WCF-VESF / WCF-VESF-E

Vinylester injection anchors - for medium and heavy loads, for use use with non-cracked concrete, without styrene

ETA-15/0744

Description

Vinylester two component (1:10) injection anchor without styrene. Intended for both handymen working around the house and professionals for reliable, durable installations. Anchor used for setting of threaded rods into concrete substrates. Content: 300 ml / 410 ml. Working temperatures for hardened anchor: -40˚C to +80˚C

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);

Related rods

- Threaded rods M8-M24 made of galvanized steel grades: 5.8 8.8 10.9;
- Threaded rods M8-M24 made of stainless steel grades: A2-70, A4-70, A4-80;
- Threaded rods M8-M24 made of HCR steel: 1.4529, 1.4565;
- Galvanized, hot-dip galvanized or thermodiffusion galvanized bars;

Application temperatures

5°C ÷ 30°C	10°C ÷ 45°C
WCF-VESF-300	WCF-VESF-E-300
WCF-VESF-410	WCF-VESF-E-410

Features and advantages

Wide range of applications	Fastening of structural elements (beams, pillars), fastening of non-structural elements (railings, handrails, barriers), fastening of façade structures and supporting elements (stairwells, shelving units), installation of acoustic barriers etc. calculation method based on TR 029
Styrene-free	Does not release volatile styrene compounds, making it safe for people and suitable for indoor applications
Normal recipe and summer recipe	Can be used in various working conditions: WCF-VESF - for normal installation conditions +5˚C to +30˚C; WCF-VESF-E - for summer (tropical) installation conditions +10˚C to +45˚C;
No stress during installation	It wallows for installation near the edges without risking cracking of the substrate
Quick and shrinkless hardening	Speeds up installation work
Long life	Valid for use within 12 months in normal storage conditions
Two mixers included in for 300 ml of content	Ability to reuse the resin after completing work. Place the mixer on an unused cartridge mouth for next use, then unscrew the dried mixer and install the new one - the anchor is now ready for further work
Durable and safe packaging	300 ml of content packed in foil and a cartridge. Foil packaging prevents the resin from getting out during prolonged storage, while the plastic cartridge serves as an additional protection layer (store in upright position)
Content 410 ml - coaxial cartridge	Increased volume - 410 ml for larger work scopes, the coaxial cartridge allows for easier portioning and allows for use of every cm^3 of the product

WCF-VESF / WCF-VESF-E

Vinylester injection anchors - for medium and heavy loads, for use use with non-cracked concrete, without styrene

TABLE 1 Ordering list

	Code	[°C]	Pcs.
300ml	WCF-VESF-300	5 ÷ 30	12
	WCF-VESF-E-300	10 ÷ 45	12
410ml	WCF-VESF-410	5 ÷ 30	12
	WCF-VESF-E-410	10 ÷ 45	12

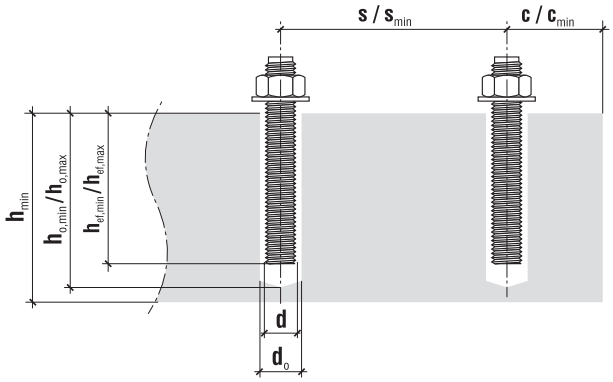


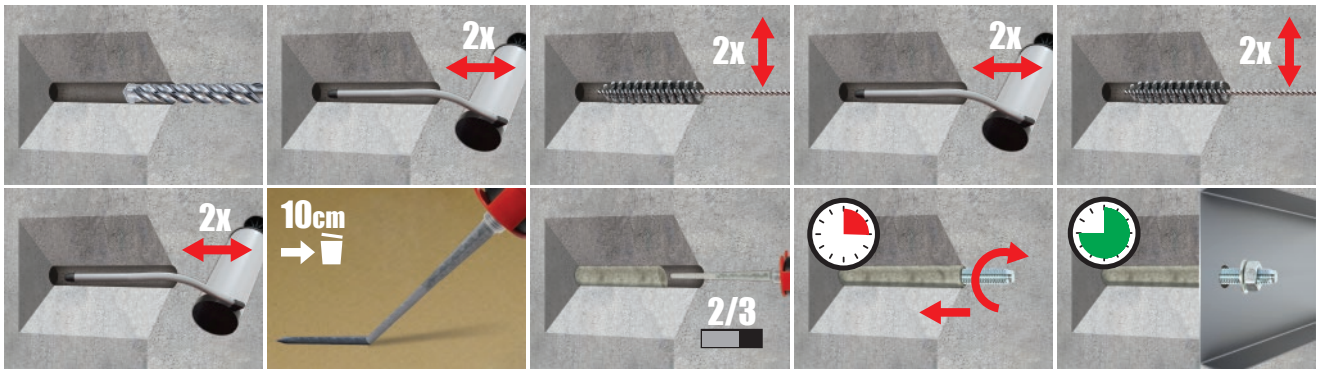
TABLE 2 Installation parameters - threaded rods

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
For minimum embedment depth = 8d	Min. embedment 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 the edge	c_{min}	[mm]	35	40	50	65	80	96
	Min. spacing	s_{min}	[mm]	35	40	50	65	80	96
Maximum embedment depth = 12d	Max. embedment depth	$h_{ef,max}$	[mm]	96	120	144	192	240	288
	Max. crevice depth	$h_{0,max}$	[mm]	101	125	149	197	245	293
	Min. distance from the edge	c_{min}	[mm]	50	60	70	95	120	145
	Min. spacing	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 3 Curing time

Substrate temp [°C]	Resin type	5 ÷ 10	10 ÷ 20	20 ÷ 25	25 ÷ 30	30 ÷ 35	35 ÷ 40	40 ÷ 45	>45
Working time [min.]	VESF	10	6	5	4	4	-	-	-
	VESF-E	-	15	10	7.5	5	3.5	2.5	2.5
Hardening time [min]	VESF	145	85	50	40	35	-	-	-
	VESF-E	-	300	145	85	50	40	35	12

Installation method



WCF-VESF / WCF-VESF-E

Vinylester injection anchors - for medium and heavy loads, for use use with non-cracked concrete, without styrene

TABLE 4 Loading resistances for tension

Bar 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 failure - $N_{R,s}$ [kN]					
			Safety factor - $\gamma_{Mc} = 1.8$												$\gamma_{Ms} = 1.5$		$\gamma_{Ms} = 1.4$	$\gamma_{Ms} = 1.87$		$\gamma_{Ms} = 1.6$
			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
M8	10	10	15.08	20.11	25.13	-	-	-	-	-	-	-	-	-	-	18.30	29.28	36.60	25.62	25.62	29.28
			8.38	11.17	13.96	-	-	-	-	-	-	-	-	-	-	12.20	19.52	26.14	13.73	13.73	18.30
M10	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
M12	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
M16	18	80	-	-	-	-	66.85	76.40	85.95	95.50	-	-	-	-	-	78.50	125.60	157.00	109.90	109.90	125.60
			-	-	-	-	37.14	42.45	47.75	53.06	-	-	-	-	-	52.33	83.73	112.14	58.88	58.88	78.50
M20	22	150	-	-	-	-	-	85.45	96.13	106.81	117.50	128.18	-	-	-	122.50	196.00	245.00	171.50	171.50	196.00
			-	-	-	-	-	47.47	53.41	59.34	65.28	71.21	-	-	-	81.67	130.67	175.00	91.88	91.88	122.50
M24	26	200	-	-	-	-	-	-	-	128.18	140.99	153.81	166.63	179.45	192.27	176.50	282.40	353.00	247.10	247.10	282.40
			-	-	-	-	-	-	-	71.21	78.33	85.45	92.57	99.69	106.81	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 from the edge decreases, the values given should be multiplied by reduction coefficients from tables 7 and 8.

Characteristic values Design values

TABLE 5 Loading resistances for shearing

Bar 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 - $\gamma_{Mc} = 1.5$												$\gamma_{Ms} = 1.25$		$\gamma_{Ms} = 1.5$	$\gamma_{Ms} = 1.56$		$\gamma_{Ms} = 1.33$
			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
M8	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
M10	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
M12	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
M16	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
M20	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
M24	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 from the edge decreases, the values given should be multiplied by reduction coefficients from tables 7 and 9.

Characteristic values Design values

WCF-VESF / WCF-VESF-E

Vinylester injection anchors - for medium and heavy loads, for use use with non-cracked concrete, without styrene

TABLE 6 Base installation conditions allowing for maintaining loading resistances from table 4.5

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

TABLE 7 Reduction factors for tension and shearing - effects of anchor spacing, "s"

Effects of anchor spacing (reduction coefficient) - $\Psi_{sn,v}$																										
s/h_{ef}	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	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})

$0,5\ h_{ef} < s < 3\ h_{ef}$	M8-M24

TABLE 8 Reduction factors for tension - effects of distance from the edge "c"

Effects of anchor distance from the edge (reduction coefficient) - $\Psi_{sn,v}$											
c/h_{ef}	0.5	0.6	0.7	0.8	0.9	1	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})

$0,5\ h_{ef} < c < 1,5h_{ef}$	M8-M24

TABLE 9 Reduction factors for shearing - effects of distance from the edge "c"

Effects of anchor distance from the edge (reduction coefficient) - Ψ_{cv}											
c/h_{ef}	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})

$0,5\ h_{ef} < c < 1,5h_{ef}$	M8-M24

TABLE 10 Consumption

Bar size	Hole diameter [mm]	Torque T_{inst} [Nm]	Estimated number of anchors made from one cartridge - content 300/410 ml												
			Embedment depth h_{ef} [mm]												
			60	80	100	120	140	160	180	200	220	240	260	280	300
M8	10	10	85	64	51	-	-	-	-	-	-	-	-	-	-
			116	87	70	-	-	-	-	-	-	-	-	-	-
M10	12	20	-	44	35	29	-	-	-	-	-	-	-	-	-
			-	60	48	40	-	-	-	-	-	-	-	-	-
M12	14	40	-	-	26	22	19	-	-	-	-	-	-	-	-
			-	-	36	30	25	-	-	-	-	-	-	-	-
M16	18	80	-	-	-	-	11	10	9	8	-	-	-	-	-
			-	-	-	-	15	13	12	11	-	-	-	-	-
M20	22	150	-	-	-	-	-	7	6	5	5	4	-	-	-
			-	-	-	-	-	9	8	7	7	6	-	-	-
M24	26	200	-	-	-	-	-	-	-	4	3	3	3	3	3
			-	-	-	-	-	-	-	5	5	4	4	4	3

content 300 ml content 410 ml