6,0 (5,5) ¹⁾				
16x85 M8 / M10 12x50 M8	16x85 UPM-I M8	3,5				
20x85 M12 / M16	20x85 UPM-I M10 / M12	7,0 (5,5) ¹⁾				
Compressive strength f _b = 20 N/	mm²					
12x50 M6 12x85 M6	16x85 UPM-I M6		4,0	0		
12x85 M8			7,5 (5	(,5) ¹⁾		
16x85 M8 / M10 12x50 M8	16x85 UPM-I M8		4,	5		
20x85 M12 / M16	20x85 UPM-I M10 / M12		8,5 (5	,5) ¹⁾		
Compressive strength fb = 28 N/	mm ²					
12x50 M6 12x85 M6	16x85 UPM-I M6	5,0				
12x85 M8			9,5 (5	(,5) ¹⁾		
16x85 M8 / M10 12x50 M8	16x85 UPM-I M8	6,5 (5,5) ¹⁾				
20x85 M12 / M16	20x85 UPM-I M10 / M12		12,0 (5,5) ¹⁾		

¹⁾ Characteristic value of pushing out of one brick V_{Rk,pb} = 5,5 kN

Factor for job site tests and displacements see Annex C78.

	Upat injection system UPM 44 masonry					
Performances						

Perforated brick HLz

Characteristic values shear load

Annex C 18

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Kind of masonry: Sand-lime hollow brick KSL

Table C31: Parameters of brick

Species of brick		Sand-lime hollow brick KSL
Density	$\rho \ge [kg/dm^3]$	1,4
Compressive strength	$f_b \ge [N/mm^2]$	8, 10, 12, 16 or 20
Standard or approval		EN 771-2
Producer		e.g. KS Wemding
Size, dimensions	[mm]	240x175x113
Minimum thickness of brick	h _{min} [mm]	175

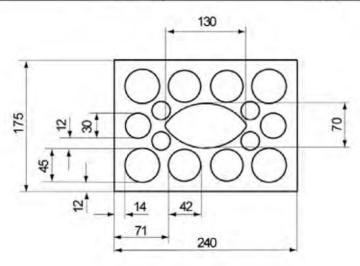


Table C32: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated	d sleeve					18x130/200			22x130/200
Size of threaded	rod	M6 M8	M6 M8	M8 M10	M8M10	M10 M12	M12 M16	M12 M16	M16
Size of internal th UPM-I	readed anchor			M6/M8			M10/M12		
Edge distance	c _{min} [mm]	6	0				80		
	s _{min} II [mm]					100			
Spacing	s _{cr} II [mm]	240							
	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$	115							
Group-factor	$\alpha_{g,N} \parallel [-]$ $\alpha_{g,V} \parallel [-]$	1,5							
Group-ractor	$\frac{\alpha_{g,N} \perp [-]}{\alpha_{g,V} \perp [-]}$	2,0							
Max. installation torque	T _{inst,max} [Nm]	2							

Upat injection system UPM 44 masonry	
Performances	Annex C 19
Sand-lime hollow brick KSL	Appendix 37 / 96
Species of brick, installation parameters	, appendix or yes

Kind of masonry: Sand-lime hollow brick KSL

Table C33: Characteristic values of resistance; tension load (N_{Rk})

Use category Temperature range [°C]			/w	d/d		
Temperature range	50/80	72/120	50/80	72/120		
Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]		
Compressive strength f _b = 8 N/mm) ²					
12x50 M6 / M8	12x85 M6 / M8	1,50	1,20	1,50	1,50	
16x85 M8 / M10	UPM-I M6 / M8	2,00	1,50	2,00	1,50	
16x130 M8 / M10 18x 130 /200 M10 / M12 20x85 UPM-I M10 / M12	20x130 M12 / M16 22x130/200 M16	2,00	1,50	2,50	2,00	
Compressive strength $f_b = 10 \text{ N/m}$	m ²					
12x50 M6 / M8	12x85 M6 / M8	2,00	1,50	2,00	2,00	
16x85 M8 / M10	UPM-I M6 / M8	2,00	2,00	2,50	2,50	
16x130 M8 / M10 18x 130 /200 M10 / M12 20x85 UPM-I M10 / M12	20x130 M12 / M16 22x130/200 M16	2,50	2,00	3,00	2,50	
Compressive strength f _b = 12 N/m	m ²					
12x50 M6 / M8	12x85 M6 / M8	2,50	2,00	2,50	2,00	
16x85 M8 / M10	UPM-I M6 / M8	2,50	2,00	3,00	2,50	
16x130 M8 / M10 18x 130 /200 M10 / M12 20x85 UPM-I M10 / M12	20x130 M12 / M16 22x130/200 M16	3,00	2,50	3,50	3,00	
Compressive strength f _b = 16 N/m	m ²					
12x50 M6 / M8	12x85 M6 / M8	3,00	2,50	3,50	3,00	
16x85 M8 / M10	UPM-I M6 / M8	3,50	3,00	4,00	3,50	
16x130 M8 / M10 18x 130 /200 M10 / M12 20x85 UPM-I M10 / M12	20x130 M12 / M16 22x130/200 M16	4,50	3,50	4,50	4,00	
Compressive strength f _b = 20 N/m	m²		a or their			
12x50 M6 / M8	12x85 M6 / M8	4,00	3,50	4,50	3,50	
16x85 M8 / M10	UPM-I M6 / M8	4,50	4,00	5,00	4,00	
16x130 M8 / M10 18x 130 /200 M10 / M12 20x85 UPM-I M10 / M12	20x130 M12 / M16 22x130/200 M16	5,50	4,50	6,00	5,00	

Upat injection system UPM 44 masonry	
Performances	Annex C 20
Sand-lime hollow brick KSL	Appendix 38 / 96
Characteristic values tension load	

Kind of masonry: Sand-lime hollow brick KSL

Table C34: Characteristic values of resistance; shear load (V_{Rk})

	cs of resistance, shear road (VR	w/w	d/d		
Use category	[°C]				
Temperature range	100 100 100 100 100 100 100 100 100 100	and the second of the second o			
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic v	/aiues V _{Rk} [KIN]		
Compressive strength $f_b = 8 \text{ N/mn}$		2.	F0		
12x50 M6 / 12x85 M6	16x85 UPM-I M6		50		
12x50 M8 / 12x85 M8		1,9	50		
16x85 M8 / M10	18x130/200 M10 / M12				
16x85 UPM-I M8	20x85 M12	3.0	00		
16x130 M10 / M12	20x85 UPM-I M10 / M12	-,,			
	20x130 M12				
20x85 M16	22x130/200 M16	2,	50		
20x130 M16		·,	**** 		
Compressive strength f _b = 10 N/m					
12x50 M6 / 12x85 M6	16x85 UPM-I M6		00		
12x50 M8 / 12x85 M8		2,0	00		
16x85 M8 / M10	18x130/200 M10 / M12				
16x85 UPM-I M8	20x85 M12	3,	50		
16x130 M10 / M12	20x85 UPM-I M10 / M12	5,	30		
102130 101107 10112	20x130 M12				
20x85 M16	22x130/200 M16	3 /	50		
20x130 M16		5,	30		
Compressive strength f _b = 12 N/m	m²				
12x50 M6 / 12x85 M6	16x85 UPM-I M6	2,50			
12x50 M8 / 12x85 M8		2,50			
40-05 M0 / M40	18x130/200 M10 / M12				
16x85 M8 / M10	20x85 M12		50		
16x85 UPM-I M8	20x85 UPM-I M10 / M12	4,	50		
16x130 M10 / M12	20x130 M12				
20x85 M16	22::120/200 M46	4.1	00		
20x130 M16	22x130/200 M16	4,0	00		
Compressive strength f _b = 16 N/m	m²				
12x50 M6 / 12x85 M6	16x85 UPM-I M6	3.0	00		
12x50 M8 / 12x85 M8			50		
	18x130/200 M10 / M12	<u> </u>	5- 0		
16x85 M8 / M10	20x85 M12	0500			
16x85 UPM-I M8	20x85 UPM-I M10 / M12	6,0	00		
16x130 M10 / M12	20x130 M12				
20x85 M16	AUGUS TO BE TO BUILD TO BUILD TO	200	<u> </u>		
20x130 M16	22x130/200 M16	5,	50		
Compressive strength $f_b = 20 \text{ N/m}$	m ²				
12x50 M6 / 12x85 M6	16x85 UPM-I M6	4,0	nn		
12x50 M6 / 12x85 M6	TOXOS OF WEIGHT	50			
	18x130/200 M10 / M12	ч,			
16x85 M8 / M10	20x85 M12				
16x85 UPM-I M8	20x85 UPM-I M10 / M12 7,50				
16x130 M10 / M12	20x130 M12				
20x85 M16	20X130 W12				
20x130 M16	22x130/200 M16	6,	50		
20X130 W116					

Upat injection system UPM 44 masonry	
Performances	Annex C 21
Sand-lime hollow brick KSL	Appendix 39 / 96
Characteristic values shear load	/ ,pps.nam.co / co

Kind of masonry: Light-weight concrete hollow block Hbl

Table C35: Parameters of brick

Species of brick		Light-weight concrete hollow block Hbl
Density	$\rho \ge [kg/dm^3]$	1,0
Compressive strength	$f_b \ge [N/mm^2]$	2 or 4
Standard or approval		EN 771-3
Producer		
Size, dimensions	[mm]	362x240x240
Minimum thickness of brick	h _{min} [mm]	240

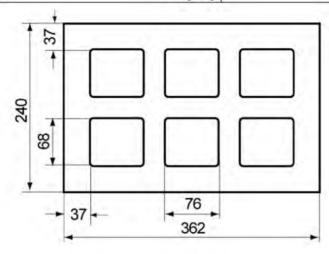


Table C36: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated	sleeve	12x50	12x85	16x85	16x130	18x130/2	00	20x85	20x130	22x130/200	20x200
Size of threaded	rod	M6M8	M6 M8	M8M10	M8M10	M10 M1	12 1	M12 M16	M12M16	M16	M12M16
Size of internal th UPM-I	readed anchor			M6/M8			N	M10/M12			
Edge distance	c _{min} [mm]						60				
	s _{min} II [mm]		100								
Spacing	s _{cr} II [mm]	362									
Scr	= s _{min} [⊥] [mm]						240)			
	α _{g,N} II [-]						1,2				
Group-factor	α _{g,V} II [-]										
Group-lactor	$\frac{\alpha_{g,N} \perp [-]}{\alpha_{g,V} \perp [-]}$	2,0									
Max. installation torque	T _{inst,max} [Nm]		2								

	Upat injection system UPM 44 masonry
Performances	
Light-weight cond	rete hollow block Hbl
Species of brick	installation parameters

Annex C 22

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Kind of masonry: Light-weight concrete hollow block Hbl Table C37: Characteristic values of resistance; tension load (N_{Rk})

Jse category		W	/w	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]	
Compressive strength f _b = 2 N/mm	12					
12x50 M6 / M8		1,20	0,90	1,20	0,90	
12x85 M6 16x130 M8 / M10	18x130/200 M10 / M12	1,50	1,20	1,50	1,20	
16x85 M8 / M10 16x85 / UPM-I M6 / M8	20x85 M12 / M16 20x85 / UPM-I M10 / M12 20x130 M12 / M16 22x130/200 M16	1,50	1,20	1,50	1,20	
20x200 M12 / M16		2,50	2,00	2,50	2,00	
Compressive strength f _b = 4 N/mm	12					
12x50 M6 / M8		2,00	2,00	2,50	2,00	
12x85 M6 16x130 M8 / M10	18x130/200 M10 / M12	3,00	2,50	3,00	2,50	
20x85 M12 / M16 16x85 M8 / M10 20x85 / UPM-I M10 / M12 16x85 / UPM-I M6 / M8 20x130 M12 / M16 22x130/200 M16		3,00	2,50	3,00	2,50	
20x200 M12 / M16		5,00	4,00	5,50	4,50	

	Upat injection system UPM 44 masonry
Performances	
Light-weight concre	ete hollow block Hbl
Characteristic value	es tension load

Kind of masonry: Light-weight concrete hollow block Hbl Table C38: Characteristic values of resistance; shear load (V_{Rk})

Use category	w	/w	d/d		
Temperature range	50/80	72/120	50/80	72/120	
Sleeve/anchor combinations	ations Sleeve/anchor combinations characteristic values V _{Rk}				kN]
Compressive strength fb = 2 N/m	nm²				
All sizes		0,90			
Compressive strength fb = 4 N/m	nm²				
All sizes		2,00			

Factor for job site tests and displacements see Annex C78.

Upat injection system UPM 44 masonry

Performances

Light-weight concrete hollow block Hbl Characteristic values shear load Annex C 24

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Table C39: Parameters of brick

Species of brick		Perforated block form B, HLz
Density	$\rho \ge [kg/dm^3]$	0,6
Compressive strength	$f_b \ge [N/mm^2]$	4, 6, 8
Standard or approval		EN 771-1
Producer		e.g. Bouyer Leroux
Size, dimensions	[mm]	500x200x315
Minimum thickness of brick	h _{min} [mm]	200

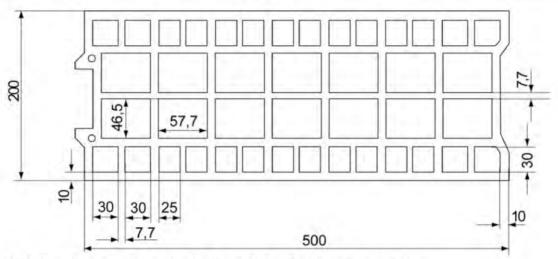


Table C40: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perfora	ated sleeve	12x50	12x85	16x85	16x130	18x130/200	20x85	20x130	22x130/200				
Size of thread	led rod	M6 M8	M6 M8	M8 M10	M8 M10	M10 M12	M12 M16	M12 M16	M16				
Size of interna anchor UPM-I				M6/M8			M10/M12						
Edge distance	c _{min} [mm]					120							
	s _{min} II [mm]	1	120										
Spacing	s _{cr} II [mm]	500											
Scr	[⊥] =s _{min} [⊥] [mm]	315											
	α _{g,N} II [-]	1,3											
- - Group-factor	α _{g,V} II [-]					1,7							
Group-ractor -	$\alpha_{g,N}^{\perp}[-]$ $\alpha_{g,V}^{\perp}[-]$												
Max. installation torque	T _{inst,max} [Nm]					2							

Upat injection system UPM 44 masonry	
Performances	Annex C 25
Perforated block form B, HLz	Appandix 42 / 06
Species of brick, installation parameters	Appendix 43 / 96

Table C41: Characteristic values of resistance; tension load (N_{Rk})

Use category		W	/w	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]	
Compressive strength f _b = 4 N/mr	n ²	To La				
12x50 M6 / M8		0,50	0,40	0,60	0,50	
12x85 M6 / M8 16x85 M8 / M10 16x85 / UPM-I M6 / M8	20x85 M12 / M16 20x85 / UPM-I M10 / M12	1,50	1,20	1,50	1,20	
16x130 M8 / M10 18x130/200 M8 / M10		0,75	0,60	0,90	0,75	
20x130 M16 22x130/200 M16		1,50	1,20	2,00	1,50	
Compressive strength fb = 6 N/mr	n²					
12x50 M6 / M8		0.75	0,60	0,90	0,75	
12x85 M6 / M8 16x85 M8 / M10 16x85 / UPM-I M6 / M8	20x85 M12 / M16 20x85 / UPM-I M10 / M12	2,00	2,00	2,50	2,00	
16x130 M8 / M10 18x130/200 M8 / M10		1,20	0,90	1,20	1,20	
20x130 M12 / M16 22x130/200 M16		2,50	2,00	2,50	2,00	
Compressive strength f _b = 8 N/mr	n ²				1	
12x50 M6 / M8		0,90	0,90	1,20	0,90	
12x85 M6 / M8 16x85 M8 / M10 16x85 / UPM-I M6 / M8	20x85 M12 / M16 20x85 / UPM-I M10 / M12	3,00	2,50	3,00	2,50	
16x130 M8 / M10 18x130/200 M8 / M10		1,50	1,20	2,00	1,50	
20x130 M12 / M16 22x130/200 M16		3,50	2,50	3,50	3,00	

Upat injection system UPM 44 masonry	
Performances	Annex C 26
Perforated block form B, HLz	
Characteristic values tension load	Appendix 44 / 96

Table C42: Characteristic values of resistance; shear load (V_{Rk})

Use category		w	d	d/d			
Temperature range	[°C]	50/80	72/120	50/80	72/120		
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values V _{Rk} [kN]					
Compressive strength f _b = 4 N/mn	n ²						
12x50 M6 / M8 12x85 M6 / M8 16x85 M8 / M10		1,	50				
20x85 M16			2,5	50			
16x130 M8 / M10 20x130 M12 / M16	18x130/200 M10 / M12 22x130/200 M16		0,0	90			
Compressive strength fb = 6 N/mn	n ²						
12x50 M6 / M8 12x85 M6 / M8 16x85 M8 / M10	16x85 / UPM-I M6 / M8 20x85 / UPM-I M10/M12 20x85 M12	2,50					
20x85 M16			3,5	50			
16x130 M8 / M10 20x130 M12 / M16	18x130/200 M10 / M12 22x130/200 M16		1,5	50			
Compressive strength f _b = 8 N/mn	n ²						
12x50 M6 / M8 12x85 M6 / M8 16x85 M8 / M10	16x85 / UPM-I M6 / M8 20x85 / UPM-I M10/M12 20x85 M12	M-I M10/M12 3,50			60		
20x85 M16							
16x130 M8 / M10 20x130 M12 / M16	18x130/200 M10 / M12 22x130/200 M16	2,00					

Upat injection system UPM 44 masonry	
Performances	Annex C27
Perforated block form B, HLz	
Characteristic values shear load	Appendix 45 / 96

Table C43: Parameters of brick

Species of brick		Perforated block form B, HLz
Density	$\rho \ge [kg/dm^3]$	0,7
Compressive strength	$f_b \ge [N/mm^2]$	4, 6, 8 or 10
Standard or approval		EN 771-1
Producer		e.g. Wienerberger
Size, dimensions	[mm]	500x200x300
Minimum thickness of brick	h _{min} [mm]	200

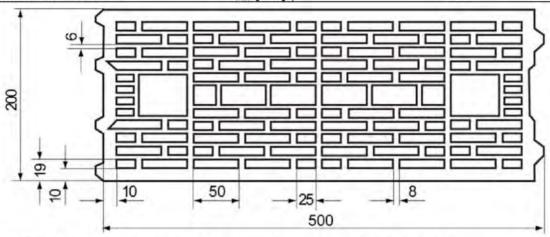


Table C44: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of pe	Size of perforated sleeve		12x50 12x85 16x8		16x85	16x130		18x130/200		20x85		20x130		22x130/200
Size of threaded rod		M6	M8	M6 M8	M8 M10	M8	M10	M10	M12	M12	M16	M12 M	16	M16
Size of int	ernal threaded PM-I				M6/M8					M10	/M12		Ī	
Edge dista	ance c _{min} [mm]			50			- 1	80		50			30	
	s _{min} II [mm]							10	0					
Spacing	s _{cr} II [mm]							50	0					
	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$	300												
	α _{g,N} II [-]							1,	4					
Group- factor	$\begin{array}{c} \alpha_{g,V} II [\text{-}] \\ \alpha_{g,N} \bot [\text{-}] \\ \alpha_{g,V} \bot [\text{-}] \end{array}$	2,0												
Max. installation torque	n T _{inst,max} [Nm]							2						

Upat injection system UPM 44 masonry	
Performances	Annex C 28
Perforated block form B,HLz	
Species of brick, installation parameters	Appendix 46 / 96

Table C45: Characteristic values of resistance; tension load (N_{Rk})

Use category	W	/w	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]
Compressive strength $f_b = 4 \text{ N/m}$	nm²				
12x50 M6 / M8	12x85 M6 / M8	0,50	0,40	0,60	0,50
16x85 M8 / M10	16x85 / UPM-I M6 / M8	0,60	0,50	0,75	0,60
20x85 M12 / M16	20x85 / UPM-I M10 / M12	0,75	0,60	0,90	0,75
16x130 M8 / M10	18x130/200 M10 / M12	1,20	0,90	1,20	0,90
20x130 M12 / M16	22x130/200 M16	1,50	1,20	1,50	1,20
Compressive strength $f_b = 6 \text{ N/m}$	nm²				
12x50 M6 / M8	12x85 M6 / M8	0,75	0,60	0,90	0,75
16x85 M8 / M10	16x85 / UPM-I M6 / M8	0,90	0,75	1,20	0,90
20x85 M12 / M16	20x85 / UPM-I M10 / M12	1,20	0,90	1,20	1,20
16x130 M8 / M10	18x130/200 M10 / M12	1,50	1,20	2,00	1,50
20x130 M12 / M16	22x130/200 M16	2,00	1,50	2,50	2,00
Compressive strength $f_b = 8 \text{ N/m}$	nm²				
12x50 M6 / M8	12x85 M6 / M8	0,90	0,90	1,20	0,90
16x85 M8 / M10	16x85 / UPM-I M6 / M8	1,20	1,20	1,50	1,20
20x85 M12 / M16	20x85 / UPM-I M10 / M12	1,50	1,20	1,50	1,50
16x130 M8 / M10	18x130/200 M10 / M12	2,00	2,00	2,50	2,00
20x130 M12 / M16	22x130/200 M16	2,50	2,50	3,00	2,50
Compressive strength $f_b = 10 \text{ N/}$	mm ²				
12x50 M6 / M8	12x85 M6 / M8	1,20	0,90	1,50	1,2
16x85 M8 / M10	16x85 / UPM-I M6 / M8	1,50	1,20	2,00	1,50
20x85 M12 / M16	20x85 / UPM-I M10 / M12	2,00	1,50	2,00	2,00
16x130 M8 / M10	18x130/200 M10 / M12	2,50	2,00	3,00	2,50
20x130 M12 / M16	22x130/200 M16	3,50	3,00	4,00	3,00

11.	not	injection	evetom	LIDM	11	masonry
U	Jal	mection	system	UPIN	44	masoniv

Table C46: Characteristic values of resistance; shear load (V_{Rk})

Use category	w/w		d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues V _{Rk} [kN]
Compressive strength $f_b = 4 \text{ N/m}$					
12x50 M6	16x85 / UPM-I M6		0,9	90	
12x50 M8 12x85 M6 / M8	16x85 / UPM-I M8		1,2	20	
20x85 M12 / M16	20x85 /UPM-I M10 / M12		2,0	00	
16x130 M8 / M10 18x130/200 M10 / M12	20x130 M12 / M16 22x130/200 M16		0,0	30	
Compressive strength f _b = 6 N/n	nm²				
12x50 M6	16x85 / UPM-I M6		1,2	20	
12x50 M8 12x85 M6 / M8	16x85 / UPM-I M8		1,3	50	
20x85 M12 / M16	20x85 /UPM-I M10 / M12		3,0	00	
16x130 M8 / M10 18x130/200 M10 / M12	20x130 M12 / M16 22x130/200 M16	0,90			
Compressive strength f _b = 8 N/n	nm²				
12x50 M6	16x85 / UPM-I M6		1,5	50	
12x50 M8 12x85 M6 / M8	16x85 / UPM-I M8	2,00			
20x85 M12 / M16	20x85 /UPM-I M10 / M12		4,0	00	
16x130 M8 / M10 18x130/200 M10 / M12	20x130 M12 / M16 22x130/200 M16	1,20			
Compressive strength f _b = 10 N/	mm²				
12x50 M6	16x85 / UPM-I M6	2,00			
12x50 M8 12x85 M6 / M8	16x85 / UPM-I M8	3,00			
20x85 M12 / M16	20x85 /UPM-I M10 / M12	5,00			
16x130 M8 / M10 18x130/200 M10 / M12	20x130 M12 / M16 22x130/200 M16	1,50			

Upat injection system UPM 44 masonry	
Performances	Annex C 30
Perforated block form B, HLz	
Characteristic values shear load	Appendix 48 / 96

Table C47: Parameters of brick

Species of brick		Perforated block form B, HLz
Density	$\rho \ge [kg/dm^3]$	0,7
Compressive strength	$f_b \ge [N/mm^2]$	2, 4, 6 or 8
Standard or approval		EN 771-1
Producer		e.g. Terreal
Size, dimensions	[mm]	500x200x315
Minimum thickness of brick	h _{min} [mm]	200

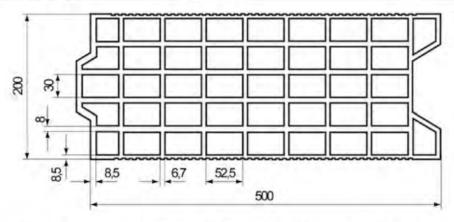


Table C48: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated sleeve		12x50	12x85	16x85	16x130	18x13	0/200	20x85	20x130	22x130/200	
Size of threaded rod		M6 M8	M6 M8	M8 M10	M8 M10	M10	M12	M12 M16	M12 M16	M16	
Size of internal anchor UPM-I	threaded			M6/M8				M10/M12			
Edge distance	c _{min} [mm]	-	50			80		50		80	
	s _{min} II [mm]					10	0				
Cassina	s _{cr} II [mm]		500								
Spacing	s _{min} +[mm]	100									
	s _{cr} L [mm]	315									
	α _{g,N} II [-]	1,1									
Group-factor	α _{g,V} II [-]	1,2									
Group-ractor	α _{g,N} ⊥[-]										
0.	α _{g,∨} ⊥[-]										
Max. installation torque	T _{inst,max} [Nm]	n] 2									

Upat injection system UPM 44 masonry	
Performances	Annex C 31
Perforated block form B, HLz	Appendix 49 / 96
Species of brick, installation parameters	

Table C49: Characteristic values of resistance; tension load (N_{Rk})

Use category			/w	d/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]
Compressive strength f _b = 2 N/I	mm²				3 N J.
12x50 M6 / M8		0,50	0,40	0,50	0,40
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 /UPM-I M10 / M12	0,50	0,40	0,50	0,40
20x130 M12 / M16		0,50	0,40	0,60	0,50
Compressive strength $f_b = 4 N/I$	mm²				
12x50 M6 / M8		0,90	0,75	0,90	0,90
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 /UPM-I M10 / M12	0,90	0,75	1,20	0,90
20x130 M12 / M16 22x130/200 M16	16x130 M8 / M10 18x130/200 M10 / M12	0,90	0,90	1,20	0,90
Compressive strength $f_b = 6 \text{ N/I}$	mm²				
12x50 M6 / M8		1,50	1,20	1,50	1,20
16x85 M8 / M10 12x85 M6 / M8 12x85 M6 / M8 20x85 M12 / M16 20x85 /UPM-I M10 / M12		1,50	1,20	1,50	1,20
20x130 M12 / M16 22x130/200 M16	16x130 M8 / M10 18x130/200 M10 / M12	1,50	1,20	1,50	1,50
Compressive strength $f_b = 8 \text{ N/I}$	mm²				
12x50 M6 / M8		2,00	1,50	2,00	1,50
16x85 M8 / M10 12x85 M6 / M8 12x85 M6 / M8 20x85 M12 / M16 20x85 /UPM-I M10 / M12M12		2,00	1,50	2,00	2,00
20x130 M12 / M16 22x130/200 M16	M12 / M16 16x130 M8 / M10		1,50	2,00	2,00

Upat injection system UPM 44 masonry	
Performances	Annex C 32
Perforated block form B, HLz	
Characteristic values tension load	Appendix 50 / 96

Table C50: Characteristic values of resistance; shear load (V_{Rk})

Use category			v/w	d/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values V _{Rk} [kN]			
Compressive strength $f_b = 2 N/m$	nm²				
12x50 M6	16x85 / UPM-I M6		0,3	30	
12x50 M8 12x85 M6 / M8	16x85 M8 16x85 / UPM-I M8		0,6	80	
20x85 M12 / M16	20x85 / UPM-I M10 / M12		0,0	90	
16x130 M8 / M10	18x130/200 M10 / M12		0,6	60	
20x130 M12 / M16	22x130/200 M16		0,7	75	
Compressive strength $f_b = 4 N/m$	nm²				
12x50 M6	16x85 / UPM-I M6		0,7	75	
12x50 M8 12x85 M6 / M8	16x85 M8 16x85 / UPM-I M8		1,2	20	
20x85 M12 / M16	20x85 / UPM-I M10 / M12		2,0	00	
16x130 M8 / M10	18x130/200 M10 / M12		1,2	20	
20x130 M12 / M16	22x130/200 M16		1,5	50	
Compressive strength $f_b = 6 N/m$	nm²				
12x50 M6	16x85 / UPM-I M6		0,9	90	
12x50 M8 12x85 M6 / M8	16x85 M8 16x85 / UPM-I M8		2,0	00	
20x85 M12 / M16	20x85 / UPM-I M10 / M12		3,0	00	
16x130 M8 / M10	18x130/200 M10 / M12		1,5	50	
20x130 M12 / M16	22x130/200 M16		2,0	00	7
Compressive strength $f_b = 8 \text{ N/m}$	nm²				
12x50 M6	16x85 / UPM-I M6	1,50			
12x50 M8 12x85 M6 / M8	16x85 M8 16x85 / UPM-I M8	2,50			
20x85 M12 / M16	20x85 / UPM-I M10 / M12	4,00		00	
16x130 M8 / M10	18x130/200 M10 / M12	2,00			
20x130 M12 / M16	22x130/200 M16	3,00			

U	pat in	jection s	system	UPM 44	masonry
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Table C51: Parameters of brick

Species of brick		Perforated block form B, HLz		
Density	$\rho \ge [kg/dm^3]$	0,7		
Compressive strength	$f_b \ge [N/mm^2]$	4, 6 or 8		
Standard or approval		EN 771-1		
Producer		e.g. Imery		
Size, dimensions	[mm]	500x200x275		
Minimum thickness of brick	h _{min} [mm]	200		

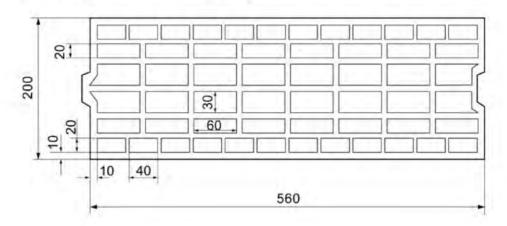


Table C52: Installation parameters for threaded rod with perforated sleeve

Size of perforated sleeve		16	16x130		18x130/200		130	22x130/200
Size of threaded rod	M8	M10	M10	M12	M12	M16	M16	
Edge distance	80							
Cassina	$s_{cr}II = s_{min}^{\perp}[mm]$	560						
Spacing	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$	275						
J	α _{g,N} II [-]							
Group-factor	α _{g.V} II [-]	2,0						
Group-racior	α _{g,N} [⊥] [-]	1						
Max. installation torque	T _{inst,max} [Nm]	2						

Upat injection system UPM 44 mason	ry
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Table C53: Characteristic values of resistance; tension load (N_{Rk})

Use category		w	/w	d/d		
Temperature range	50/80	72/120	50/80	72/120		
Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [l	kN]		
Compressive strength fb = 4 N/m	nm²					
16x130 M8 / M10	18x130/200 M10 / M12	0,90	0,90	1,20	0,90	
20x130 M12 / M16	1,20	1,20	1,50	1,20		
Compressive strength f _b = 6 N/m	nm²					
16x130 M8 / M10	18x130/200 M10 / M12	1,50	1,20	1,50	1,50	
20x130 M12 / M16 22x130/200 M16			1,50	2,00	2,00	
Compressive strength f _b = 8 N/m	nm²					
16x130 M8 / M10	18x130/200 M10 / M12	2,00	1,50	2,50	2,00	
20x130 M12 / M16	22x130/200 M16	2,50	2,00	3,00	2,50	

Table C54: Characteristic values of resistance; shear load (V_{Rk})

Use category	W	/w	d	/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations	ch	aracteristic v	alues V _{Rk} [kN]	
Compressive strength fb = 4 N/m	m²			- 12	
16x130 M8 / M10 18x130/200 M10 / M12	20x130 M12 / M16 22x130/200 M16	0,90			
Compressive strength fb = 6 N/m	m ²				
16x130 M8 / M10 18x130/200 M10 / M12	20x130 M12 / M16 22x130/200 M16	1,50			
Compressive strength fb = 8 N/m	m²				
16x130 M8 / M10 18x130/200 M10 / M12	20x130 M12 / M16 22x130/200 M16	2,00			

Upat injection system UPM 44 masonry	
Performances	Annex C 35
Perforated block form B,HLz	Annan div 52 / 00
Characteristic values	Appendix 53 / 96

Kind of masonry: Light-weight concrete hollow block Hbl

Table C55: Parameters of brick

Species of brick		Light-weight concrete hollow block Hbl	
Density	$\rho \ge [kg/dm^3]$	1,0	
Compressive strength	$f_b \ge [N/mm^2]$	2, 4 or 6	
Standard or approval	3.57.7.79	EN 771-1	
Producer		e.g. Sepa	
Size, dimensions	[mm]	500x200x200	
Minimum thickness of brick	h _{min} [mm]	[mm] 200	

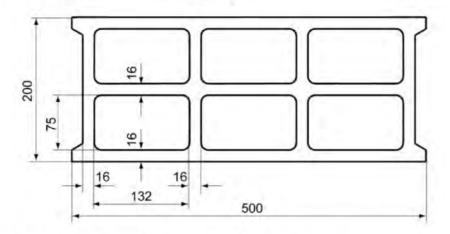


Table C56: Installation parameters for threaded rod with perforated sleeve

Size of perfora	ted sleeve	12x	12x50 12x85 16x85 16x130 18x130/3		30/200	20:	x85						
Size of threade	ed rod	M6	M8	M6	M8	M8	M10	M8	M10	M10	M12	M12	M16
Size of internal threaded anchor UPM-I						M	M6/M8					M10	/M12
Edge distance	c _{min} [mm]	100											
Chaoina	s _{cr} II = s _{min} II [mm]		500										
Spacing -	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$	200											
	α _{g,N} [-]												
Group-factor	$\frac{\alpha_{g,V} II[\text{-}]}{\alpha_{g,N} \bot[\text{-}]}$							2,0	b				
Max. installatio torque	n T _{inst,max} [Nm]		1	1						2			

	Upat injection system UPM 44 masonny
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Light-weight concrete hollow block Species of brick, installation parameters Annex C 36

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Kind of masonry: Light-weight concrete hollow block Hbl

Table C57: Characteristic values of resistance; tension load (N_{Rk})

Use category		W	/w	d/d			
Temperature range	[°C]	50/80	72/120	50/80	72/120		
Sleeve/anchor combinations		characteristic values N _{Rk} [kN]					
Compressive strength f _b = 2 N/mm ²							
All sizes		0,40	0,40	0,50	0,40		
Compressive strength f _b = 4 N/mm ²							
All sizes		0,90	0,75	0,90	0,75		
Compressive strength f _b = 6N/mm ²							
All sizes	5 5 10	1,20	1,20	1,50	1,20		

Table C58: Characteristic values of resistance; shear load (VRk)

Use category		W	/w	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120	
Sleeve/anchor combinations			aracteristic v	alues V _{Rk} [kN]	
Compressive strength f _b = 2 N/mm ²						
All sizes	0,90					
Compressive strength f _b = 4 N/mm ²						
All sizes	1,50					
Compressive strength f _b = 6 N/mm ²						
All sizes 2,50			50			

Upat injection system UPM 44 masonry	
Performances	Annex C 37
Light-weight concrete hollow block Hbl Characteristic values	Appendix 55 / 96

Kind of masonry: Solid brick Mz

Table C59: Parameters of brick

Species of brick		Solid brick Mz	
Density	$\rho \ge [kg/dm^3]$	1,8	
Compressive strength	f _b ≥ [N/mm ²]	10 or 20	
Standard or approval		EN 771-1	
Producer		e.g. Nigra	
Size, dimensions	[mm]	≥ 245x118x54	
Minimum thickness of brick	h _{min} [mm]	118	

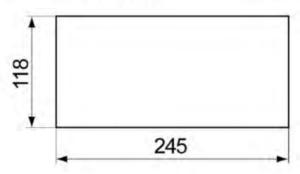


Table C60: Installation parameters for threaded rod and internal threaded anchor without perforated sleeve

Size of threaded	rod	N	16	N	18	М	10	М	12	М	16	UPM-I ¹⁾ M6/M8	UPM-I M10/M12
Effective anchorage depth	h _{ef} [mm]	50	100	50	100	50	100	50	100	50	100	85	85
Edge distance	c _{min} [mm]								60				
Cassing S.	or II = s _{min} II [mm]								245				
Spacing -s _c	$_{r}^{\perp} = s_{min}^{\perp} [mm]$								60				
Group-factor -	$\alpha_{g,N} \parallel [-]$ $\alpha_{g,V} \parallel [-]$ $\alpha_{g,N} \perp [-]$ $\alpha_{g,V} \perp [-]$							H	2,0				
Max. installation torque	T _{inst,max} [Nm]		4							10			

¹⁾ For UPM-I with screw M6: T_{inst,max}= 4 Nm

Upat injection system UPM 44 masonry	
Performances	
Solid brick Mz	
Species of brick, installation parameters	

Annex C 38

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Kind of masonry: Solid brick Mz

Table C61: Characteristic values of resistance; tension load (N_{Rk})

Use category		W	/w	d/d		
Temperature range	[°C]	50/80	72/120	50/80	72/120	
Effective anchorage depth Anchor size			aracteristic v	alues N _{Rk} [kN]	
Compressive strength fb = 10 N/r	nm²					
≥ 50	M6	0,60	0,50	1,20	0,9	
85	UPM-I M6	0,00	0,50	1,20	0,9	
≥ 50	M8	0,90	0,90	1,50	1,50	
85	UPM-I M8					
≥ 50	M10 / M12 / M16	0,75	0,60	1,20	1,20	
85	UPM-I M10 / M12				1	
Compressive strength fb = 20 N/r	nm²					
≥ 50	M6	0.00	0.75	1.50	1,20	
85	UPM-I M6	0,90	0,75	1,50	1,20	
≥ 50	M8	1,50	1,20	2,50	2,00	
85	UPM-I M8					
≥ 50	M10 / M12 / M16	1,20	0,90	2,00	1,50	
85	UPM-I M10 / M12					

Table C62: Characteristic values of resistance; shear load (VRk)

Use category			/w	d/d	
Temperature range	[°C]	50/80 72/120		50/80	72/120
Effective anchorage depth	Anchor size	ch	aracteristic v	alues VRk [(N]
Compressive strength fb = 10 N/m	m ²				
≥ 50	M6		2.0	10	
85	UPM-I M6		2,0	00	
≥ 50	M8		2.0	00	
85	UPM-I M8		3,0	00	
≥ 50	M10		47	10	
85	UPM-I M10		4,0	00	
≥ 50	M12	7.62			
85	UPM-I M12	4,50			
≥ 50	M16	5,50			
Compressive strength fb = 20 N/m	m²				
≥ 50	M6	2,50			
85	UPM-I M6		2,3	50	
≥ 50	M8		4.0	00	
85	UPM-I M8	4,00			
≥ 50	M10			-0	
85	UPM-I M10	5,50			
≥ 50 M12		a saue east			
85	UPM-I M12	6,00 (5,50) ¹			
≥ 50	M16		8,00 (5,50) ¹	

 $^{^{1)}}$ Characteristic value pushing out of one brick $V_{Rk,pb}$ = 5,50 kN Factor for job site tests and displacements see Annex C78

Upat injection system UPM 44	masonry
Performances	
Solid brick Mz	

Solid brick Mz Characteristic values Annex C 39

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Table C63: Parameters of brick

Species of brick		Perforated brick HLz
Density	$\rho \ge [kg/dm^3]$	1,0
Compressive strength	$f_b \ge [N/mm^2]$	2, 4, 6, 8, 10 or 12
Standard or approval		EN 771-1
Producer		e.g. Wienerberger
Size, dimensions	[mm]	255x120x118
Minimum thickness of brick	h _{min} [mm]	120

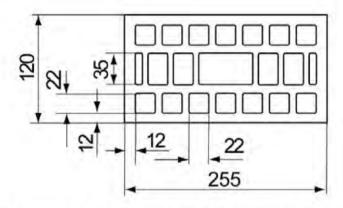


Table C64: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated sleeve		12x50		12x85		16x85		20x85	
Size of threade	ed rod	M6	M8	M6	M8	M8	M10	M12	M16
Size of internal threaded anchor UPM-I						M6	/M8	M10/M12	
Edge distance	c _{min} [mm]					60			
$s_{cr} II = s_{min} II [mm]$		255							
Spacing -	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$	120							
Group-factor $ \frac{\alpha_{g,N} \text{II}[-]}{\alpha_{g,V} \text{II}[-]} \\ \frac{\alpha_{g,N} \text{II}[-]}{\alpha_{g,V} \text{I}[-]} $		2,0							
Max. installation torque						2			

Upat injection system UPM 44 masonry	
	_

Performances

Perforated brick HLz

Species of brick, installation parameters

Annex C 40

Table C65: Characteristic values of resistance; tension load (N_{Rk})

Use category		w	/w	d/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]
Compressive strength $f_b = 2 N/n$	nm²				
12x50 M6 / M8		0,40	0,30	0,50	0,40
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8	0,50	0,40	0,50	0,50
20x85 M12 / M16	20x85 / UPM-I M10 / M12	- 12		- 14	
Compressive strength $f_b = 4 N/m$	nm²				
12x50 M6 / M8		0,90	0,75	0,90	0,75
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8	0,90	0,90	1,20	0,90
20x85 M12 / M16	20x85 / UPM-I M10 / M12	0,50	0,40	0,50	0,40
Compressive strength $f_b = 6 N/n$	nm²				
12x50 M6 / M8		1,20	0,90	1,50	1,20
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8	1,50	1,20	1,50	1,50
20x85 M12 / M16	20x85 / UPM-I M10 / M12	0,75	0,60	0,75	0,60
Compressive strength $f_b = 8 N/n$	nm²				
12x50 M6 / M8		1,50	1,50	2,00	1,50
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8	2,00	1,50	2,00	2,00
20x85 M12 / M16	20x85 / UPM-I M10 / M12	0,90	0,75	0,90	0,90
Compressive strength $f_b = 10 \text{ N/}$	mm ²				
12x50 M6 / M8		2,00	1,50	2,50	2,00
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8	2,50	2,00	2,50	2,50
20x85 M12 / M16	20x85 / UPM-I M10 / M12	1,20	0,90	1,20	1,20
Compressive strength $f_b = 12 \text{ N/}$	mm ²			VV	
12x50 M6 / M8		2,50	2,00	3,00	2,50
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8	3,00	2,50	3,50	2,50
20x85 M12 / M16	20x85 / UPM-I M10 / M12	1,50	1,20	1,50	1,20

Upat injection system UPM 44 masonry	
Performances	Annex C 41
Perforated brick HLz	1000
Characteristic values tension load	
Andre collections to have an experienced and	Appendix 59 / 96

Table C66: Characteristic values of resistance; shear load (VRk)

Use category Temperature range [°C]			w	d/d		
			72/120	50/80	72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values V _{Rk} [kN]				
Compressive strength $f_b = 2 N/m$	nm²					
12x50 M6	12x85 M6		0,0	60		
12x50 M8	12x85 M8		0,	75		
20x85 M12 / M16 20x85 / UPM-I M10 / M12	16x85 M8 / M10 16x85 / UPM-I M6 / M8	0,90				
Compressive strength $f_b = 4 N/m$	nm²					
12x50 M6	12x85 M6		1,:	20		
12x50 M8	12x85 M8		1,	50		
20x85 M12 / M16 20x85 / UPM-I M10 / M12	16x85 M8 / M10 16x85 / UPM-I M6 / M8		2,	00		
Compressive strength $f_b = 6 N/m$	nm²					
12x50 M6	12x85 M6		2,	00		
12x50 M8	12x85 M8		2,0	00		
20x85 M12 / M16 20x85 / UPM-I M10 / M12	16x85 M8 / M10 16x85 / UPM-I M6 / M8	2,50				
Compressive strength $f_b = 8 N/n$	nm²					
12x50 M6	12x85 M6		2,	50		
12x50 M8	12x85 M8		3,0	00		
20x85 M12 / M16 20x85 / UPM-I M10 / M12	16x85 M8 / M10 16x85 / UPM-I M6 / M8			50		
Compressive strength $f_b = 10 \text{ N/}$	mm ²					
12x50 M6	12x85 M6		3,0	00		
12x50 M8	12x85 M8		3,			
20x85 M12 / M16 20x85 / UPM-I M10 / M12	16x85 M8 / M10 16x85 / UPM-I M6 / M8	4,50				
Compressive strength f _b = 12 N/	mm²					
12x50 M6	12x85 M6		4,0	00		
12x50 M8	12x85 M8	4,50				
20x85 M12 / M16 20x85 / UPM-I M10 / M12	16x85 M8 / M10 16x85 / UPM-I M6 / M8	5,50				

Upat injection system UPM 44 masonry	
Performances	Annex C 42
Perforated brick HLz	100000000000000000000000000000000000000
Characteristic values shear load	
State of Control of the Control of t	Appendix 60 / 96

Table C67: Parameters of brick

Species of brick		Perforated brick LLz	
Density	$\rho \ge [kg/dm^3]$	0,7	
Compressive strength	$f_b \ge [N/mm^2]$	2, 4 or 6	
Standard or approval	3.77	EN 771-1	
Producer			
Size, dimensions	[mm]	248x78x248	
Minimum thickness of brick	h _{min} [mm]	80	

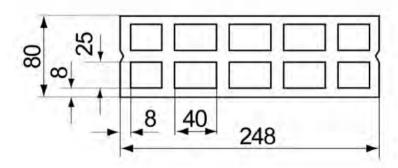


Table C68: Installation parameters for threaded rod with perforated sleeve

Size of perforated sleeve		12x	50
Size of threaded ro	od	M6	M8
Edge distance	c _{min} [mm]	100	
	s _{min} II [mm]	75	
Spacing	s _{cr} II [mm]	25	0
	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$	m] 250	
Constant	α _{g,N} II [-]	1,6	
	α _{g,V} II [-]	1,1	
Group-factor	$\frac{\alpha_{g,N}^{\perp}[-]}{\alpha_{g,V}^{\perp}[-]}$	2,	0
Max. installation torque	T _{inst,max} [Nm]	2	

Upat injection system UPM 44 masonry	
Performances	Annex C 43
Perforated brick LLz	110000000000000000000000000000000000000
Species of brick, installation parameters	
The state of the s	Appendix 61 / 96

Table C69: Characteristic values of resistance; tension load (N_{Rk})

Use category		w/w d/d		/d	
Temperature range	[°C]	50/80 72/120 50/80 72		72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values N _{Rk} [kN]		kN]	
Compressive strength $f_b = 2 N/r$	nm²				
12x50 M6 / M8		0,50 0,40 0,60		0,50	
Compressive strength $f_b = 4 N/r$	nm²				
12x50 M6 / M8		0,90	0,90	1,20	0,90
Compressive strength $f_b = 6 N/r$	nm²				
12x50 M6 / M8		1,50	1,20	1,50	1,50

Table C70: Characteristic values of resistance; shear load (VRk)

Use category	e category			w/w d/d	
Temperature range	[°C]	50/80 72/120 50/80 72/1		72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values V _{Rk} [kN]		kN]	
Compressive strength fb = 2 N/r	nm²				
12x50 M6 / M8		0,50			
Compressive strength fb = 4 N/r	nm²				
12x50 M6 / M8		0,90			
Compressive strength $f_b = 6 N/r$	nm²				
12x50 M6 / M8		1,50			

Upat injection system UPM 44 masonry	
Performances	Annex C 44
Perforated brick LLz	114,012,00
Characteristic values	
Annual contrast at the field	Appendix 62 / 96

Table C71: Parameters of brick

Species of brick		Perforated brick HLz	
Density	$\rho \ge [kg/dm^3]$	0,8	
Compressive strength	$f_b \ge [N/mm^2]$	6, 8, 12, 16 or 20	
Standard or approval	3.23.62.33.	EN 771-1	
Producer		e.g. Cermanica Farreny S.A.	
Size, dimensions	[mm]	275x130x94	
Minimum thickness of brick	h _{min} [mm]	130	

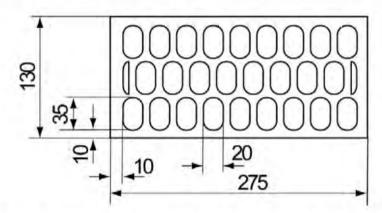


Table C72: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated sleeve		12x50 12x85 16x85		20x85				
Size of threaded rod		M6	M8	M6	M8	M8 M10	M12	M16
Size of internal threaded a	nchor UPM-I			le.		M6/M8	M10/	M12
Edge distance	c _{min} [mm]	100		1:	120			
S _{cr} II = S _{min} II [mm]		275						
Spacing —	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$	95						
	α _{g,N} II [-]							- 4
Group-factor —	$\alpha_{g,V}$ II [-]							
Group-ractor	$\alpha_{g,N} \perp$ [-]							
	$\alpha_{g,V}^{\perp}$ [-]							
Max. installation torque	T _{inst,max} [Nm]	2						

Upat injection system UPM 44 masonry	
Performances	Annex C 45
Perforated brick HLz	244. E. C.
Species of brick, installation parameters	
A STATE OF THE STA	Annendix 63 / 96

Table C73: Characteristic values of resistance; tension load (N_{Rk})

Use category		w/w		d/d	
Temperature range [°C]		50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values N _{Rk} [kN]		kN]	
Compressive strength f _b = 6 N/mi	m²				
12x50 M6 / M8		0,40	0,30	0,40	0,40
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	0,90	0,75	0,90	0,75
Compressive strength f _b = 8 N/mi	m²				
12x50 M6 / M8		0,50	0,40	0,60	0,50
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	1,20	0,90	1,20	0,90
Compressive strength f _b = 12 N/m	ım²				
12x50 M6 / M8		0,75	0,60	0,90	0,75
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	1,50	1,50	2,00	1,50
Compressive strength f _b = 16 N/m	nm²				
12x50 M6 / M8		0,90	0,90	1,20	0,90
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	2,00	2,00	2,50	2,00
Compressive strength f _b = 20 N/m	ım²				
12x50 M6 / M8		1,20	1,20	1,50	1,20
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	3,00	2,50	3,00	2,50

Upat injection system UPM 44 masonry	
Performances	Annex C 46
Perforated brick HLz	A
Characteristic values tension load	Appendix 64 / 96

Table C74: Characteristic values of resistance; shear load (V_{Rk})

Jse category		w/w		d/d	
emperature range [°C]		50/80	72/120	2/120 50/80	
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	naracteristic v	alues V _{Rk} [kN]
Compressive strength $f_b = 6 \text{ N/m}$	ım²				
12x50 M6 / M8			1,	2	
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	85 M8 / M10 UPM-I M6 / M8 5 M12 / M16			
Compressive strength $f_b = 8 \text{ N/m}$	im²				
12x50 M6 / M8			1,	5	
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	1,5			
Compressive strength f _b = 12 N/I	mm²				
12x50 M6 / M8			2,	0	
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	2,5			
Compressive strength $f_b = 16 \text{ N/I}$	mm²				
12x50 M6 / M8			3,	0	
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	M6 / M8 M16 3,0			
Compressive strength $f_b = 20 \text{ N/H}$	mm²				
12x50 M6 / M8			4,	0	
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	4,0			

Upat injection system UPM 44 masonry	
Performances	Annex C 47
Perforated brick HLz	
Characteristic values shear load	Appendix 65 / 96

Table C75: Parameters of brick

Species of brick		Perforated brick LLz	
Density	$\rho \ge [kg/dm^3]$	$\rho \ge [kg/dm^3] \qquad 0,8$	
Compressive strength	$f_b \ge [N/mm^2]$	2	
Standard or approval		EN 771-1	
Producer		e.g. Cermanica Farreny S.A.	
Size, dimensions	[mm]	128x88x275	
Minimum thickness of brick	h _{min} [mm]	88	

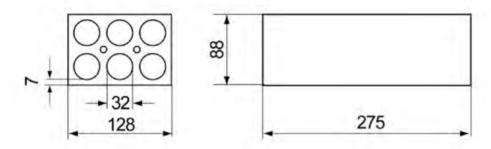


Table C76: Installation parameters for threaded rod with perforated sleeve

Size of perforated sleeve		12)	(50
Size of threaded rod		M6	M8
Edge distance	c _{min} [mm]	6	0
	s _{min} II [mm]	7	5
Spacing —	s _{cr} II [mm]	m] 275	
	s _{min} ⊥[mm]	75	
_	s _{cr} ⊥ [mm]	130	
	α _{g,N} II [-]	1,	3
Crown factor	α _{g,V} II [-]	1,	5
Group-factor –	α _{g,N} ⊥ [-]	1,	3
	α _{g,V} ¹ [-]	1.	5
Max. installation torq	ue T _{inst,max} [Nm]	2	2

	Upat injection system UPM 44 masonry
Performances	

Table C77: Characteristic values of resistance; tension load (N_{Rk})

Use category			/w	d/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations Sleeve/anchor combinations		characteristic values N _{Rk} [kN]			
Compressive strength fb = 2 N/m	im²				
12x50 M6 / M8		1,50	1,20	1,50	1,20

Table C78: Characteristic values of resistance; shear load (VRk)

Use category		w/w		d/d	
Temperature range	ure range [°C]		72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values V _{Rk} [kN]			
Compressive strength fb = 2 N/m	nm²				
12x50 M6 / M8		1,20			

Factor for job site tests and displacements see Annex C78.

Upat injection system UPM 44 masonry

Performances

Perforated brick LLz Characteristic values Annex C 49

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Table C79: Parameters of brick

Species of brick		Perforated brick HLz	
Density	$\rho \ge [kg/dm^3]$	0,7	
Compressive strength	$f_b \ge [N/mm^2]$	6, 8 or 10	
Standard or approval	2-2-2-2-2-1	EN 771-1	
Producer		e.g. Perceram	
Size, dimensions	[mm]	220x190x290	
Minimum thickness of brick	h _{min} [mm]	190	

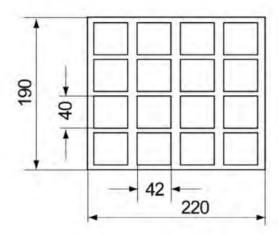


Table C80: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated sleeve	12x50	12x85	16x85	16x130	18x130/200	20x85	20x130	22x130/200
Size of threaded rod	M6 M8	M6 M8	M8 M10	M8 M10	M10 M12	M12 M16	M12 M16	M16
Size of internal threaded anchor UPM-I			M6/M8			M10/M12		
Edge distance c _{min} [mm]	-				110			
Specing S _{cr} II = S _{min} II [mm]					220			
Spacing $\frac{s_{cr} \perp = s_{min} \perp [mm]}{s_{cr} \perp = s_{min} \perp [mm]}$	290							
$\begin{array}{c} \alpha_{g,N} \parallel [-] \\ \alpha_{g,V} \parallel [-] \\ \alpha_{g,N} \perp [-] \\ \alpha_{g,V} \perp [-] \end{array}$	2,0							
$\begin{array}{ll} \text{Max. installation} & & \\ \text{torque} & & \\ \end{array} \text{$T_{\text{inst,max}} [\text{Nm}]$}$	2							

Upat injection system UPM 44 masonry	
Performances	Annex C 50
Perforated brick HLz	
Species of brick, installation parameters	Appendix 68 / 96

Table C81: Characteristic values of resistance; tension load (N_{Rk})

Use category			w/w		/d
Temperature range [°C]		50/80	72/120	50/80	72/120
Sleeve/anchor combinations Sleeve/anchor combinations			aracteristic v	alues N _{Rk} [kN]
Compressive strength fb = 6 N/mm	n ²				V
12x50 M6 / M8		0,30		0,40	0,30
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	1,20	1,20	1,50	1,20
20x130 M12 / M16 22x130/200 M16	16x130 M8 / M10 18x130/200 M10 / M12	1,50	1,20	1,50	1,50
Compressive strength f _b = 8 N/mm	12				
12x50 M6 / M8		0,50	0,40	0,50	0,40
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	1,50	1,50	2,00	1,50
20x130 M12 / M16 22x130/200 M16	16x130 M8 / M10 18x130/200 M10 / M12	2,00	1,50	2,50	2,00
Compressive strength f _b = 10 N/m	m ²				
12x50 M6 / M8		0,60	0,50	0,60	0,50
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	2,00	2,00	2,50	2,00
20x130 M12 / M16 22x130/200 M16	16x130 M8 / M10 18x130/200 M10 / M12	2,50	2,00	3,00	2,00

Upat injection system UPM 44 masonry	
Performances	Annex C 51
Perforated brick HLz	
Characteristic values tension load	Appendix 69 / 96

Table C82: Characteristic values of resistance; shear load (V_{Rk})

Jse category		w/w		d/d		
Temperature range [°C]			72/120	50/80	72/120	
Sleeve/anchor combinations	characteristic values V _{Rk} [kN]					
Compressive strength $f_b = 6 \text{ N/m}$	ım²			- 1		
12x50 M6 / M8		1,50				
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	1,50				
16x130 M8 / M10		2,50				
20x130 M12 / M16	22x130/200 M16 18x130/200 M10 / M12	2,00				
Compressive strength f _b = 8 N/m	im²					
12x50 M6 / M8		2,00				
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	2,00				
16x130 M8 / M10		3,50				
20x130 M12 / M16	22x130/200 M16 18x130/200 M10 / M12	3,00				
Compressive strength $f_b = 10 \text{ N/}$	mm²					
12x50 M6 / M8	2,50					
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	3,00				
16x130 M8 / M10		4,50				
20x130 M12 / M16	22x130/200 M16 18x130/200 M10 / M12	3,50				

Upat injection system UPM 44 masonry	
Performances	Annex C 52
Perforated brick HLz	
Characteristic values shear load	Appendix 70 / 96

Kind of masonry: Perforated brick HLz Table C83: Parameters of brick

pecies of brick		Perforated brick HLz	
Density	ρ≥ [kg/dm³]	0,8	
Compressive strength	$f_b \ge [N/mm^2]$	2, 4 or 6	
Standard or approval		EN 771-1	
Producer		e.g. Ziegelwerk Brenna	
Size, dimensions	[mm]	253x300x240	
Minimum thickness of brick	h _{min} [mm]	300	

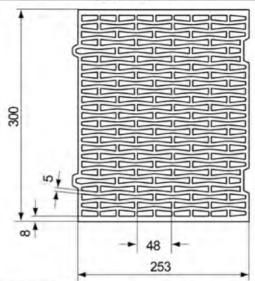


Table C84: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated sleeve	12x50	12x85	16x85	16x130	18x13	80/200	20x85	20x130	22x130/200
Size of threaded rod	M6 M8	M6 M8	M8 M10	M8 M10	M10	M12	M12 M16	M12 M16	M16
Size of internal threaded anchor UPM-I			M6/M8				M10/M12		
Edge distance c _{min} [mm]					6	0			
Specime S _{or} II = S _{min} II [mm]		255							
Spacing $\frac{s_{cr} \perp s_{min} \perp [mm]}{s_{cr} \perp s_{min} \perp [mm]}$	240								
	2,0								
$\label{eq:max} \begin{array}{ll} \text{Max.} \\ \text{installation} & T_{\text{inst,max}} \left[\text{Nm} \right] \\ \text{torque} \end{array}$					2	2			

Upat injection system UPM 44 masonry		
Performances	Annex C 53	
Perforated brick HLz	- 10.45.45.4	
Species of brick, installation parameters	Appendix 71 / 96	

Table C85: Characteristic values of resistance; tension load (N_{Rk})

Use category		w	/w	d/d		
Temperature range [°C]		50/80	72/120	50/80	72/120	
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]	
Compressive strength f _b = 2 N/mn	n ²				7.	
12x50 M6 / M8		-		0,30	-	
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	0,50	0,40	0,50	0,40	
20x130 M12 / M16 22x130/200 / M16	16x130 M8 / M10 18x130/200 M10 / M12	0,40	0,30	0,50	0,40	
Compressive strength f _b = 4 N/mn	12					
12x50 M6 / M8		0,50	0,40	0,60	0,50	
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	0,90	0,75	0,90	0,90	
20x130 M12 / M16 22x130/200 / M16	16x130 M8 / M10 18x130/200 M10 / M12	0,90	0,75	0,90	0,75	
Compressive strength f _b = 6 N/mn	12					
12x50 M6 / M8		0,75	0,60	0,90	0,75	
12x85 M6 / M8	16x85 M8 / M10 16x85 / UPM-I M6 / M8 20x85 M12 / M16 20x85 / UPM-I M10 / M12	1,50	1,20	1,50	1,20	
20x130 M12 / M16 22x130/200 / M16	16x130 M8 / M10 18x130/200 M10 / M12	1,20	0,90	1,50	1,20	

Upat injection system UPM 44 masonry	
Performances	Annex C 54
Perforated brick HLz	7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Characteristic values tension load	Appendix 72 / 96

Table C86: Characteristic values of resistance; shear load (V_{Rk})

Use category		w/w		d/d	
Temperature range [°C]		50/80 72/120		50/80 72/12	
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues V _{Rk} [kN]
Compressive strength f _b = 2 N/mn	12				- 2
12x50 M6 / M8			0,	50	
12x85 M6 / M8 16x130 M8 / M10	16x85 M8 / M10 16x85 / UPM-I M6 / M8 18x130/200 M10 / M 12 20x85 / UPM-I M10	0,50			
20x130 M12 / M16 22x130/200 M16	20x85 M12 / M16 20 x 85, UPM-I M12	0,60			
Compressive strength f _b = 4 N/mn	n ²				
12x50 M6 / M8		0,90			
12x85 M6 / M8 16x130 M8 / M10	16x85 M8 / M10 16x85 / UPM-I M6 / M8 18x130/200 M10 / M 12 20x85 / UPM-I M10	0,90			
20x130 M12 / M16 22x130/200 M16	20x85 M12 / M16 20 x 85, UPM-I M12		1,:	20	
Compressive strength fb = 6 N/mm	12				
12x50 M6 / M8			1,	50	
12x85 M6 / M8 16x130 M8 / M10	16x85 M8 / M10 16x85 / UPM-I M6 / M8 18x130/200 M10 / M 12 20x85 / UPM-I M10	1,50			
20x130 M12 / M16 22x130/200 M16	20x85 M12 / M16 20x85, UPM-I M12	1,50			

Upat injection system UPM 44 masonry	
Performances	Annex C 55
Perforated brick HLz	Ann an dia 70 / 00
Characteristic values shear load	Appendix 73 / 96

Kind of masonry: Solid light-weight concrete block Vbl

Table C87: Parameters of brick

Species of brick		Solid light-weight concrete block Vbl
Density	ρ≥ [kg/dm³]	2,0
Compressive strength	$f_b \ge [N/mm^2]$	4, 6, 8 or 10
Standard or approval	2,22,31,51	
Producer		e.g. Roadstone wood
Size, dimensions	[mm]	≥ 440x100x215
Minimum thickness of brick	h _{min} [mm]	100

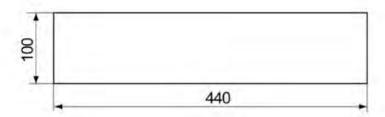


Table C88: Installation parameters for threaded rod (without perforated sleeve)

Size of threaded rod		M6		M8		M10		M12		M16	
Effective anchorage depth	h _{ef} [mm]	50	70	50	70	50	70	50	70	50	70
Edge distance	c _{min} [mm]					10	00				
	s _{min} II [mm]	75									
Spacing	s _{cr} II [mm]	440									
	s _{min} 1 [mm]	75									
	s _{cr} L [mm]	215									
	α _{g,N} II [-]	1,6									
Oracia fastas	α _{g,V} II [-]	1,3									
Group-factor	α _{g,N} ¹ [-]										
	α _{g.∨} ⊥[-]										
Max. installation torqu	ie T _{inst,max} [Nm]		4				1	0			

Upat injection system UPM 44 masonry

Performances

Solid light-weight concrete block Vbl Species of brick, installation parameters Annex C 56

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Kind of masonry: Solid light-weight concrete block VbI

Table C89: Characteristic values of resistance; tension load (N_{Rk})

Use category		W	/w	d/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Effective anchorage depth	Anchor size	ch	aracteristic v	alues N _{Rk} [kN]
Compressive strength fb = 4 N/n	nm²				
> 50	M6	1,20	0,90	2,00	1,50
≥ 50	M8 / M10 / M12 / M16	1,20	1,20	2,00	2,00
Compressive strength fb = 6 N/n	nm²				
≥ 50	M6	1,50	1,50	3,00	2,50
	M8 / M10 / M12 / M16	2,00	1,50	3,50	2,50
Compressive strength fb = 8 N/n	nm²				
> 50	M6	2,00	2,00	4,00	3,00
≥ 50	M8 / M10 / M12 / M16	2,50	2,00	4,50	3,50
Compressive strength fb = 10 N/	mm ²				
≥ 50	M6	3,00	2,50	5,00	4,00
	M8 / M10 / M12 / M16	3,50	2,50	5,50	4,50

Table C90: Characteristic values of resistance; shear load (V_{Rk})

Use category			r/w	d/d		
Temperature range [°C]			72/120	50/80	72/120	
Effective anchorage depth	Anchor size	ch	aracteristic v	alues V _{Rk}	kN]	
Compressive strength fb = 4 N/mm	12			3 3 5 0 0 0		
	M6		1,2	20		
> 50	M8		1,5	50		
≥ 50	M10 / M12		1,5	50		
	M16		1,5	50		
Compressive strength fb = 6 N/mm	12					
	M6	2,00				
. 50	M8	2,00				
≥ 50	M10 / M12		2,5	50		
	M16	2,50				
Compressive strength fp = 8 N/mm	12					
	M6		2,5	50		
> 50	M8	2,50				
≥ 50	M10 / M12		3,0	00		
	M16	3,50				
Compressive strength fb = 10 N/m	m²					
	M6	3,00				
> 50	M8	3,50				
≥ 50	M10 / M12	4,00				
	M16	4,50				

Upat injection system UPM 44 masonry	
Performances	Annex C 57
Solid light-weight concrete block Vbl	
Characteristic values	Appendix 75 / 96

Kind of masonry: Solid light-weight concrete block Vbl

Table C91: Parameters of brick

Species of brick		Solid light-weight concrete block Vbl
Density	$\rho \ge [kg/dm^3]$	2,0
Compressive strength	$f_b \ge [N/mm^2]$	6, 8 ,10 or 12
Standard or approval	2 2 2 3	
Producer		e.g. Tramac
Size, dimensions	[mm]	≥ 440x95x215
Minimum thickness of brick	h _{min} [mm]	95

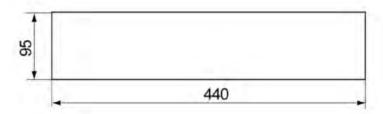


Table C92: Installation parameters for threaded rod without perforated sleeve

Size of threaded rod		N	16	N	18	M	10	M	12	M	16
Effective anchorage depth	h _{ef} [mm]	50	70	50	70	50	70	50	70	50	70
Edge distance	c _{min} [mm]					6	0		_		
Cassina	s _{min} II [mm]	75									
	s _{cr} II [mm]	440									
Spacing	s _{min} ¹ [mm]	75									
	s _{cr} L [mm]	215									
	$\alpha_{g,N}$ II [-]	1,9									
Group-factor	α _{g.V} II [-]	1,4									
Group-ractor	α _{g,N} [⊥] [-]					1	,9				
	α _{g,V} [⊥] [-]	1,4									
Max. installation torque	T _{inst,max} [Nm]	- 4	4	(==			- 1	10			

Upat injection system UPM 44 masonry

Kind of masonry: Solid light-weight concrete block VbI

Table C93: Characteristic values of resistance; tension load (N_{Rk})

Use category		W	/w	d/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Effective anchorage depth	Anchor size	cl	naracteristic v	alues N _{Rk} [k	N]
Compressive strength fb = 6 N/m	nm²				
50	M6 / M8 / M10 / M12 / M16	1,50	1,20	2,50	2,00
70	M6 / M8	2,00	1,50	3,50	3,00
70	M10 / M12 / M16	2,00	2,00	3,50	3,00
Compressive strength fb = 8 N/m	nm²				
50	M6 / M8 / M10 / M12 / M16	2,00	1,50	3,50	3,00
70	M6 / M8	2,50	2,00	4,50	4,00
70	M10 / M12 / M16	3,00	2,50	5,00	4,00
Compressive strength f _b = 10 N/	mm²				
50	M6 / M8 / M10 / M12 / M16	2,50	2,00	4,50	3,50
70	M6 / M8	3,50	3,00	6,00	5,00
70	M10 / M12 / M16	3,50	3,00	6,00	5,00
Compressive strength fb = 12 N/	mm²				
50	M6 / M8 / M10 / M12 / M16	3,00	2,50	5,00	4,50
70	M6 / M8	4,00	3,50	7,00	6,00
70	M10 / M12 / M16	4,50	3,50	7,50	6,00

Table C94: Characteristic values of resistance; shear load (V_{Rk})

Use category	W	/w	d	/d			
Temperature range	[°C]	50/80	72/120	50/80	72/120		
Effective anchorage depth	Anchor size	C	haracteristic v	alues V _{Rk} [k	[N]		
Compressive strength $f_b = 6 \text{ N/mm}^2$							
	M6 / M8		2,0	00			
≥ 50	M10		2,0	00			
	M12 / M16		1,5	50			
Compressive strength $f_b = 8 \text{ N/mm}^2$							
M6 / M8		2,50					
≥ 50	M10	3,00					
	M12 / M16	2,50					
Compressive strength f _b = 10 N/mm	2						
	M6 / M8	3,50					
≥ 50	M10	4,00					
	M12 / M16	3,00					
Compressive strength f _b = 12 N/mm	2						
	M6 / M8	4,00					
≥ 50	M10	4,50					
	M12 / M16		50				

Upat injection system UPM 44 masonry	
Performances	Annex C 59
Solid light-weight concrete block Vbl Characteristic values	Appendix 77 / 96

Kind of masonry: Light-weight concrete hollow block Hbl

Table C95: Parameters of brick

	Light-weight concrete hollow block Hbl
$\rho \ge [kg/dm^3]$	1,2
$f_b \ge [N/mm^2]$	4, 6, 8 or 10
2 2 - 0	EN771-3
	e.g. Roadstone wood
[mm]	≥ 440x215x215
h _{min} [mm]	215
	$f_b \ge [N/mm^2]$ [mm]

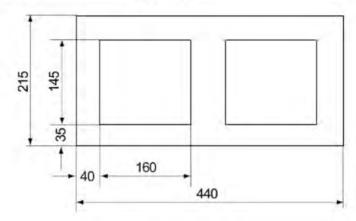


Table C96: Installation parameters for threaded rod and internal threaded anchor UPM-I with perforated sleeve

Size of perforat	ed sleeve	12x50 12x85 16x85 16x130 18x130/200 20x85 20x130 22x						22x130/200			
Size of threade	d rod	M6M8	M6M8M6M8M8M10M8M10 M10 M12 M1					M12	M16	M12M16	M16
Size of internal anchor UPM-I	threaded	M6/M8 M10/M12									
Edge distance	c _{min} [mm]		110								
	s _{min} II [mm]		100								
Cassina	s _{cr} II [mm]	n] 440									
Spacing	100										
	s _{cr} L[mm]	215									
	α _{g,N} II [-]	1,4									
Croup factor	α _{g.V} II [-]	2,0									
Group-factor	α _{g,N} ⊥[-]										
	α _{g,V} [⊥] [-]										
Max. installation torque	T _{inst,max} [Nm]	2									

Upat injection system UPM 44 masonry	
Performances	Annex C 60
Light-weight concrete hollow block Hbl Species of brick, installation parameters	Appendix 78 / 96

Kind of masonry: Light-weight concrete hollow block Hbl

Table C97: Characteristic values of resistance; tension load (N_{Rk})

Use category	w	/w	d	l/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	aracteristic v	alues N _{Rk} [kN]
Compressive strength f _b = 4 N/mm	2				100
12x50 M6 / M8	12x85 M6 / M8	0,90	0,90	1,20	0,90
16x85 M8 / M10 16x85 / UPM-I M6 / M8	16x130 M8 / M10 18x130/200 M10 / M12	1,20	0,90	1,50	1,20
20x85 M12 / M16 20x130 M12 / M16	22x130/200 M16 20x85 UPM-I M10 /M 12	2,00	1,50	2,00	1,50
Compressive strength f _b = 6 N/mm	2	-2			
12x50 M6 / M8	12x85 M6 / M8	1,50	1,20	1,50	1,50
16x85 M8 / M10 16x85 / UPM-I M6 / M8	16x130 M8 / M10 18x130/200 M10 / M12	2,00	1,50	2,00	1,50
20x85 M12 / M16 20x130 M12 / M16	22x130/200 M16 20x85 UPM-I M10 /M 12	3,00	2,50	3,00	2,50
Compressive strength f _b = 8 N/mm					
12x50 M6 / M8	12x85 M6 / M8	2,00	1,50	2,00	2,00
16x85 M8 / M10 16x85 / UPM-I M6 / M8	16x130 M8 / M10 18x130/200 M10 / M12	2,50	2,00	3,00	2,50
20x85 M12 / M16 20x130 M12 / M16	22x130/200 M16 20x85 UPM-I M10 /M 12	3,50	3,00	4,00	3,50
Compressive strength f _b = 10 N/mi	m ²				
12x50 M6 / M8	12x85 M6 / M8	2,50	2,00	3,00	2,50
16x85 M8 / M10 16x85 / UPM-I M6 / M8	16x130 M8 / M10 18x130/200 M10 / M12	3,00	2,50	3,50	3,00
20x85 M12 / M16 20x130 M12 / M16	22x130/200 M16 20x85 UPM-I M10 /M 12	4,50	4,00	5,00	4,50

Upat injection system UPM 44 masonry	
Performances	Annex C 61
Light-weight concrete hollow block Hbl Characteristic values tension load	Appendix 79 / 96

Kind of masonry: Light-weight concrete hollow block Hbl

Table C98: Characteristic values of resistance; shear load (V_{Rk})

Use category			/w		d/d		
Temperature range	[°C]	50/80 72/120 50/80 72/ characteristic values V _{Rk} [kN]					
Sleeve/anchor combinations	Sleeve/anchor combinations	ch	naracteristic v	alues V _{Rk}	kN]		
Compressive strength $f_b = 4 \text{ N/m}$	nm²						
12x50 M6 12x85 M6	16x85 / UPM-I M6		0,7	75			
12x50 M8 12x85 M8 16x85 M8 / M10 16x85 / UPM-I M8 16x130 M8 / M10	20x85 M12 / M16 20x85 UPM-I M10 / M12 20x130 M12 / M16 18x130/200 M12 22x130/200 M16	1,20					
Compressive strength $f_b = 6 \text{ N/m}$	nm²						
12x50 M6 12x85 M6	16x85 / UPM-I M6		1,2	20			
12x50 M8 12x85 M8 16x85 M8 / M10 16x85 / UPM-I M8 16x130 M8 / M10	20x85 M12 / M16 20x85 UPM-I M10 / M12 20x130 M12 / M16 18x130/200 M12 22x130/200 M16	2,00					
Compressive strength $f_b = 8 N/m$	im²						
12x50 M6 12x85 M6	12x50 M6						
12x50 M8 12x85 M8 16x85 M8 / M10 16x85 / UPM-I M8 16x130 M8 / M10	12x50 M8 20x85 M12 / M16 12x85 M8 20x85 UPM-I M10 / M12 16x85 M8 / M10 20x130 M12 / M16 16x85 / UPM-I M8 18x130/200 M12						
Compressive strength $f_b = 10 \text{ N/}$	mm²						
12x50 M6 12x85 M6	16x85 / UPM-I M6	2,00					
12x50 M8 12x85 M8 16x85 M8 / M10 16x85 / UPM-I M8 16x130 M8 / M10	20x85 M12 / M16 20x85 UPM-I M10 / M12 20x130 M12 / M16 18x130/200 M12 22x130/200 M16	3,00					

Upat injection system UPM 44 masonry	
Performances	Annex C 62
Light-weight concrete hollow block Hbl Characteristic values shear load	Appendix 80 / 96

Kind of masonry: Solid brick Mz

Table C99: Parameters of brick

	Solid brick Mz	
$\rho \ge [kg/dm^3]$	1,8	
$f_b \ge [N/mm^2]$	10 or 20	
3 7 2 2	EN 771-2	
	e.g. Wienerberger	
[mm]	≥ 228x108x54	
h _{min} [mm]	108	
	$f_b \ge [N/mm^2]$	$ρ ≥ [kg/dm^3]$ 1,8 $f_b ≥ [N/mm^2]$ 10 or 20 EN 771-2 e.g. Wienerberger [mm] ≥ 228x108x54

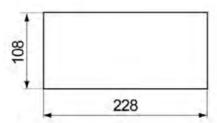


Table C100: Installation parameters for threaded rod and internal threaded anchor without perforated sleeve

Size of threade	d rod	N	16	N	18	М	10	М	12	М	16	UPM-I ¹⁾ M6/M8	UPM-I M10/M12
Effective anchorage dep	th h _{ef} [mm]	50	90	50	90	50	90	50	90	50	90	85	85
Edge distance	c _{min} [mm]	60											
Spacing —	s _{cr} II = s _{min} II [mm]							- 8	230				
Spacing —	60												
Group-factor	$\begin{array}{c} \alpha_{g,N} II[\text{-}] \\ \alpha_{g,V} II[\text{-}] \\ \alpha_{g,N} \bot[\text{-}] \\ \alpha_{g,V} \bot[\text{-}] \end{array}$								2,0				
Max. installatio torque	n T _{inst,max} [Nm]	2	1							10			

¹⁾ For UPM-I with screw M6: T_{inst,max} = 4 Nm

Upat injection system UPM 44 masonry	
Performances	Annex C 63
Solid brick Mz	
Characteristic values	Appendix 81 / 96

Kind of masonry: Solid brick Mz

Table C101: Characteristic values of resistance; tension load (N_{Rk})

Use category	W	/w	d/d		
Temperature range	50/80	72/120	50/80	72/120	
Effective anchorage depth	Anchor size	ch	aracteristic v	alues N _{Rk} [kN]
Compressive strength fb = 10 N/r	nm²				
≥ 50	M6	0,60	0,50	1,20	0,90
≥ 50	M8	0,90	0,90	1,50	1,50
≥ 50	M10 / M12 / M16				
85	UPM-I M6 / M8	0,75	0,60	1,20	1,20
	UPM-I M10 / M12				
Compressive strength fb = 20 N/r	nm²				
≥ 50	M6	0,90	0,75	1,50	1,20
≥ 50	M8	1,50	1,20	2,50	2,00
≥ 50	M10 / M12 / M16			2,00	
85	UPM-I M6 / M8	1,20	0,90		1,50
	UPM-I M10 / M12				

Table C102: Characteristic values of resistance; shear load (V_{Rk})

Use category			/w	d/d		
Temperature range [°C]			72/120	50/80	72/120	
Effective anchorage depth	Anchor size	ch	aracteristic v	alues V _{Rk} [l	kN]	
Compressive strength f _b = 10 N/m	m² ,				N. V	
≥ 50	M6		2,0	20		
85	UPM-I M6		2,0	JU		
≥ 50	M8		3,0	20		
85	UPM-I M8		3,0	30		
≥ 50 M10			4,0	20		
85	UPM-I M10		4,0	JU		
≥ 50	M12	7.60				
85	UPM-I M12	4,50				
≥ 50	M16	5,50				
Compressive strength f _b = 20 N/m	m ²					
≥ 50	M6		2,	-0		
85	UPM-I M6		2,	50		
≥ 50	M8		4,0	20		
85	UPM-I M8		4,0	00		
≥ 50	M10			E0.		
85	UPM-I M10	5,50				
≥ 50	M12		6.00	(E E)1		
85	UPM-I M12		6,00	(5,5)		
≥ 50	M16		8,00	$(5,5)^1$		

¹⁾ Characteristic value pushing out of one brick V_{Rk,pb}= 5,50 kN

Upat injection system UPM 44 masonry	
Performances	Annex C 64
Solid brick Mz	
Characteristic values	Appendix 82 / 96

Kind of masonry: Solid sand-lime block KS

Table C103: Parameters of brick

Species of brick		Solid sand-lin	ne block KS
Density	$\rho \ge [kg/dm^3]$	1,8	2,2
Compressive strength	$f_b \ge [N/mm^2]$	10, 20	36
Standard or approval		EN 7	71-2
Producer		e.g. Ca	lduran
Size, dimensions	[mm]	≥ 997x2	14x538
Minimum thickness of brick	h _{min} [mm]	21	4

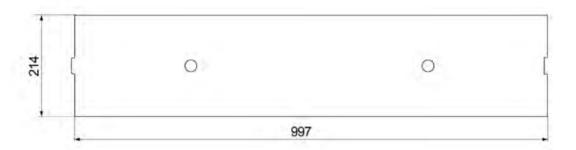


Table C104: Installation parameters for threaded rod and internal threaded anchor without perforated sleeve

Size of thre	e of threaded rod		M6 M8		M10		M12		M16		UPM-I ¹⁾ M6/M8	UPM-I M10/M12		
Effective anchorage	depth	h _{ef} [mm]	50	100	50	100	50	100	50	100	50	100	85	85
Edge distar	nce	c _{min} [mm]								75				
Canaina	s _{min} II =	s _{min} II [mm]	300											
Spacing -	s _{min} =	s _{min} ¹ [mm]	300											
Group- factor		$\alpha_{g,N} \parallel [-]$ $\alpha_{g,V} \parallel [-]$ $\alpha_{g,N} \perp [-]$ $\alpha_{g,V} \perp [-]$	2,0											
Max. install torque	lation T	inst,max [Nm]		4						1	10			

¹⁾ FOR UPM-I with screw M6: T_{inst,max}= 4 Nm

Upat injection system UPM 44 masonry	
Performances	Annex C 65
Solid sand-lime block KS	A and in 00 / 00
Species of brick, installation parameters	Appendix 83 / 96

Kind of masonry: Solid sand-lime block KS

Table C105: Characteristic values of resistance; tension load (N_{Rk})

Use category			/w	d/d		
Temperature range [°C]			72/120	50/80	72/120	
Effective anchorage depth	Anchor size	ch	aracteristic v	alues N _{Rk} [kN]	
Compressive strength $f_b = 10$	N/mm ²					
50, 100	M6	4,00	3,00	7,00	5,50	
50	M8	4,00	3,50	7,00	6,00	
100	M8	7,00	6,00	12,00	10,00	
50	M10	5,00	4,00	8,00	7,00	
100	M10	6,00	5,00	9,50	8,00	
50	M12	5,00	4,00	8,00	6,50	
100	M12	6,00	5,00	10,00	8,00	
≥50	M16	5,50	4,50	9,00	7,50	
85	UPM-I M6/M8,UPM-I M10/M12	0,00	1,00	3,00	7,50	
100	M16	7,50	6,00	11,50	9,50	
Compressive strength fb = 20	N/mm ²					
50, 100	M6	5,50	4,50	8,50	8,00	
50	M8	6,00	5,00	10,50	8,50	
100	M8	10,00	8,50	12,00	12,00	
50	M10	7,00	6,00	11,50	10,00	
100	M10	8,5	7,00	12,00	10,00	
50	M12	7,00	6,00	11,00	9,50	
100	M12	9,00	7,50	12,00	12,00	
≥50	M16	0.00	7.00			
85	UPM-I M6/M8,UPM-I M10/M12	8,00	7,00	12,00	10,50	
100	M16	11,00	9,00	12,00	12,00	
Compressive strength fb = 36	N/mm ²		,			
50, 100	M6	4,50	3,50	8,00	6,50	
50	M8	8,00	6,50	12,00	11,00	
100	M8	12,00	12,00	12,00	12,00	
50	M10	11,50	9,50	12,00	12,00	
100	M10	12,00	12,00	12,00	12,00	
50	M12	12,00	11,50	12,00	12,00	
100	M12	12,00	12,00	12,00	12,00	
≥50	M16		- 0.0	F	-	
85	UPM-I M6/M8,UPM-I M10/M12	12,00	12,00	12,00	12,00	
100	M16	12,00	12,00	12,00	12,00	

Upat injection system UPM 44 masonry	
Performances	Annex C 66
Solid sand-lime block KS Characteristic values tension load	Appendix 84 / 96

Kind of masonry: Solid sand-lime block KS

Table C106: Characteristic values of resistance; shear load (V_{Rk})

Use category			/w	d/d			
Temperature range	50/80 72/120 50/80 7			72/120			
Effective anchorage depth	characteristic values V _{Rk} [kN]						
Compressive strength fb = 10 N/mi	n²						
≥50	M6		3,0	20			
85	UPM-I M6		3,0	30			
≥50	M8		5,0	20			
85	UPM-I M8		5,0	30			
≥50	M10		5,5	50			
85	UPM-I M10		5,0	30			
≥50	M12 / M16	40.6	4,0	20			
85	UPM-I M12		4,0	50			
Compressive strength fb = 20 N/mi	n²						
≥50				4,50			
85	UPM-I M6	4,50					
≥50	M8	7,00					
85	UPM-I M8						
≥50	M10		7 1	50			
85	UPM-I M10	7,50					
≥50	M12 / M16		61	20			
85	UPM-I M12	6,00					
Compressive strength fb = 36 N/mi	n²						
≥50	M6		4.0	=0			
85	UPM-I M6		4,5	50			
≥50	M8		0.4	20			
85	UPM-I M8	9,00					
≥50	M10		4.4	00			
85	UPM-I M10	11,00					
≥50	M12 / M16		10	00			
85	UPM-I M12	12,00					

	Upat injection system UPM 44 masonry
Performances	
Solid sand-lime blo	ock KS
Characteristic value	s shear load

Table C107: Parameters of brick

Species of brick		Perforated brick HLz	
Density	$\rho \ge [kg/dm^3]$	≥ 1,4	
Compressive strength	$f_b \ge [N/mm^2]$	2, 4, 6 or 8	
Standard or approval	3237 9	EN 771-1	
Producer		e.g. Wienerberger	
Size, dimensions	[mm]	230x108x55	
Minimum thickness of brick	h _{min} [mm]	108	

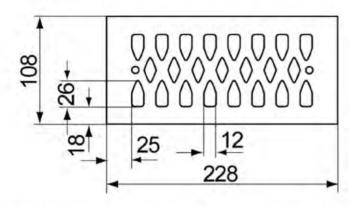


Table C108: Installation parameters for threaded rod with perforated sleeve and internal threaded anchor UPM-I with perforated sleeve

Size of perforated sleeve		12x50		12x85		16x85		20x85	
Size of threaded rod		M6	M8	M6	M8	M8	M10	M12 M16	
Size of internal threaded	anchor UPM-I					M6	/M8	M10/M12	
Edge distance	c _{min} [mm]					60			
11	s _{min} II [mm]	80							
Spacing	s _{cr} II [mm]	230							
	s _{min} ¹ [mm]	60							
	$\alpha_{g,N} \parallel [-]$ $\alpha_{g,V} \parallel [-]$	<u>-]</u> -]							
Group-factor	$\alpha_{g,N} \perp [-]$								
Max. installation torque	$\alpha_{g,V}^{\perp}[-]$ $T_{inst,max}[Nm]$					2			

Upat injection system UPM 44 masonry

Performances

Perforated brick HLz

Species of brick, installation parameters

Annex C 68

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Table C109: Characteristic values of resistance; tension load (N_{Rk})¹⁾

Use category		W	/w	d	/d
Temperature range [°C]		50/80	72/120	50/80	72/120
Sleeve/anchor combinations Sleeve/anchor combinations		ch	aracteristic v	alues N _{Rk} [kN]
Compressive strength f _b = 2 N/m	im²				
12x50 M6 / M8		0,30		0,30	0,30
12x85 M6 / M8		0,90	0,75	0,90	0,75
16x85 M8 / M10	16x85 / UPM-I M6 / M8	0,75	0,60	0,90	0,75
20x85 M12 / M16	20x85 / UPM-I M10 / M12	0,50	0,40	0,60	0,50
Compressive strength $f_b = 4 \text{ N/m}$	im²				
12x50 M6 / M8		0,60	0,50	0,75	0,60
12x85 M6 / M8		1,50	1,50	2,00	1,50
16x85 M8 / M10	16x85 / UPM-I M6 / M8	1,50	1,20	1,50	1,50
20x85 M12 / M16	20x85 / UPM-I M10 / M12	0,90	0,90	1,20	0,90
Compressive strength f _b = 6 N/m	im²				
12x50 M6 / M8		0,90	0,75	0,90	0,90
12x85 M6 / M8		2,50	2,00	3,00	2,50
16x85 M8 / M10	16x85 / UPM-I M6 / M8	2,50	2,00	2,50	2,00
20x85 M12 / M16	20x85 / UPM-I M10 / M12	1,50	1,20	1,50	1,50
Compressive strength f _b = 8 N/m	ım²	- 1227			
12x50 M6 / M8		1,20	0,90	1,50	1,20
12x85 M6 / M8		3,50	3,00	4,00	3,00
16x85 M8 / M10	16x85 / UPM-I M6 / M8	3,00	2,50	3,50	3,00
20x85 M12 / M16	20x85 / UPM-I M10 / M12	2,00	1,50	2,50	2,00

Upat injection system UPM 44 masonry	
Performances	
Perforated brick HLz	
Characteristic values tension load	

¹⁾ If the fixing is in a solid area, for w/w, the characteristic values shall be reduced with the factor 0,64.

Table C110: Characteristic values of resistance; shear load (V_{Rk})

Use category	category		w/w		I/d
Temperature range [°C		50/80	72/120	50/80	72/120
Sleeve/anchor combinations	Sleeve/anchor combinations	characteristic values V _{Rk} [kN]		kN]	
Compressive strength fb = 2 N/m	m²				
12x50 M6 / M8	16x85 M8 / M10		0.	6	
12x85 M6 / M8	16x85 UPM-I M6 / M8		U,	0	
20x85 M12 / M16	20x85 / UPM-I M10 / M12		0,	4	
Compressive strength fb = 4 N/m	m²				
12x50 M6 / M8	16x85 M8 / M10	1,2			
12x85 M6 / M8	16x85 UPM-I M6 / M8				
20x85 M12 / M16	20x85 / UPM-I M10 / M12	0,9			
Compressive strength fb = 6 N/m	m ²				
12x50 M6 / M8	16x85 M8 / M10	1,5			
12x85 M6 / M8	16x85 UPM-I M6 / M8		1.	5	
20x85 M12 / M16	20x85 / UPM-I M10 / M12	1,2			
Compressive strength fb = 8 N/m	m²				
12x50 M6 / M8	16x85 M8 / M10	2,5			
12x85 M6 / M8	16x85 UPM-I M6 / M8				
20x85 M12 / M16	20x85 / UPM-I M10 / M12		1,	5	

Upat injection system UPM 44 masonry	
Performances	Annex C 70
Perforated brick HLz	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
Characteristic values shear load	Appendix 88 / 96

Kind of masonry: Autoclaved aerated concrete

Cylindrical drill hole

Table C111: Parameters of brick

Species of brick	Autoclaved aerated concrete			
Density	$\rho \ge [kg/dm^3]$	350	500	650
Compressive strength	$f_b \ge [N/mm^2]$	2	4	6
Standard			EN 771-4	
Producer			e.g. Ytong	

Table C112: Installation parameters for threaded rod and internal threaded anchor without perforated sleeve

Size of three	eaded rod	M6	M8	M10	M12	M16	UPM-I M6 / M8	UPM-I M10/ M12
Effective anchorage	depth h _{ef} [mm]			100				85
Edge distar	nce c _{min} [mm]				100			
Cassina	$s_{cr} II = s_{min} II [mm]$				250			
Spacing	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$				250			
Group- factor	$\begin{array}{c} \alpha_{g,N} \parallel [-] \\ \alpha_{g,V} \parallel [-] \\ \\ \alpha_{g,N} \perp [-] \\ \\ \alpha_{g,V} \perp [-] \end{array}$				2,0			
Max. instal torque	lation T _{inst,max} [Nm]				2		1	2

Upat injection system UPM 44	masonry
Performances	
Autoclaved aerated concrete	
Cylindrical drill hole	
Installation parameters	

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Kind of masonry: Autoclaved aerated concrete (cylindrical drill hole) Table C113: Characteristic values of resistance; tension load (N_{Rk})

	Use category	W	/w	0	I/d
Temperature range	[°C]	50/80	72/120	50/80	72/120
Effective anchorage depth	Anchor size	ch	aracteristic v	alues N _{Rk} [kN]
Compressive strength $f_b = 2 N/m$	m²				
	M6	1,	20	1,	50
	M8	1,	50	1,50	
100	M10	1,	50	1.	50
	M12	1,	50	2	,00
	M16	2,00		2,00	
85	UPM-I M6 / M 8	1,	50	1,	50
	UPM-I M10 / M 12	1,	50	1.	50
Compressive strength f _b = 4 N/m	m ²				
	M6	1,	20	- 1,	50
	M8	2,	00	2	,00
100	M10	2,	50	3.	,00
	M12	2,	50	2	50
	M16	2,	00	2,00	
85	UPM-I M6 / M 8	2,	00	2,00	
05	UPM-I M10 / M 12	1,	50	1,	50
Compressive strength $f_b = 6 \text{ N/m}$	m ²				
	M6	1,	50	1.	50
	M8	3,	00	3	50
100	M10		50		,00
1	M12		50		00
	M16		00		.00
0.5	UPM-I M6 / M 8		50		50
85	UPM-I M10 / M 12		50		50

Calculation of pulling out of one brick (tension load): N_{Rk,pb} see ETAG 029, Annex C

Upat injection system UPM 44 masonry	
Performances	
Autoclaved aerated concrete	Annex C 72
Cylindrical drill hole	Appendix 90 / 96
Characteristic values tension load	

Kind of masonry: Autoclaved aerated concrete (cylindrical drill hole)

Table C114: Characteristic values of resistance; shear load (V_{Rk})

	Use category		/w	d/d	
Temperature range	[°C]				72/120
Effective anchorage depth	Anchor size	characteristic values V _{Rk} [kN]			kN]
Compressive strength fb = 2 N/r	nm²				
85	UPM-I M6 UPM-I M8 UPM-I M10		1,3		
	UPM-I M12		1,5		
100	M12		1,3	50	
100	M6, M8, M10, M16		1,2	20	
Compressive strength f _b = 4 N/r	nm²				
85	UPM-I M6 UPM-I M8 UPM-I M10	2,00			
85	UPM-I M12		2,	50	
100	M8, M12		2,	50	
100	M6, M10, M16		2,0	00	
Compressive strength fb = 6 N/r	nm²				
85	UPM-I M6 UPM-I M8 UPM-I M10	2,50			
85	UPM-I M12		3,	50	
100	M6	2,5			
100	M8, M10	3,0			
100	M12	3,50			
100	M16		4,5		

Calculation of pushing out of one brick (shear load): VRk,pb see ETAG 029, Annex C

	Upat injection system UPM 44 masonry
Performances	
Autoclaved aerated	concrete
Cylindrical drill hole	
Characteristic values	s shear load

Kind of masonry: Autoclaved aerated concrete

Conical drill hole (with special drill bit PBB)

Table C115: Parameters of brick

Species of brick		Auto	claved aerated con	crete
Density	$\rho \ge [kg/dm^3]$	350	500	650
Compressive strength	$f_b \ge [N/mm^2]$	2	4	6
Standard or approval			EN 771-4	
Producer			e.g. Ytong	

Table C116: Installation parameters for threaded rod and internal threaded anchor without perforated sleeve

Size of threaded rod		M8	M10	M12	M8	M10	M12	UPM-I M6/M8	
Effective anchorage depth h _{ef} [mm]		75			95 85				
Edge distance		120				150			
Cooring	s _{cr} II = s _{min} II [mm]	240			300				
Spacing -	$s_{cr}^{\perp} = s_{min}^{\perp} [mm]$		240		250				
- Group-factor - -	α _{g,N} II [-]								
	$\alpha_{g,V} \parallel [-]$ $\alpha_{g,N} \perp [-]$ $\alpha_{g,V} \perp [-]$				2,0	0			
Max. installation	on T _{inst,max} [Nm]				2	ģ.			

Upat injection system	UPM 44 masonry
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Kind of masonry: Autoclaved aerated concrete

Conical drill hole (with special drill bit PBB)

Table C117: Characteristic values of resistance; tension load (N_{Rk})

	Use category	w/w		d/d	
Temperature range	[°C]	50/80	72/120	50/80	72/120
Effective anchorage depth	ch	aracteristic v	alues N _{Rk} [kN]	
Compressive strength fb = 2 N/mr	n²				
75	M8 / M10 / M12	2,00	1,50	2,00	2,00
95	M8 / M10 / M12	2,50	2,00	2,50	2,50
85	UPM-I M6 / M8	2,00	1,50	2,00	2,00
Compressive strength fb = 4 N/mr	n²				
75	M8 / M10 / M12	3,00	1,50	3,00	2,50
95	M8 / M10 / M12	3,50	3,00	3,50	3,00
85	UPM-I M6 / M8	3,00	2,50	3,00	2,50
Compressive strength fb = 6 N/mr	n²				
75	M8 / M10 / M12	3,50	3,00	4,00	3,50
95	M8 / M10 / M12	4,00	4,00	4,50	4,00
85	UPM-I M6 / M8	3,50	3,00	4,00	3,50

Calculation of pulling out of one brick (tension load): NRk,pb see ETAG 029, Annex C

Table C118: Characteristic values of resistance; shear load (V_{Rk})

	Use category	w/w		d/d	
Temperature range	[°C]	50/80	72/120		
Effective anchorage depth	Anchor size	ch	50/80 72/120 50/8 characteristic values		
Compressive strength fb = 2 N/mr	n²				
75,	5.7. w- 1 1 1				
95,	all sizes		2,	50	
85					
Compressive strength fb = 4 N/mr	n²				
75,					
95,	all sizes	4,50			
85					
Compressive strength fb = 6 N/mr	n ²				
75,					
95,	all sizes		6,	00	
85	and the same				

Calculation of pushing out of one brick (shear load): VRk,pb see ETAG 029, Annex C

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Autoclaved aerated concrete	Annex C 75
Conical drill hole with drill bit PBB	Appendix 93 / 96
Characteristic values	

Table C119: Characteristic bending moments for threaded rods

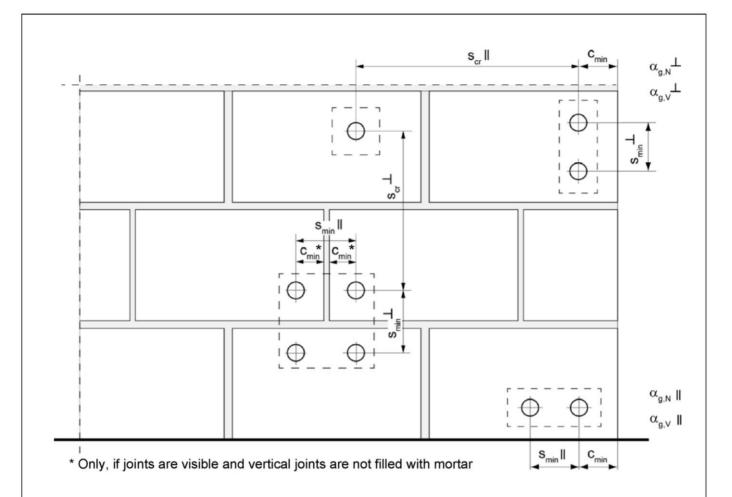
Size				M6	M8	M10	M12	M16
nents	zinc plated	Property class	5.8 [Nm]	8	19	37	65	166
	steel		8.8 [Nm]	12	30	60	105	266
JO		4	50 [Nm]	8	19	37	65	166
Characteristic bending moments M _{RK.s}	stainless steel A4	Property class	70 [Nm]	11	26	52	92	232
	SIGGI A4	Class	80 [Nm]	12	30	60	105	266
	high	Property class	50 [Nm]	8	19	37	65	166
	corrosion		70 ¹⁾ [Nm]	11	26	52	92	232
	steel C		80 [Nm]	12	30	60	105	266

¹⁾ f_{uk}= 700 N/mm²; f_{yk}=560 N/mm²

Table C120: Characteristic bending moments for internal threaded anchors UPM-I

Size UP	M-I			M6	M8	M10	M12
o zinc	Property	5.8 [Nm]	8	19	37	65	
ending k.s	plated steel,	class of screw	8.8 [Nm]	12	30	60	105
Characterisi moment	stainless steel A4	Property class of screw	70 [Nm]	11	26	52	92
	high corrosion resistant steel C	Property class of screw	70 [Nm]	11	26	52	92

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s_{min} II = Minimum spacing parallel to bed joint

 s_{min}^{\perp} = Minimum spacing vertical to bed joint

 $s_{cr} II$ = Characteristic spacing parallel to bed joint

 s_{cr}^{\perp} = Characteristic spacing vertical to bed joint

 $c_{cr} = c_{min}$ = Edge distance

 $\alpha_{g,N}$ II = Group factor for tension load parallel to bed joint

 $\alpha_{g,V}$ II = Group factor for shear load parallel to bed joint

 $\alpha_{g,N} \bot$ = Group factor for tension load vertical to bed joint

 $\alpha_{g,V} \perp$ = Group factor for shear load vertical to bed joint

For s > s_{cr} $\alpha_{o} = 2$

For $s_{min} \le s \le s_{cr}$ α_g according to installation parameters of brick

$$N_{Rk}^g = \alpha_{g,N} \cdot N_{Rk}$$
; $V_{Rk}^g = \alpha_{g,V} \cdot V_{Rk}$ (Group of 2 anchors)

$$N_{Rk}^g = \alpha_{g,N} II \cdot \alpha_{g,N} \cdot N_{Rk}; \quad V_{Rk}^g = \alpha_{g,V} II \cdot \alpha_{g,V} \cdot V_{Rk}$$
 (Group of 4 anchors)

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Performances

Definition of minimum edge distance, minimum spacing and group factors

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Table C121: B- factors for job site tests

Tension load

Use category		w/w		d/d		
Temperature ran	ge	50/80	72/120	50/80	72/120	
Material	Size	17 1				
	M6	0,55	0,46			
	M8	0,57	0,51			
	M10	0,59	0,52		0,80	
solid units	M12 UPM-I M6, M8	0,60	0,54	0,96		
	M16 UPM-I M10, M12	0,62	0,52			
	16x85	0,55	0,46			
hollow units	all size	0,86	0,72	0,96	0,80	
Autoclaved aerated concrete, cylindrical drill hole	all size	0,73	0,73	0,81	0,81	
Autoclaved aerated concrete, conical drill hole	all size	0,66	0,59	0,73	0,66	

Table C122: Displacements

Material	N [kN]	δN ₀ [mm]	δN∞ [mm]	V [kN]	δV ₀ [mm]	δV∞ [mm]
Solid units and autoclaved aerated concrete	N _{Rk} 1,4 * γ _M	0,03	0,06	V _{Rk} 1,4 * γ _M	0,59	0,88
hollow units	N _{Rk} 1,4 * γ _M	0,03	0,06	V _{Rk} 1,4 * γ _M	1,71	2,56
brick Annex C36/C37	N _{Rk} 1,4 * γ _M	0,03	0,06	V _{Rk} 1,4 * γ _M	6,44	9,66

Upat injection system UPM 44 masonry

ß- factors for job site tests,

Displacements

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