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PRODUCT DATA SHEET – WCF-PESF/WCF-PESF-E/WCF-PESF-C

Section 1. PRODUCT DESCRIPTION

POLYESTER INJECTION ANCHOR – WCF-PESF/WCF-PESF-E/WCF-PESF-C



Polyester two-component (1:10) injection anchor without styrene. Dedicated for handymen for work around the house and for professional when anchoring in masonry elements. Intended for installation of threaded rods into concrete substrates and into masonry elements and hollow bricks with nylon mesh sleeves TSN or metal mesh sleeve TSM.

Substrate material:

- **Non-cracked concrete (option 7) C20/25 through C50/60**
- **Reinforced and non-reinforced concrete**
- **Dry and wet concrete and flooded holes (Cat 2)**
- **Solid brick, hollow bricks**

Application temperatures:

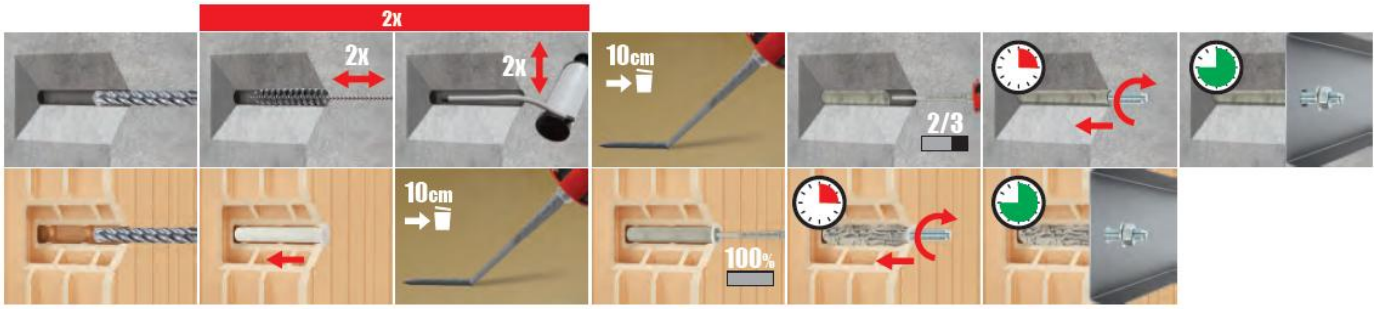
5°C ÷ 30°C	10°C ÷ 45°C	-10°C ÷ 30°C
WCF-PESF-300	WCF-PESF-E-300	WCF-PESF-C-300

Injection anchors hold European Technical Assessment: ETA-15/0745 and ETA-16/0677

Section 2. METHOD OF INSTALLATION

1. Original injection anchors delivered by the manufacturer can be used only
2. Before installation, indicate the drilling points
3. Then drill the holes in accordance with the parameters selected (diameter and depth of the hole)
4. The holes should be cleaned with SCF brush (2x) and blown out clean with PCF pump (2x)
5. Unscrew the resin cartridge lid, screw on the mixer nozzle onto the mouth of the cartridge and in case it is the first use of the cartridge, extrude about 10 cm^3, to make sure the resin has uniform colour (its ingredients are fully mixed)
6. For hollow materials use an additional TSM or TSN mesh sleeve to keep the resin in place and prevent it from filling the empty spaces in the substrate
7. Apply the resin to the hole (at about 2/3 depth) or to the mesh sleeve (filling it completely) moving the mixer nozzle from the bottom of the hole in order to make sure no air gaps appear
8. In order to apply the resin into deep holes use MCF-P or MCF-PK extension hose installed over the mixer nozzle and a resin stopper
9. Install the anchor rod in the hole within working time, using calm, revolving motion, so that the resin adheres to the rod and hole walls
10. Remove any excess resin flowing out of the hole with a putty knife
11. Load on the connector can be applied after reaching maximum strength parameters (after the resin hardens completely)
12. After attaching the fixture on a threaded rod, screw in the nut with appropriate torque (T_{inst})

Installation



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Section 3a. TECHNICAL DATA – CONCRETE SUBSTRATES

TABLE 1. PRODUCT FEATURES		
Parameter	**Value**	
Name	Mont Blanc	
Symbol	WCF-PESF	
Type	Polyester	
Capacity	300 ml	
Installation temperature	WCF-PESF	+5 ÷ +30 ˚C
	WCF-PESF-E	+10 ÷ +45 ˚C
	WCF-PESF-C	-10 ÷ +30 ˚C
Substrate	Non-cracked concrete	
Anchoring of threaded rods	M8 ÷ M24	
Threaded rods	5.8; 8.8; 10.9 – galvanized	
	A2-70; A4-70; A4-80 – stainless steel	
	1.4529; 1.4565 – HCR steel	
Installation conditions	Dry, wet and flooded holes	
Drilling conditions	Hammer-drill	

TABLE 2. PRODUCT SELECTION		
Code	**[˚C]**	**Pcs**
WCF-PESF-300	+5 ÷ +30	12
WCF-PESF-E-300	+10 ÷ +45	12
WCF-PESF-C-300	-10 ÷ +30	12

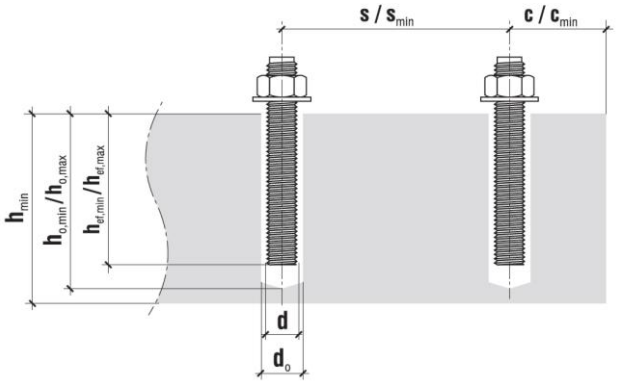


TABLE 3. INSTALLATION PARAMETERS – THREADED RODS – CONCRETE SUBSTRATES									
Parameters			**Rod size**						
			M8	M10	M12	M16	M20	M24	
Threaded rod diameter	d	[mm]	8	10	12	16	20	24	
Hole diameter	d_0	[mm]	10	12	14	18	22	26	
Min. anchorage depth	$h_{ef,min}$	[mm]	64	80	96	128	160	192	
Min. hole depth	$h_{0,min}$	[mm]	69	85	101	133	165	197	
Min. distance from edge	c_{min}	[mm]	35	40	50	65	80	96	
Min. spacing between connector centres	s_{min}	[mm]	35	40	50	65	80	96	
Max. anchorage depth	$h_{ef,max}$	[mm]	96	120	144	192	240	288	
Max. hole depth	$h_{0,max}$	[mm]	101	125	149	197	245	293	
Min. distance from edge	c_{min}	[mm]	50	60	70	95	120	145	
Min. spacing between connector centres	s_{min}	[mm]	50	60	70	95	120	145	
Min. substrate thickness	h_{min}	[mm]	h_{ef} + 30 mm > 100 mm				h_{ef} + 2*d_0		
Torque	T_{inst}	[Nm]	10	20	40	80	150	200	

TABLE 4. CURING TIME											
Substrate temp. [˚C]	Resin type	-10 ÷ -5	-5 ÷ +5	+5 ÷ +10	+10 ÷ +20	+20 ÷ +25	+25 ÷ +30	+30 ÷ +35	+35 ÷ +40	+40 ÷ +45	+45
Working time [minutes]	PESF	-	-	10	6	5	4	4	-	-	-
	PESF-E	-	-	-	15	10	7,5	5	3,5	2,5	2,5
	PESF-C	5	5	3,5	2	1,5	1	1	-	-	-
Hardening time [minutes]	PESF	-	-	145	85	50	40	35	-	-	-
	PESF-E	-	-	-	300	145	85	50	40	35	12
	PESF-C	240	125	60	40	20	15	10	-	-	-

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TABLE 5. LOADING RESISTANCES FOR TENSION

Rod size	Hole diameter [mm]	Torque T_{inst} [Nm]	Loading resistances of individual anchors installed into non-cracked concrete C20/25 maintaining basic installation conditions - characteristic and designed values																		
			Minimal value of {pull-out failure – $N_{R,p}$ [kN]; concrete cone failure – $N_{R,c}$ [kN]}												Steel wear – $N_{R,s}$ [kN]					
			Safety factor – γ_{Mc} = 1,8												γ_{Ms} = 1,5		γ_{Ms} = 1,4	γ_{Ms} = 1,87		γ_{Ms} = 1,6
			Embedment depth h_{ef} [mm]												Steel grade					
			60	80	100	120	140	160	180	200	220	240	260	280	300	5,8	8,8	10,9	A2-70	A4-70	A4-80
8	10	10	12,82	17,09	21,36	-	-	-	-	-	-	-	-	-	-	18,30	29,28	36,60	25,62	25,62	29,28
			7,12	9,49	11,87	-	-	-	-	-	-	-	-	-	-	12,20	19,52	26,14	13,73	13,73	18,30
10	12	20	-	20,11	25,13	30,16	-	-	-	-	-	-	-	-	-	29,00	46,40	58,00	40,60	40,60	46,40
			-	11,17	13,96	16,76	-	-	-	-	-	-	-	-	-	19,33	30,93	41,43	21,75	21,75	29,00
12	14	40	-	-	33,93	40,72	47,50	-	-	-	-	-	-	-	-	42,15	67,44	84,30	59,01	59,01	67,44
			-	-	18,85	22,62	26,39	-	-	-	-	-	-	-	-	28,10	44,96	60,21	31,61	31,61	42,15
16	18	80	-	-	-	-	63,33	72,38	81,43	90,48	-	-	-	-	-	78,50	125,60	157,00	109,90	109,90	125,60
			-	-	-	-	35,19	40,21	45,24	50,27	-	-	-	-	-	52,33	83,73	112,14	58,88	58,88	78,50
20	22	150	-	-	-	-	-	80,42	90,48	100,53	110,58	120,64	-	-	-	122,50	196,00	245,00	171,50	171,50	196,00
			-	-	-	-	-	44,68	50,27	55,85	61,44	67,02	-	-	-	81,67	130,67	175,00	91,88	91,88	122,50
24	26	200	-	-	-	-	-	-	-	113,10	124,41	135,72	147,03	158,34	169,65	176,50	282,40	353,00	247,10	247,10	282,40
			-	-	-	-	-	-	-	62,83	69,12	75,40	81,68	87,96	94,25	117,67	188,27	252,14	132,38	132,38	176,50

Data for a single anchor without influence of distance or effects of spacing between the anchors
As the spacing and distance decreases, the values given should be multiplied by reduction coefficients from tables 8 and 9

TABLE 6. LOADING RESISTANCES FOR SHEARING

Rod size	Hole diameter [mm]	Torque T_{inst} [Nm]	Loading resistances of individual anchors installed into non-cracked concrete C20/25 affected by shearing force maintaining basic installation conditions - characteristic and designed values																		
			Minimal value of {pry-out – $V_{R,p}$ [kN]; concrete edge failure – $V_{R,c}$ [kN]}												Steel failure – $V_{R,s}$ [kN]					
			Safety factor – γ_{Mc} = 1,5												γ_{Ms} = 1,25		γ_{Ms} = 1,5	γ_{Ms} = 1,56		γ_{Ms} = 1,33
			Embedment depth h_{ef} [mm]												Steel grade					
			60	80	100	120	140	160	180	200	220	240	260	280	300	5,8	8,8	10,9	A2-70	A4-70	A4-80
8	10	10	15,63	24,12	33,76	-	-	-	-	-	-	-	-	-	-	9,15	14,64	18,30	12,81	12,81	14,64
			10,42	16,08	22,50	-	-	-	-	-	-	-	-	-	-	7,32	11,71	12,20	8,24	8,24	10,98
10	12	20	-	24,85	34,78	45,75	-	-	-	-	-	-	-	-	-	14,50	23,20	29,00	20,30	20,30	23,20
			-	16,57	23,19	30,50	-	-	-	-	-	-	-	-	-	11,60	18,56	19,33	13,05	13,05	17,40
12	14	40	-	-	35,65	46,90	59,12	-	-	-	-	-	-	-	-	21,08	33,72	42,15	29,51	29,51	33,72
			-	-	23,77	31,27	39,41	-	-	-	-	-	-	-	-	16,86	26,98	28,10	18,97	18,97	25,29
16	18	80	-	-	-	-	61,53	75,17	89,68	105,01	-	-	-	-	-	39,25	62,80	78,50	54,95	54,95	62,80
			-	-	-	-	41,02	50,11	59,79	70,00	-	-	-	-	-	31,40	50,24	52,33	35,33	35,33	47,10
20	22	150	-	-	-	-	-	77,59	92,57	108,38	124,99	142,36	-	-	-	61,25	98,00	122,50	85,75	85,75	98,00
			-	-	-	-	-	51,73	61,71	72,26	83,33	94,91	-	-	-	49,00	78,40	81,67	55,13	55,13	73,50
24	26	200	-	-	-	-	-	-	-	111,28	128,33	146,15	164,72	183,99	203,95	88,25	141,20	176,50	123,55	123,55	141,20
			-	-	-	-	-	-	-	74,18	85,55	97,44	109,81	122,66	135,97	70,60	112,96	117,67	79,43	79,43	105,90

Data for a single anchor without influence of distance or effects of spacing between the anchors
As the spacing and distance decreases, the values given should be multiplied by reduction coefficients from tables 8 and 10

Characteristic resistance

Design resistance

TABLE 7. BASE INSTALLATION CONDITIONS ALLOWING FOR MAINTAINING LOADING RESISTANCES FROM TABLES 5, 6

Parameter	Rod size	Formula	Embedment depth h_{ef} [mm]												
			60	80	100	120	140	160	180	200	220	240	260	280	300
Distance from edge – c [mm]	M8-M24	$c=1,5h_{ef}$	90	120	150	180	210	240	270	300	330	360	390	420	450
Anchor spacing – s [mm]	M8-M24	$s=3h_{ef}$	180	240	300	360	420	480	540	600	660	720	780	840	900

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TABLE 8. REDUCTION FACTORS FOR TENSION AND SHEARING – EFFECTS OF ANCHOR SPACING "s"																										
Effects of anchor spacing (reduction coefficient) – $\Psi_{sn,v}$																										
s/hef	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3	2,4	2,5	2,6	2,7	2,8	2,9	≥ 3
M8-M24	0,58	0,60	0,62	0,63	0,65	0,67	0,68	0,70	0,72	0,73	0,75	0,77	0,78	0,80	0,82	0,83	0,85	0,87	0,88	0,90	0,92	0,93	0,95	0,97	0,98	1,00

Spacing between anchors cannot be lower than 0,5 of embedment depth (h_{ef}) – $0,5h_{ef} < s < 3h_{ef}$

TABLE 9. REDUCTION FACTORS FOR TENSION – EFFECTS OF DISTANCE FROM THE EDGE "c"											
Effects of anchor distance from the edge (reduction coefficient) – Ψ_{cn}											
c/hef	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	≥ 1,5
M8-M24	0,53	0,57	0,62	0,67	0,71	0,76	0,81	0,85	0,90	0,95	1,00

Distance from the edge cannot be lower than 0,5 of embedment depth (h_{ef}) – $0,5h_{ef} < c < 1,5h_{ef}$

TABLE 10. REDUCTION FACTORS FOR SHEARING – EFFECTS OF DISTANCE FROM THE EDGE "c"											
Effects of anchor distance from the edge (reduction coefficient) – Ψ_{cv}											
c/hef	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4	≥ 1,5
M8-M24	0,23	0,29	0,36	0,43	0,50	0,58	0,66	0,74	0,82	0,91	1,00

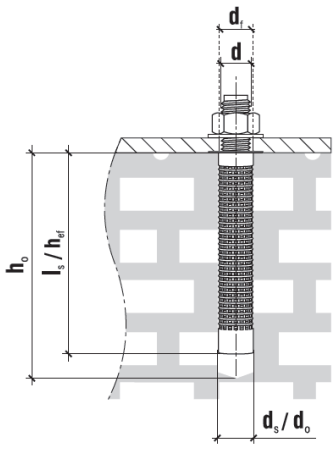
Distance from the edge cannot be lower than 0,5 of embedment depth (h_{ef}) – $0,5h_{ef} < c < 1,5h_{ef}$

TABLE 11. CONSUMPTION														
Rod size	Hole diameter [mm]	Torque T_{inst} [Nm]	Estimated number of anchors made from one cartridge – capacity 300 ml											
			Anchorage depth h_{ef} [mm]											
			60	80	100	120	140	160	180	200	220	240	260	280	300
M8	10	10	85	64	51	-	-	-	-	-	-	-	-	-	-
M10	12	20	-	44	35	29	-	-	-	-	-	-	-	-	-
M12	14	40	-	-	26	22	19	-	-	-	-	-	-	-	-
M16	18	80	-	-	-	-	11	10	9	8	-	-	-	-	-
M20	22	150	-	-	-	-	-	7	6	5	5	4	-	-	-
M24	26	200	-	-	-	-	-	-	-	4	3	3	3	3	3

Section 3b. TECHNICAL DATA – MASONRY

TABLE 1. PRODUCT FEATURES		
Parameter	Value	
Name	Mont Blanc	
Symbol	WCF-PESF	
Type	Polyester	
Capacity	300 ml	
Installation temperature	WCF-PESF	+5 ÷ +30 ˚C
	WCF-PESF-E	+10 ÷ +45 ˚C
	WCF-PESF-C	-10 ÷ +30 ˚C
Substrate	Solid brick, hollow bricks, cell concrete	
Anchoring of threaded rods	M8 ÷ M12	
Threaded rods	5.8; 8.8; 10.9 – galvanized	
	A2-70; A4-70; A4-80 – stainless steel	
	1.4529; 1.4565 – HCR steel	
Installation conditions	Dry, wet and flooded holes	
Drilling conditions	Hammer-drill/no hammer-drill	

TABLE 2. PRODUCT SELECTION		
Code	[˚C]	Pcs
WCF-PESF-300	+5 ÷ +30	12
WCF-PESF-E-300	+10 ÷ +45	12
WCF-PESF-C-300	-10 ÷ +30	12



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TABLE 3. INSTALLATION PARAMETERS – THREADED RODS – MASONRY									
Substrate type			Solid brick			Hollow brick		
Rod size			M8	M10	M12	M8	M10	M12
Threaded rod diameter	d	[mm]	8	10	12	8	10	12
Length of mesh sleeve	l_s	[mm]	-	-	-	85	85	85
Diameter of mesh sleeve	d_s	[mm]	-	-	-	15	15	20
Hole diameter	d_o	[mm]	16	16	20	16	16	20
Min. hole depth	h_0	[mm]	90					
Min. anchorage depth	h_{ef}	[mm]	85					
Fixed element hole diameter	d_f	[mm]	9	12	14	9	12	14
Torque	T_{inst}	[Nm]	2					

TABLE 4. CURING TIME											
Substrate temp. [˚C]	Resin type	-10 ÷ -5	-5 ÷ +5	+5 ÷ +10	+10 ÷ +20	+20 ÷ +25	+25 ÷ +30	+30 ÷ +35	+35 ÷ +40	+40 ÷ +45	+45
Working time [minutes]	PESF	-	-	10	6	5	4	4	-	-	-
	PESF-E	-	-	-	15	10	7,5	5	3,5	2,5	2,5
	PESF-C	5	5	3,5	2	1,5	1	1	-	-	-
Hardening time [minutes]	PESF	-	-	145	85	50	40	35	-	-	-
	PESF-E	-	-	-	300	145	85	50	40	35	12
	PESF-C	240	125	60	40	20	15	10	-	-	-

TABLE 5. LOADING RESISTANCES FOR TENSION AND SHEARING – MASONRY									
Loading resistances of individual anchors installed for tension and shearing in masonry – characteristics and design values – N_{Rk}=V_{Rk}*									
Safety factor – γ_{Mm} = 2,5									
Rod size	Substrate type***								
	Brick 1**	Brick 2**	Brick 3**	Brick 4	Brick 5	Brick 6**	Brick 7**	Brick 8**	Brick 9**
M8	2,50	0,75	0,75	1,50	0,75	1,20	0,60	0,60	2,50
	1,00	0,30	0,30	0,60	0,30	0,48	0,24	0,24	1,00
M10	2,00	1,20	1,20	1,50	0,90	1,20	0,30	1,50	1,50
	0,80	0,48	0,48	0,60	0,36	0,48	0,12	0,60	0,60
M12	2,00	0,50	0,50	3,00	1,50	0,90	-	1,20	2,50
	0,80	0,20	0,20	1,20	0,60	0,36	-	0,48	1,00

*For design according to ETAG 029, Annex C: $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$; $N_{Rk,pb}$ according to ETAG 029, Annex C.
For $V_{Rk,s}$ see Annex C1, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$, according to ETAG 029, Annex C
**To use with mesh sleeve
***Substrate types according to Table 7

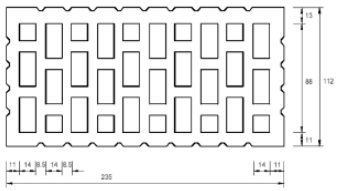
Characteristic resistance
Design resistance

TABLE 6. BASE INSTALLATION CONDITIONS ALLOWING FOR MAINTAINING LOADING RESISTANCES FROM TABLE 5									
Substrate type	Rod size								
	M8			M10			M12		
	$c = c_{min}$	$s_{II} = s_{minII}$	$s_{\perp} = s_{min\perp}$	$c = c_{min}$	$s_{II} = s_{minII}$	$s_{\perp} = s_{min\perp}$	$c = c_{min}$	$s_{II} = s_{minII}$	$s_{\perp} = s_{min\perp}$
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
Brick 1	100	235	115	100	235	115	120	235	115
Brick 2	100	240	113	100	240	113	120	240	113
Brick 3	100	250	237	100	250	237	120	250	237
Brick 4	128	255	255	128	255	255	128	255	255
Brick 5	128	255	255	128	255	255	128	255	255
Brick 6	100	250	240	100	250	240	120	250	240
Brick 7	100	250	248	100	250	248	-	-	-
Brick 8	100	250	248	100	250	248	120	250	248
Brick 9	100	370	238	100	370	238	120	370	238

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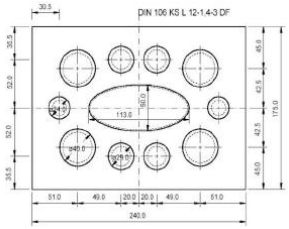
TABLE 7. TYPES OF MASONRY FOR TABLE 5, 6

Brick 1



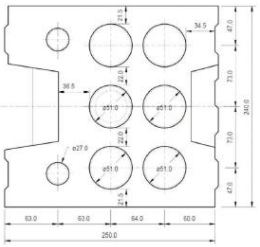
HLz 12-1.0-2DF perforated ceramic brick in accordance with EN 771-1
Length/width/height = 235 mm/112 mm/115 mm
$f_b \geq 12$ N/mm^2 / $\rho \geq 1.0$ kg/dm^3

Brick 2



KSL 12-1.4-3DF perforated silicate brick in accordance with EN 771-2
Length/width/height = 240 mm/175 mm/113 mm
$f_b \geq 12$ N/mm^2 / $\rho \geq 1.4$ kg/dm^3

Brick 3



KSL 12-1.4-8DF perforated silicate brick in accordance with EN 771-2
Length/width/height = 250 mm/240 mm/237 mm
$f_b \geq 12$ N/mm^2 / $\rho \geq 1.4$ kg/dm^3

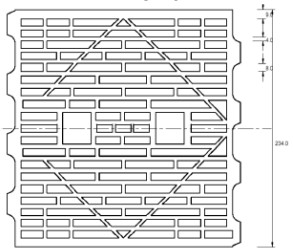
Brick 4

Solid ceramic brick Mz 12-2.0-NF in accordance with EN 771-1
Length/width/height = 240 mm/116 mm/71 mm
$f_b \geq 12$ N/mm^2 / $\rho \geq 2.0$ kg/dm^3

Brick 5

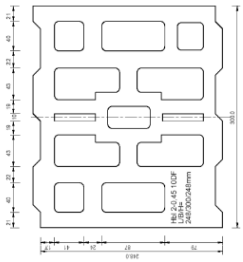
KS 12-2.0-NF solid silicate brick in accordance with EN 771-2
Length/width/height = 240 mm/115 mm/70 mm
$f_b \geq 12$ N/mm^2 / $\rho \geq 2.0$ kg/dm^3

Brick 6



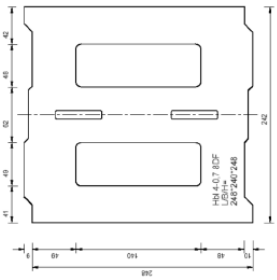
HLzW 6-0.7-8DF perforated ceramic brick in accordance with EN 771-1
Length/width/height = 250 mm/240 mm/240 mm
$f_b \geq 6$ N/mm^2 / $\rho \geq 0.8$ kg/dm^3

Brick 7



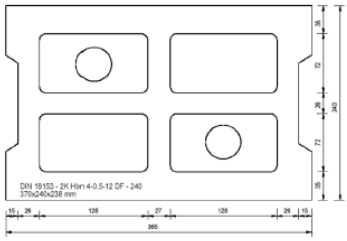
Lightweight concrete block Hbl 2-0.45-10DF in accordance with EN 771-3
Length/width/height = 250 mm/300 mm/248 mm
$f_b \geq 2.0$ N/mm^2 / $\rho \geq 0.45$ kg/dm^3

Brick 8



Lightweight concrete block Hbl 4-0.7-8DF in accordance with EN 771-3
Length/width/height = 250 mm/240 mm/248 mm
$f_b \geq 4.0$ N/mm^2 / $\rho \geq 0.7$ kg/dm^3

Brick 9



Concrete masonry unit Hbn 4-12DF in accordance with EN 771-3
Length/width/height = 370 mm/240 mm/238 mm
$f_b \geq 4.0$ N/mm^2 / $\rho \geq 1.2$ kg/dm^3

TABLE 8. CONSUMPTION – MASONRY

Rod size	Hole diameter [mm]	Torque T_{inst} [Nm]	Estimated number of anchors made from one cartridge – capacity 300 ml	
			Embedment depth h_{ef} = 85 [mm]	
			Solid brick	Hollow brick
M8	16	2	20	15
M10	16	2	24	18
M12	20	2	15	11

Section 4. REMARKS

1. All previous versions of this Product Data Sheet shall cease to be valid
2. Data given in this Product Data Sheet is in accordance with current knowledge and published in good faith. Klimas Wkręt-met Sp. z o.o. is not responsible for correctness and quality of the fixing if recommendations regarding method of use and installation are not followed.

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