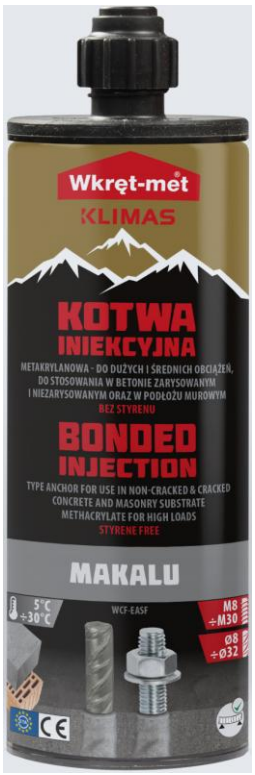
Klimas Wkret-met Sp. z o.o. ul. W. Witosa 170/176
Kuźnica Kiedrzyńska 42-233 Mykanów
tel. +48 34 377 71 00, fax. +48 34 328 01 73 Hotline: 801 477 477, www.wkret-met.com

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

Section 1. PRODUCT DESCRIPTION

METHACRYLATE INJECTION ANCHOR – WCF-EASF/WCF-EASF-E/WCF-EASF-C



Methacrylic two-component (1:10) injection anchor without styrene. Dedicated for reliable and durable connections. Anchor used for setting of rebars into concrete substrates and 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 and cracked concrete, reinforced and non-reinforced (option 1) C20/25 through C50/60**
- **Non-cracked concrete, reinforced and non-reinforced (option 7) C20/25 through C50/60**
- **Rebars – post installed reinforcement connection**
- **Full brick, slotted brick, ceramic block**

Application temperatures:

	Concrete substrates	Masonry substrates	
5°C ÷ 30°C	15°C ÷ 40°C	-10°C ÷ 20°C	0°C ÷ 20°C	
WCF-EASF-410	WCF-EASF-E-410	WCF-EASF-C-410*	WCF-EASF-C-410	

*does not apply to deep anchoring

Injection anchors hold European Technical Assessment: ETA-15/0702, ETA-15/0703 and ETA-20/0618

Section 2. METHOD OF INSTALLATION

1. Original injection anchors delivered by the manufacturer can be used only
2. Before use, read the safety information in the Material Safety Data Sheet (MSDS)
3. Before installation, indicate the drilling points
4. Then drill the holes in accordance with the parameters selected (diameter and depth of the hole)
5. The holes should be cleaned with SCF brush (2x) and blown out clean with PCF pump (2x)
6. 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)
7. For hollow materials use an additional TSN or TSM mesh sleeve to keep the resin in place and prevent it from filling the empty spaces in the substrate
8. 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
9. 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
10. 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
11. Remove any excess resin flowing out of the hole with a putty knife
12. Load on the connector can be applied after reaching maximum strength parameters (after the resin hardens completely)
13. After attaching the fixture on a threaded rod, screw in the nut with appropriate torque (T_{inst})



All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20 Updated: 2026-07-15

Klimas Wkret-met Sp. z o.o. ul. W. Witosa 170/176
Kuźnica Kiedrzyńska 42-233 Mykanów
tel. +48 34 377 71 00, fax. +48 34 328 01 73 Hotline: 801 477 477, www.wkret-met.com

Section 3a. TECHNICAL DATA – THREADED RODS

TABLE 1. PRODUCT FEATURES		
Parameter	**Value**	
Name	Makalu	
Symbol	WCF-EASF	
Type	Methacrylate	
Capacity	410 ml	
Installation temperature	WCF-EASF	+5 ÷ +30 ˚C
	WCF-EASF-E	+15 ÷ +40 ˚C
	WCF-EASF-C	-10 ÷ +20 ˚C
Substrate	Cracked and non-cracked concrete	
Anchoring of threaded rods	M8 ÷ M30	
Threaded rods	4.6; 5.8; 8.8; 10.9 – Galvanized, hot-dip galvanized, A2, A4, HCR	
Installation conditions	Dry, wet and flooded holes	
Drilling conditions	Hammer-drill	

TABLE 2. PRODUCT SELECTION		
Code	**[˚C]**	**Pcs**
WCF-EASF-410	+5 ÷ +30	12
WCF-EASF-E-410	+15 ÷ +40	12
WCF-EASF-C-410	-10 ÷ +20	12

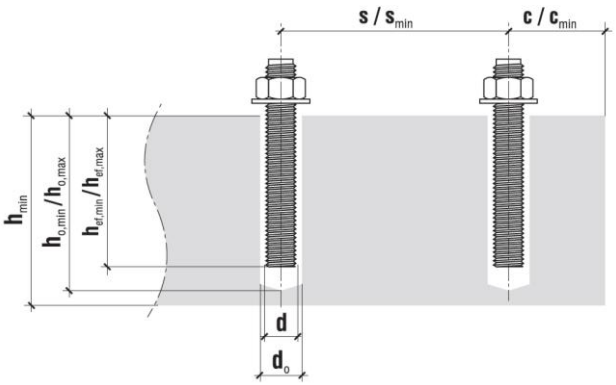


TABLE 3. INSTALLATION PARAMETERS – THREADED RODS										
Parameters			**Rod size**							
			M8	M10	M12	M16	M20	M24	M27	M30
Threaded rod diameter	d	[mm]	8	10	12	16	20	24	27	30
Hole diameter	d_0	[mm]	10	12	14	18	22	26	30	35
Min. anchorage depth	$h_{ef,min}$	[mm]	64	80	96	128	160	192	216	240
Min. hole depth	$h_{0,min}$	[mm]	69	85	101	133	165	197	221	245
Min. distance from edge	c_{min}	[mm]	35	40	50	65	80	96	110	120
Min. spacing between connector centres	s_{min}	[mm]	35	40	50	65	80	96	110	120
Max. anchorage depth	$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600
Max. hole depth	$h_{0,max}$	[mm]	165	205	245	325	405	485	545	605
Min. distance from edge	c_{min}	[mm]	80	100	120	160	200	240	270	300
Min. spacing between connector centres	s_{min}	[mm]	80	100	120	160	200	240	270	300
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	240	275

TABLE 4. CURING TIME											
Substrate temp. [˚C]	Resin type	-10 ÷ -5	-5 ÷ 0	0 ÷ +5	+5 ÷ +10	+10 ÷ +15	+15 ÷ +20	+20 ÷ +25	+25 ÷ +30	+30 ÷ +35	+35 ÷ +40
Working time [minutes]	EASF	-	-	-	10	8	6	5	4	-	-
	EASF-E	-	-	-	-	-	15	10	7,5	5	3,5
	EASF-C	50	15	10	5	5	5	1,4	-	-	-
Hardening time [minutes]	EASF	-	-	-	145	85	75	50	40	-	-
	EASF-E	-	-	-	-	-	300	145	85	50	40
	EASF-C	720	100	75	50	50	50	20	-	-	-

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20 Updated: 2026-07-15

TABLE 5.1. LOADING RESISTANCES FOR TENSION – NON-CRACKED CONCRETE

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 – M8-M24, γ_{Mc} = 2,1 – M27-M30																		γ_{Ms} = 2	γ_{Ms} = 1,5		γ_{Ms} = 1,4	γ_{Ms} = 1,87	γ_{Ms} = 1,6
			Anchorage depth h_{ef} [mm]																		Steel grade					
			60	80	100	120	140	160	180	200	220	240	280	320	360	400	440	480	540	600	4,6	5,8	8,8	10,9	A4-70	A4-80
8	10	10	15,08	20,11	25,13	30,16	35,19	40,21	-	-	-	-	-	-	-	-	-	-	-	-	14,64	18,30	29,28	36,60	25,62	29,28
			8,38	11,17	13,96	16,76	19,55	22,34	-	-	-	-	-	-	-	-	-	-	-	-	7,32	12,20	19,52	26,14	13,73	18,30
10	12	20	-	23,88	29,85	35,81	41,78	47,75	53,72	59,69	-	-	-	-	-	-	-	-	-	-	23,20	29,00	46,40	58,00	40,60	46,40
			-	13,26	16,58	19,90	23,21	26,53	29,85	33,16	-	-	-	-	-	-	-	-	-	-	11,60	19,33	30,93	41,43	21,75	29,00
12	14	40	-	-	35,81	42,98	50,14	57,30	64,47	71,63	78,79	85,95	-	-	-	-	-	-	-	-	33,72	42,15	67,44	84,30	59,01	67,44
			-	-	19,90	23,88	27,86	31,83	35,81	39,79	43,77	47,75	-	-	-	-	-	-	-	-	16,86	28,10	44,96	60,21	31,61	42,15
16	18	80	-	-	-	-	63,33	72,38	81,43	90,48	99,53	108,57	126,67	144,76	-	-	-	-	-	-	62,80	78,50	125,60	157,00	109,90	125,60
			-	-	-	-	35,19	40,21	45,24	50,27	55,29	60,32	70,37	80,42	-	-	-	-	-	-	31,40	52,33	83,73	112,14	58,88	78,50
20	22	150	-	-	-	-	-	85,45	96,13	106,81	117,50	128,18	149,54	170,90	192,27	213,63	-	-	-	-	98,00	122,50	196,00	245,00	171,50	196,00
			-	-	-	-	-	47,47	53,41	59,34	65,28	71,21	83,08	94,95	106,81	118,68	-	-	-	-	49,00	81,67	130,67	175,00	91,88	122,50
24	26	200	-	-	-	-	-	-	-	120,64	132,70	144,76	168,89	193,02	217,15	241,27	265,40	289,53	-	-	141,20	176,50	282,40	353,00	247,10	282,40
			-	-	-	-	-	-	-	67,02	73,72	80,42	93,83	107,23	120,64	134,04	147,45	160,85	-	-	70,60	117,67	188,27	252,14	132,38	176,50
27	30	240	-	-	-	-	-	-	-	-	121,30	132,32	154,38	176,43	198,49	220,54	242,59	264,65	297,73	-	183,60	229,50	367,20	459,00	321,30	367,20
			-	-	-	-	-	-	-	-	57,76	63,01	73,51	84,02	94,52	105,02	115,52	126,02	141,78	-	91,80	153,00	244,80	327,86	172,13	229,50
30	35	275	-	-	-	-	-	-	-	-	-	124,41	145,14	165,88	186,61	207,35	228,08	248,81	279,92	311,02	224,40	280,50	448,80	561,00	392,70	448,80
			-	-	-	-	-	-	-	-	-	59,24	69,12	78,99	88,86	98,74	108,61	118,48	133,29	148,10	112,20	187,00	299,20	400,71	210,38	280,50

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 6.1. LOADING RESISTANCES FOR SHEARING – NON-CRACKED CONCRETE

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} = 1,67	γ_{Ms} = 1,25		γ_{Ms} = 1,5	γ_{Ms} = 1,56	γ_{Ms} = 1,33
			Anchorage depth h_{ef} [mm]																		Steel grade					
			60	80	100	120	140	160	180	200	220	240	280	320	360	400	440	480	540	600	4,6	5,8	8,8	10,9	A4-70	A4-80
8	10	10	15,63	24,12	33,76	44,40	55,96	68,37	-	-	-	-	-	-	-	-	-	-	-	-	7,32	9,15	14,64	18,30	12,81	14,64
			10,42	16,08	22,50	29,60	37,31	45,58	-	-	-	-	-	-	-	-	-	-	-	-	4,39	7,32	11,71	12,20	8,24	10,98
10	12	20	-	24,85	34,78	45,75	57,66	70,45	84,05	98,41	-	-	-	-	-	-	-	-	-	-	11,60	14,50	23,20	29,00	20,30	23,20
			-	16,57	23,19	30,50	38,44	46,97	56,03	65,61	-	-	-	-	-	-	-	-	-	-	6,96	11,60	18,56	19,33	13,05	17,40
12	14	40	-	-	35,65	46,90	59,12	72,22	86,17	100,89	116,36	132,53	-	-	-	-	-	-	-	-	16,86	21,08	33,72	42,15	29,51	33,72
			-	-	23,77	31,27	39,41	48,15	57,44	67,26	77,57	88,35	-	-	-	-	-	-	-	-	10,12	16,86	26,98	28,10	18,97	25,29
16	18	80	-	-	-	-	61,53	75,17	89,68	105,01	121,10	137,93	173,65	211,96	-	-	-	-	-	-	31,40	39,25	62,80	78,50	54,95	62,80
			-	-	-	-	41,02	50,11	59,79	70,00	80,73	91,95	115,77	141,30	-	-	-	-	-	-	18,84	31,40	50,24	52,33	35,33	47,10
20	22	150	-	-	-	-	-	77,59	92,57	108,38	124,99	142,36	179,22	218,75	260,76	305,09	-	-	-	-	49,00	61,25	98,00	122,50	85,75	98,00
			-	-	-	-	-	51,73	61,71	72,26	83,33	94,91	119,48	145,83	173,84	203,39	-	-	-	-	29,40	49,00	78,40	81,67	55,13	73,50
24	26	200	-	-	-	-	-	-	-	111,28	128,33	146,15	183,99	224,56	267,68	313,18	360,94	410,84	-	-	70,60	88,25	141,20	176,50	123,55	141,20
			-	-	-	-	-	-	-	74,18	85,55	97,44	122,66	149,71	178,45	208,78	240,62	273,90	-	-	42,36	70,60	112,96	117,67	79,43	105,90
27	30	240	-	-	-	-	-	-	-	-	130,56	148,69	187,19	228,45	272,30	318,58	367,16	417,92	497,94	-	91,80	114,75	183,60	229,50	160,65	183,60
			-	-	-	-	-	-	-	-	87,04	99,13	124,79	152,30	181,54	212,39	244,77	278,61	331,96	-	55,08	91,80	146,88	153,00	103,28	137,70
30	35	275	-	-	-	-	-	-	-	-	-	151,02	190,12	232,02	276,55	323,55	372,87	424,41	505,66	591,38	112,20	140,25	224,40	280,50	196,35	224,40
			-	-	-	-	-	-	-	-	-	100,68	126,74	154,68	184,37	215,70	248,58	282,94	337,11	394,25	67,32	112,20	179,52	187,00	126,23	168,30

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

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20
Updated: 2026-07-15

TABLE 5.2. LOADING RESISTANCES FOR TENSION – CRACKED CONCRETE

Rod size	Hole diameter [mm]	Torque T_{inst} [Nm]	Loading resistances of individual anchors installed into 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} = 2	γ_{Ms} = 1,5		γ_{Ms} = 1,4	γ_{Ms} = 1,87	γ_{Ms} = 1,6	
			Anchorage depth h_{ef} [mm]																		Steel grade							
			60	80	100	120	140	160	180	200	220	240	280	320	360	400	440	480	540	600	4,6	5,8	8,8	10,9	A4-70	A4-80		
10	12	20	-	11,31	14,14	16,96	19,79	22,62	25,45	28,27	-	-	-	-	-	-	-	-	-	-	23,20	29,00	46,40	58,00	40,60	46,40		
			-	6,28	7,85	9,42	11,00	12,57	14,14	15,71	-	-	-	-	-	-	-	-	-	-	11,60	19,33	30,93	41,43	21,75	29,00		
12	14	40	-	-	16,96	20,36	23,75	27,14	30,54	33,93	37,32	40,72	-	-	-	-	-	-	-	-	33,72	42,15	67,44	84,30	59,01	67,44		
			-	-	9,42	11,31	13,19	15,08	16,96	18,85	20,73	22,62	-	-	-	-	-	-	-	-	16,86	28,10	44,96	60,21	31,61	42,15		
16	18	80	-	-	-	-	31,67	36,19	40,72	45,24	49,76	54,29	63,33	72,38	-	-	-	-	-	-	62,80	78,50	125,60	157,00	109,90	125,60		
			-	-	-	-	17,59	20,11	22,62	25,13	27,65	30,16	35,19	40,21	-	-	-	-	-	-	31,40	52,33	83,73	112,14	58,88	78,50		
20	22	150	-	-	-	-	-	40,21	45,24	50,27	55,29	60,32	70,37	80,42	90,48	100,53	-	-	-	-	98,00	122,50	196,00	245,00	171,50	196,00		
			-	-	-	-	-	22,34	25,13	27,93	30,72	33,51	39,10	44,68	50,27	55,85	-	-	-	-	49,00	81,67	130,67	175,00	91,88	122,50		
24	26	200	-	-	-	-	-	-	-	60,32	66,35	72,38	84,45	96,51	108,57	120,64	132,70	144,76	-	-	141,20	176,50	282,40	353,00	247,10	282,40		
			-	-	-	-	-	-	-	33,51	36,86	40,21	46,91	53,62	60,32	67,02	73,72	80,42	-	-	70,60	117,67	188,27	252,14	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 6.2. LOADING RESISTANCES FOR SHEARING – CRACKED CONCRETE

Rod size	Hole diameter [mm]	Torque T_{inst} [Nm]	Loading resistances of individual anchors installed into 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} = 1,67	γ_{Ms} = 1,25		γ_{Ms} = 1,5	γ_{Ms} = 1,56	γ_{Ms} = 1,33	
			Anchorage depth h_{ef} [mm]																		Steel grade							
			60	80	100	120	140	160	180	200	220	240	280	320	360	400	440	480	540	600	4,6	5,8	8,8	10,9	A4-70	A4-80		
10	12	20	-	17,60	24,64	32,41	39,58	45,24	50,89	56,55	-	-	-	-	-	-	-	-	-	-	11,60	14,50	23,20	29,00	20,30	23,20		
			-	11,74	16,42	21,60	26,39	30,16	33,93	37,70	-	-	-	-	-	-	-	-	-	-	6,96	11,60	18,56	19,33	13,05	17,40		
12	14	40	-	-	25,26	33,22	41,87	51,16	61,03	67,86	74,64	81,43	-	-	-	-	-	-	-	-	16,86	21,08	33,72	42,15	29,51	33,72		
			-	-	16,84	22,15	27,92	34,11	40,69	45,24	49,76	54,29	-	-	-	-	-	-	-	-	10,12	16,86	26,98	28,10	18,97	25,29		
16	18	80	-	-	-	-	43,58	53,25	63,52	74,38	85,78	97,70	123,00	144,76	-	-	-	-	-	-	31,40	39,25	62,80	78,50	54,95	62,80		
			-	-	-	-	29,05	35,50	42,35	49,59	57,19	65,13	82,00	96,51	-	-	-	-	-	-	18,84	31,40	50,24	52,33	35,33	47,10		
20	22	150	-	-	-	-	-	54,96	65,57	76,77	88,54	100,84	126,95	154,95	180,96	201,06	-	-	-	-	49,00	61,25	98,00	122,50	85,75	98,00		
			-	-	-	-	-	36,64	43,71	51,18	59,03	67,23	84,63	103,30	120,64	134,04	-	-	-	-	29,40	49,00	78,40	81,67	55,13	73,50		
24	26	200	-	-	-	-	-	-	-	78,82	90,90	103,53	130,33	159,07	189,60	221,83	255,66	289,53	-	-	70,60	88,25	141,20	176,50	123,55	141,20		
			-	-	-	-	-	-	-	52,55	60,60	69,02	86,89	106,04	126,40	147,89	170,44	193,02	-	-	42,36	70,60	112,96	117,67	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	Anchorage depth h_{ef} [mm]																			
			60	80	100	120	140	160	180	200	220	240	280	320	360	400	440	480	540	600	640	
Distance from edge – c [mm]	M8 ÷ M30	$c=1,5h_{ef}$	90	120	150	180	210	240	270	300	330	360	420	480	540	600	660	720	810	900	960	
Anchor spacing – s [mm]	M8 ÷ M30	$s=3h_{ef}$	180	240	300	360	420	480	540	600	660	720	840	960	1080	1200	1320	1440	1620	1800	1920	

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20
Updated: 2026-07-15

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-M30	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 anchorage 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-M30	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 anchorage 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-M30	0,23	0,29	0,36	0,43	0,50	0,58	0,66	0,74	0,82	0,91	1,00

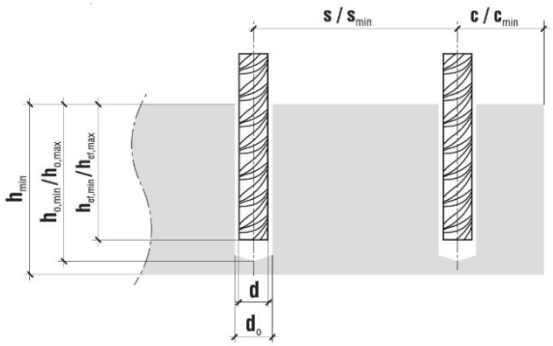
Distance from the edge cannot be lower than 0,5 of anchorage depth (h_{ef}) – $0,5h_{ef} < c < 1,5h_{ef}$

TABLE 11. CONSUMPTION																			
Rod size	Hole diameter [mm]	Torque T_{inst} [Nm]	Estimated number of anchors made from one cartridge – capacity 410 ml																
			Anchorage depth h_{ef} [mm]																
			60	80	100	120	140	160	180	200	220	240	280	320	360	400	440	480	540	600
M8	10	10	116	87	70	58	50	44	-	-	-	-	-	-	-	-	-	-	-	-
M10	12	20	-	60	48	40	35	30	27	24	-	-	-	-	-	-	-	-	-	-
M12	14	40	-	-	36	30	25	22	20	18	16	15	-	-	-	-	-	-	-	-
M16	18	80	-	-	-	-	15	13	12	11	10	9	8	7	-	-	-	-	-	-
M20	22	150	-	-	-	-	-	9	8	7	7	6	5	4	4	4	-	-	-	-
M24	26	200	-	-	-	-	-	-	-	5	5	4	4	3	3	3	2	2	-	-
M27	30	240	-	-	-	-	-	-	-	-	4	3	3	2	2	2	2	2	1	-
M30	35	275	-	-	-	-	-	-	-	-	-	2	2	2	2	1	1	1	1	1

Section 3b. TECHNICAL DATA – REBARS

TABLE 1. PRODUCT FEATURES		
Parameter	Value	
Name	Makalu	
Symbol	WCF-EASF	
Type	Methacrylate	
Capacity	410 ml	
Installation temperature	WCF-EASF	+5 ÷ +30 ˚C
	WCF-EASF-E	+15 ÷ +40 ˚C
	WCF-EASF-C	-10 ÷ +20 ˚C
Substrate	Non-cracked concrete	
Anchoring of rebars	ϕ8 ÷ ϕ32	
Rebars	Grade: B, C	
Installation conditions	Dry, wet and flooded holes	
Drilling conditions	Hammer-drill	

TABLE 2. PRODUCT SELECTION		
Code	[˚C]	Pcs
WCF-EASF-410	+5 ÷ +30	12
WCF-EASF-E-410	+15 ÷ +40	12
WCF-EASF-C-410	-10 ÷ +20	12



All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20 Updated: 2026-07-15

TABLE 3. INSTALLATION PARAMETERS – REBARS

Parameters			Rod size						
			ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ25	ϕ 32
Rebar diameter	d	[mm]	8	10	12	16	20	25	32
Hole diameter	d_0	[mm]	12	14	16	20	25	32	40
Min. anchorage depth	$h_{ef,min}$	[mm]	64	80	96	128	160	200	256
Min. hole depth	$h_{0,min}$	[mm]	69	85	101	133	165	205	261
Min. distance from edge	c_{min}	[mm]	35	40	50	65	80	100	130
Min. spacing between connector centres	s_{min}	[mm]	35	40	50	65	80	100	130
Max. anchorage depth	$h_{ef,max}$	[mm]	160	200	240	320	400	500	640
Max. hole depth	$h_{0,max}$	[mm]	165	205	245	325	405	505	645
Min. distance from edge	c_{min}	[mm]	80	100	120	160	200	250	320
Min. spacing between connector centres	s_{min}	[mm]	80	100	120	160	200	250	320
Min. substrate thickness	h_{min}	[mm]	h_{ef} + 30 mm > 100 mm				h_{ef} + 2*d_0		

TABLE 4. CURING TIME

Substrate temp. [°C]	Resin type	-10 ÷ -5	-5 ÷ 0	0 ÷ +5	+5 ÷ +10	+10 ÷ +15	+15 ÷ +20	+20 ÷ +25	+25 ÷ +30	+30 ÷ +35	+35 ÷ +40
Working time [minutes]	EASF	-	-	-	10	8	6	5	4	-	-
	EASF-E	-	-	-	-	-	15	10	7,5	5	3,5
	EASF-C	50	15	10	5	5	5	1,4	-	-	-
Hardening time [minutes]	EASF	-	-	-	145	85	75	50	40	-	-
	EASF-E	-	-	-	-	-	300	145	85	50	40
	EASF-C	720	100	75	50	50	50	20	-	-	-

TABLE 5. LOADING RESISTANCES FOR TENSION

Rod size	Hole diameter [mm]	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} = 1,4	γ_{Ms} = 1,4	γ_{Ms} = 1,46	γ_{Ms} = 1,62
		Anchorage depth h_{ef} [mm]																			Steel grade			
		60	80	100	120	140	160	180	200	220	240	280	300	360	400	450	500	550	600	640	BSt 500 S	B 500 SP	34 GS	18 G2
8	12	16,59	22,12	27,65	33,18	38,70	44,23	-	-	-	-	-	-	-	-	-	-	-	-	-	27,67	28,92	25,15	24,14
		9,22	12,29	15,36	18,43	21,50	24,57	-	-	-	-	-	-	-	-	-	-	-	-	-	19,76	20,66	17,19	14,88
10	14	-	23,88	29,85	35,81	41,78	47,75	53,72	59,69	-	-	-	-	-	-	-	-	-	-	-	43,18	45,14	39,25	37,68
		-	13,26	16,58	19,90	23,21	26,53	29,85	33,16	-	-	-	-	-	-	-	-	-	-	-	30,84	32,24	26,82	23,22
12	16	-	-	35,81	42,98	50,14	57,30	64,47	71,63	78,79	85,95	-	-	-	-	-	-	-	-	-	62,15	64,98	56,50	54,24
		-	-	19,90	23,88	27,86	31,83	35,81	39,79	43,77	47,75	-	-	-	-	-	-	-	-	-	44,39	46,41	38,61	33,43
16	20	-	-	-	-	63,33	72,38	81,43	90,48	99,53	108,57	126,67	135,72	-	-	-	-	-	-	-	110,55	115,58	100,50	96,48
		-	-	-	-	35,19	40,21	45,24	50,27	55,29	60,32	70,37	75,40	-	-	-	-	-	-	-	78,96	82,55	68,68	59,46
20	25	-	-	-	-	-	85,45	96,13	106,81	117,50	128,18	149,54	160,22	192,27	213,63	-	-	-	-	-	172,70	180,55	157,00	150,72
		-	-	-	-	-	47,47	53,41	59,34	65,28	71,21	83,08	89,01	106,81	118,68	-	-	-	-	-	123,36	128,96	107,28	92,89
25	32	-	-	-	-	-	-	-	133,52	146,87	160,22	186,92	200,28	240,33	267,04	300,41	333,79	-	-	-	270,05	282,33	245,50	235,68
		-	-	-	-	-	-	-	74,18	81,59	89,01	103,85	111,26	133,52	148,35	166,90	185,44	-	-	-	192,89	201,66	167,76	145,25
32	40	-	-	-	-	-	-	-	-	121,64	132,70	154,82	165,88	199,05	221,17	248,81	276,46	304,11	331,75	353,87	442,20	462,30	402,00	385,92
		-	-	-	-	-	-	-	-	67,58	73,72	86,01	92,15	110,58	122,87	138,23	153,59	168,95	184,31	196,59	315,86	330,21	274,70	237,85

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

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20 Updated: 2026-07-15

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

TABLE 6. LOADING RESISTANCES FOR SHEARING

Rod size	Hole diameter [mm]	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} = 1,5	γ_{Ms} = 1,5	γ_{Ms} = 1,5	γ_{Ms} = 1,5
		Anchorage depth h_{ef} [mm]																			Steel grade			
		60	80	100	120	140	160	180	200	220	240	280	300	360	400	450	500	550	600	640	BSt 500 S	B 500 SP	34 GS	18 G2
8	12	15,63	24,12	33,76	44,40	55,96	68,37	-	-	-	-	-	-	-	-	-	-	-	-	-	13,83	14,46	12,58	12,07
		10,42	16,08	22,50	29,60	37,31	45,58	-	-	-	-	-	-	-	-	-	-	-	-	-	9,22	9,64	8,38	8,05
10	14	-	24,85	34,78	45,75	57,66	70,45	84,05	98,41	-	-	-	-	-	-	-	-	-	-	-	21,59	22,57	19,63	18,84
		-	16,57	23,19	30,50	38,44	46,97	56,03	65,61	-	-	-	-	-	-	-	-	-	-	-	14,39	15,05	13,08	12,56
12	16	-	-	35,65	46,90	59,12	72,22	86,17	100,89	116,36	132,53	-	-	-	-	-	-	-	-	-	31,08	32,49	28,25	27,12
		-	-	23,77	31,27	39,41	48,15	57,44	67,26	77,57	88,35	-	-	-	-	-	-	-	-	-	20,72	21,66	18,83	18,08
16	20	-	-	-	-	61,53	75,17	89,68	105,01	121,10	137,93	173,65	192,49	-	-	-	-	-	-	-	55,28	57,79	50,25	48,24
		-	-	-	-	41,02	50,11	59,79	70,00	80,73	91,95	115,77	128,33	-	-	-	-	-	-	-	36,85	38,53	33,50	32,16
20	25	-	-	-	-	-	77,59	92,57	108,38	124,99	142,36	179,22	198,67	260,76	305,09	-	-	-	-	-	86,35	90,28	78,50	75,36
		-	-	-	-	-	51,73	61,71	72,26	83,33	94,91	119,48	132,44	173,84	203,39	-	-	-	-	-	57,57	60,18	52,33	50,24
25	32	-	-	-	-	-	-	-	111,94	129,09	147,03	185,09	205,16	269,27	315,03	375,43	439,15	-	-	-	135,03	141,16	122,75	117,84
		-	-	-	-	-	-	-	74,63	86,06	98,02	123,39	136,78	179,51	210,02	250,28	292,77	-	-	-	90,02	94,11	81,83	78,56
32	40	-	-	-	-	-	-	-	-	133,89	152,48	191,95	212,76	279,21	326,65	389,25	455,29	524,60	597,01	657,07	221,10	231,15	201,00	192,96
		-	-	-	-	-	-	-	-	89,26	101,65	127,96	141,84	186,14	217,77	259,50	303,53	349,73	398,01	438,05	147,40	154,10	134,00	128,64

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	Anchorage depth h_{ef} [mm]																			
			60	80	100	120	140	160	180	200	220	240	280	320	360	400	440	480	540	600	640
Distance from edge – c [mm]	ϕ8 ÷ ϕ32	$c=1,5h_{ef}$	90	120	150	180	210	240	270	300	330	360	420	480	540	600	660	720	810	900	960
Anchor spacing – s [mm]	ϕ8 ÷ ϕ32	$s=3h_{ef}$	180	240	300	360	420	480	540	600	660	720	840	960	1080	1200	1320	1440	1620	1800	1920

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
ϕ8-ϕ32	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 anchorage 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
ϕ8-ϕ32	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 anchorage 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
ϕ8-ϕ32	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 anchorage depth (h_{ef}) – $0,5h_{ef} < c < 1,5h_{ef}$

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20 Updated: 2026-07-15

TABLE 11. CONSUMPTION																				
Rod size	Hole diameter [mm]	Estimated number of anchors made from one cartridge – capacity 410 ml																		
		Anchorage depth h_{ef} [mm]																		
		60	80	100	120	140	160	180	200	220	240	280	300	360	400	450	500	550	600	640
ϕ8	12	81	60	48	40	35	30	-	-	-	-	-	-	-	-	-	-	-	-	-
ϕ10	14	-	44	36	30	25	22	20	18	-	-	-	-	-	-	-	-	-	-	-
ϕ12	16	-	-	27	23	19	17	15	14	12	11	-	-	-	-	-	-	-	-	-
ϕ16	20	-	-	-	-	12	11	10	9	8	7	6	6	-	-	-	-	-	-	-
ϕ20	25	-	-	-	-	-	7	6	6	5	5	4	4	3	3	-	-	-	-	-
ϕ25	32	-	-	-	-	-	-	-	3	3	3	2	2	2	2	2	1	-	-	-
ϕ 32	40	-	-	-	-	-	-	-	-	2	2	2	1	1	1	1	1	1	1	1

Section 3c. TECHNICAL DATA – REBARS (POST INSTALLED)

TABLE 1. PRODUCT FEATURES		
Parameter	Value	
Name	Makalu	
Symbol	WCF-EASF	
Type	Methacrylate	
Capacity	410 ml	
Installation temperature	WCF-EASF	+5 ÷ +30 ˚C
	WCF-EASF-E	+15 ÷ +40 ˚C
	-	-
Substrate	Non-cracked concrete	
Rebars – post installed	ϕ8 ÷ ϕ25	
Rebars	Grade: B, C	
Installation conditions	Dry and wet holes	
Drilling conditions	Hammer/diamond	

TABLE 2. PRODUCT SELECTION		
Code	[˚C]	Pcs
WCF-EASF-410	+5 ÷ +30	12
WCF-EASF-E-410	+15 ÷ +40	12

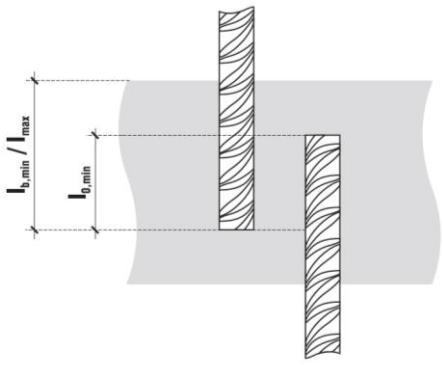


TABLE 3. INSTALLATION PARAMETERS – REBARS								
Parameters			Rod size					
			ϕ8	ϕ10	ϕ12	ϕ14	ϕ16	ϕ20	ϕ25
Rebar diameter	d	[mm]	8	10	12	14	16	20	25
Hole diameter	d_0	[mm]	12	14	16	18	20	25	32
Min. anchorage depth – C20/25	$l_{b,min}$	[mm]	113	142	170	198	227	284	354
Min. anchorage depth – C50/60	$l_{b,min}$	[mm]	100	100	120	140	160	200	250
Min. anchorage depth for overlapping	$l_{0,min}$	[mm]	200	200	200	210	240	300	375
Max. anchorage depth	l_{max}	[mm]	400	500	600	700	800	1000	1000

Values have been calculated for good bonding conditions and α_6=1,0
Min. anchorage depth for rebar as an anchor: $l_{b,min}$=max(0,3*$l_{b,rqd}$;10*d;100 mm)
Min. anchorage length for overlapping: $l_{0,min}$=max(0,3*α_6*$l_{b,rqd}$;15*d;200 mm)

TABLE 4. CURING TIME											
Substrate temp. [˚C]	Resin type	-10 ÷ -5	-5 ÷ 0	0 ÷ +5	+5 ÷ +10	+10 ÷ +15	+15 ÷ +20	+20 ÷ +25	+25 ÷ +30	+30 ÷ +35	+35 ÷ +40
Working time [minutes]	EASF	-	-	-	10	8	6	5	4	-	-
	EASF-E	-	-	-	-	-	15	10	7,5	5	3,5
Hardening time [minutes]	EASF	-	-	-	145	85	75	50	40	-	-
	EASF-E	-	-	-	-	-	300	145	85	50	40

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20 Updated: 2026-07-15

TABLE 5. ULTIMATE LIMIT FOR RESIN-CONCRETE CONNECTION									
Bond stress limit f_{bd} [N/mm^2]									
Bar size	Concrete grade								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
ϕ8	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
ϕ10	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
ϕ12	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
ϕ14	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
ϕ16	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
ϕ20	1,6	2,0	2,3	2,7	3,0	3,4	3,7	3,7	3,7
ϕ25	1,6	2,0	2,3	2,7	3,0	3,0	3,0	3,0	3,0

Values provided in this table are correct only for good installation conditions outlined in accordance with EN 1992-1-1. For all other conditions, these values are multiplied by 0,7
Minimum cover: c_{min}=30 mm+0,06*l_b≥2*d
Minimal installed rebar spacing: a=40 mm≥4*d

TABLE 6.1. DESIGN LOADING RESISTANCES FOR TENSION – FOR ANCHORING BARS IN CONCRETE C50/60																					
Bar size	C20/25 concrete																				Steel
	Anchorage depth l_b [mm]																				BSt 500S
	110	140	170	200	230	280	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	γ_{Ms}=1,15
ϕ8	6,36	8,09	9,83	11,56	13,30	16,19	20,23	21,87	-	-	-	-	-	-	-	-	-	-	-	-	21,87
ϕ10	-	10,12	12,28	14,45	16,62	20,23	25,29	28,90	32,52	34,13	-	-	-	-	-	-	-	-	-	-	34,13
ϕ12	-	-	14,74	17,34	19,94	24,28	30,35	34,68	39,02	43,35	47,69	49,13	-	-	-	-	-	-	-	-	49,13
ϕ14	-	-	-	20,23	23,27	28,32	35,41	40,46	45,52	50,58	55,64	60,70	65,75	66,96	-	-	-	-	-	-	66,96
ϕ16	-	-	-	-	26,59	32,37	40,46	46,24	52,02	57,81	63,59	69,37	75,15	80,93	86,71	87,39	-	-	-	-	87,39
ϕ20	-	-	-	-	-	40,46	50,58	57,81	65,03	72,26	79,48	86,71	93,93	101,16	108,38	115,61	122,84	130,06	136,52	-	136,52
ϕ25	-	-	-	-	-	-	63,22	72,26	81,29	90,32	99,35	108,38	117,42	126,45	135,48	144,51	153,55	162,58	171,61	180,64	213,48

Values provided for good bonding conditions in accordance with EN 1992-1-1 and for α_1-α_5=1. For other anchoring conditions the values provided should be multiplied by 0,7

TABLE 6.2. DESIGN LOADING RESISTANCES FOR TENSION – FOR ANCHORING BARS IN CONCRETE C50/60																					
Bar size	C50/60 concrete																				Steel
	Anchorage depth l_b [mm]																				BSt 500S
	100	120	140	160	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	γ_{Ms}=1,15
ϕ8	10,81	12,97	15,13	17,29	21,61	21,87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21,87
ϕ10	13,51	16,21	18,91	21,61	27,02	33,77	34,13	-	-	-	-	-	-	-	-	-	-	-	-	-	34,13
ϕ12	-	19,45	22,69	25,94	32,42	40,53	48,63	49,13	-	-	-	-	-	-	-	-	-	-	-	-	49,13
ϕ14	-	-	26,48	30,26	37,82	47,28	56,74	66,19	66,96	-	-	-	-	-	-	-	-	-	-	-	66,96
ϕ16	-	-	-	34,58	43,23	54,04	64,84	75,65	86,46	87,39	-	-	-	-	-	-	-	-	-	-	87,39
ϕ20	-	-	-	-	46,50	58,12	69,74	81,37	92,99	104,62	116,24	127,86	136,52	-	-	-	-	-	-	-	136,52
ϕ25	-	-	-	-	-	58,90	70,69	82,47	94,25	106,03	117,81	129,59	141,37	153,15	164,93	176,71	188,50	200,28	212,06	213,48	213,48

Values provided for good bonding conditions in accordance with EN 1992-1-1 and for α_1-α_5=1. For other anchoring conditions the values provided should be multiplied by 0,7

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20 Updated: 2026-07-15

TABLE 7.1. DESIGN LOADING RESISTANCES FOR TENSION – FOR OVERLAPPING BARS IN CONCRETE C20/25

Bar size	C20/25 concrete																				Steel
	Lap length l_0 [mm]																				BSt 500S
	200	210	240	270	300	375	400	420	450	500	550	600	650	700	750	800	850	900	950	1000	γ_{Ms}=1,15
ϕ8	11,56	12,14	13,87	15,61	17,34	21,68	21,87	-	-	-	-	-	-	-	-	-	-	-	-	-	21,87
ϕ10	14,45	15,17	17,34	19,51	21,68	27,10	28,90	30,35	32,52	34,13	-	-	-	-	-	-	-	-	-	-	34,13
ϕ12	17,34	18,21	20,81	23,41	26,01	32,52	34,68	36,42	39,02	43,35	47,69	49,13	-	-	-	-	-	-	-	-	49,13
ϕ14	-	21,24	24,28	27,31	30,35	37,93	40,46	42,49	45,52	50,58	55,64	60,70	65,75	66,96	-	-	-	-	-	-	66,96
ϕ16	-	-	27,75	31,21	34,68	43,35	46,24	48,56	52,02	57,81	63,59	69,37	75,15	80,93	86,71	87,39	-	-	-	-	87,39
ϕ20	-	-	-	-	43,35	54,19	57,81	60,70	65,03	72,26	79,48	86,71	93,93	101,16	108,38	115,61	122,84	130,06	136,52	-	136,52
ϕ25	-	-	-	-	-	67,74	72,26	75,87	81,29	90,32	99,35	108,38	117,42	126,45	135,48	144,51	153,55	162,58	171,61	180,64	213,48

Values provided for good bonding conditions in accordance with EN 1992-1-1 and for α_1-α_5=1. For other anchoring conditions the values provided should be multiplied by 0,7

TABLE 7.2. DESIGN LOADING RESISTANCES FOR TENSION – FOR OVERLAPPING BARS IN CONCRETE C50/60

Bar size	C50/60 concrete																			Steel
	Lap length l_0 [mm]																			BSt 500S
	200	210	240	270	300	350	375	400	420	450	500	550	600	650	700	750	800	850	900	950	γ_{Ms}=1,15
ϕ8	21,61	21,87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21,87
ϕ10	27,02	28,37	32,42	34,13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34,13
ϕ12	32,42	34,04	38,91	43,77	48,63	49,13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49,13
ϕ14	-	39,72	45,39	51,06	56,74	66,19	66,96	-	-	-	-	-	-	-	-	-	-	-	-	-	66,96
ϕ16	-	-	51,87	58,36	64,84	75,65	81,05	86,46	87,39	-	-	-	-	-	-	-	-	-	-	-	87,39
ϕ20	-	-	-	-	69,74	81,37	87,18	92,99	97,64	104,62	116,24	136,52	-	-	-	-	-	-	-	-	136,52
ϕ25	-	-	-	-	-	-	88,36	94,25	98,96	106,03	117,81	129,59	141,37	153,15	164,93	176,71	188,50	200,28	212,06	213,48	213,48

Values provided for good bonding conditions in accordance with EN 1992-1-1 and for α_1-α_5=1. For other anchoring conditions the values provided should be multiplied by 0,7

TABLE 8. CONSUMPTION

Bar size	Hole diameter [mm]	Estimated number of anchors made from one cartridge – capacity 410 ml																				
		Anchorage depth h_{ef} [mm]																				
		100	120	140	160	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
ϕ8	12	54	45	39	34	27	22	18	16	14	-	-	-	-	-	-	-	-	-	-	-	-
ϕ10	14	45	38	32	28	23	18	15	13	11	10	9	-	-	-	-	-	-	-	-	-	-
ϕ12	16	-	32	28	24	19	16	13	11	10	9	8	7	6	-	-	-	-	-	-	-	-
ϕ14	18	-	-	24	21	17	14	11	10	9	8	7	6	6	5	5	-	-	-	-	-	-
ϕ16	20	-	-	-	19	15	12	10	9	8	7	6	5	5	5	4	4	4	-	-	-	-
ϕ20	25	-	-	-	-	10	8	6	6	5	4	4	4	3	3	3	3	2	2	2	2	-
ϕ25	32	-	-	-	-	-	4	4	3	3	2	2	2	2	2	2	1	1	1	1	1	1

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20 Updated: 2026-07-15

Section 3d. TECHNICAL DATA – MASONRY

TABLE 1. PRODUCT FEATURES		
Parameter	**Value**	
Name	Makalu	
Symbol	WCF-EASF	
Type	Methacrylate	
Capacity	410 ml	
Installation temperature	WCF-EASF	+5 ÷ +30 ˚C
	WCF-EASF-E	+15 ÷ +40 ˚C
	WCF-EASF-C	0 ÷ +20 ˚C
Substrate	Solid brick, slotted brick, ceramic block	
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-EASF-410	+5 ÷ +30 ˚C	12
WCF-EASF-E-410	+15 ÷ +40 ˚C	12
WCF-EASF-C-410	0 ÷ +20 ˚C	12

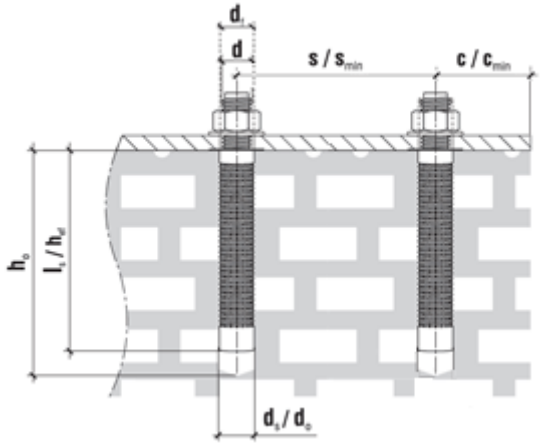


TABLE 3. INSTALLATION PARAMETERS – THREADED RODS – MASONRY								
Substrate type			Solid brick			Hollow brick		
Rod size			M8	M10	M12	M8	M10	M12
Threaded rod diameter	d	[mm]	8	10	12	8	10	12
Length of mesh sleeve	l_s	[mm]	-	-	-	85	85	85
Diameter of mesh sleeve	d_s	[mm]	-	-	-	15	15	20
Hole diameter	d_o	[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 do -5	-5 do 0	0 do +5	+5 do +10	+10 do +15	+15 do +20	+20 do +25	+25 do +30	+30 do +35	+35 do +40
Working time [minutes]	EASF	-	-	-	10	8	6	5	4	-	-
	EASF-E	-	-	-	-	-	15	10	7,5	5	3,5
	EASF-C	-	-	10	5	5	5	1,4	-	-	-
Hardening time [minutes]	EASF	-	-	-	145	85	75	50	40	-	-
	EASF-E	-	-	-	-	-	300	145	85	50	40
	EASF-C	-	-	75	50	50	50	20	-	-	-

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20
Updated: 2026-07-15

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 – $\gamma_{Mm} = 2,5$

Rod size	Substrate type***				
	Brick 1**	Brick 2**	Brick 3	Brick 4	Brick 5**
M8	0,90	2,00	3,00	3,00	2,00
	0,36	0,80	1,20	1,20	0,80
M10	1,50	2,00	3,00	3,00	2,00
	0,60	0,80	1,20	1,20	0,80
M12	1,50	2,50	3,00	3,00	2,50
	0,60	1,00	1,20	1,20	1,00

*For design according TR 054: $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$; $N_{Rk,pb}$ according to TR 054
For $V_{Rk,s}$ see Annex C1, Table C2; Calculation of $V_{Rk,pb}$ and $V_{Rk,c}$ according to TR 054
**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	245	110	100	245	110	120	245	110
Brick 2	100	373	238	100	373	238	120	373	238
Brick 3	128	255	255	128	255	255	128	255	255
Brick 4	128	255	255	128	255	255	125	255	255
Brick 5	100	239	248	100	239	248	120	239	248

TABLE 7. TYPES OF MASONRY FOR TABLE 5, 6

Brick N° 1



Hollow clay brick Hueco Doble
according to EN 771-1
length/width/height = 245 mm / 110 mm / 88 mm
$f_b \geq 2,5$ N/mm² / $\rho \geq 0,74$ kg/dm³

Brick N° 2



Hollow clay brick Porotherm P+W
according to EN 771-1
length/width/height = 373 mm/250 mm/238 mm
$f_b \geq 12$ N/mm² / $\rho \geq 0,9$ kg/dm³

Brick N° 3



Solid clay brick Mz-NF
according to EN 771-1
length/width/height = 240 mm / 115 mm / 71 mm
$f_b \geq 20$ N/mm² / $\rho \geq 1,9$ kg/dm³

Brick N° 4



Solid calcium silicate brick KSV-NF
according to EN 771-2
length/width/height = 240 mm / 115 mm / 71 mm
$f_b \geq 25$ N/mm² / $\rho \geq 1,8$ kg/dm³

Brick N° 5



Perforated calcium silicate brick KSL-R-12-1,2-16DF
according to EN 771-2
length/width/height = 239 mm / 248 mm / 239 mm
$f_b \geq 15$ N/mm² / $\rho \geq 1,3$ kg/dm³

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20 Updated: 2026-07-15

TABLE 8. CONSUMPTION – MASONRY				
Rod size	Hole diameter [mm]	Torque T_{inst} [Nm]	Estimated number of anchors made from one cartridge – capacity 410 ml	
			Embedment depth h_{ef} = 85 [mm]	
			Solid brick	Hollow brick
M8	16	2	27	20
M10	16	2	32	24
M12	20	2	20	15

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.

All rights reserved The sheet may be disclosed only in the form as delivered. No part (contents such as text, graphics, logos, figures, pictures, and any other data) given in this document may be modified or published whatsoever in part, without prior authorisation. Any trademarks, graphic symbols, trade names, logos and other data are protected by copyright and are property of their owner. Created: 2016-07-20
Updated: 2026-07-15