



TECHNICAL DATA SHEET

VINYLESTER CHEMICAL ANCHOR

Description

ALCOLIN VINYLESTER CHEMICAL ANCHOR is a vinylester-based, styrene free, high performance, rapid curing two-part chemical anchoring system. It is designed as a fast curing, high strength fixing anchor for very high loads and critical fixings especially in corrosive environments and damp conditions. The product is extruded via the mixing nozzle with the use of a barrel applicator gun directly into the hole.

Features & Benefits

- Suitable for medium and heavy duty fixing.
- Can be used in structural and non-structural applications.
- Particularly suitable for structural fixing in cracked and un-cracked concrete.
- Styrene Free - low odour, suitable for indoor use and in enclosed spaces.
- Can be used in wet and dry conditions.
- Has good chemical and corrosion resistance.
- Fast curing for rapid repair and installation work.
- Low shrinkage - enables large diameter installation.
- Single cartridge so can be applied with a barrel applicator gun.

Applications

- Anchoring threaded steel rods, bolts and rebar into concrete and stone.
- Crack and gap filling repairs in concrete and masonry.
- Balcony repairs, installation of pool ladders, safety barriers and handrails.
- Anchoring of railings, legs, machine housings and steel plates to concrete.
- Steel reinforcing of concrete (grouting).

Adhesion

ALCOLIN VINYLESTER CHEMICAL ANCHOR provides excellent primerless adhesion to natural stone, marble, slate, granite, brickwork, plaster, concrete, hollow walls, masonry, wood and steel. Specifically threaded steel rods made of zinc coated steel, stainless steel, high corrosion resistant stainless steel (HCR), or rebar.

Limitations

- Will not bond to plastics e.g., polyethylene, polypropylene, Teflon.
- For optimum strength, embedment depths must be within the range 4 diameters to 20 diameters.



- Not suitable for anchoring structures exposed to particularly aggressive conditions e.g., permanent, alternating immersion in seawater or the splash zone of seawater.
- Not recommended for overhead installations.
- For anchoring applications, concrete must be a minimum of 21 days old prior to anchor installation.

Safety instructions

ALCOLIN VINYLESTER CHEMICAL ANCHOR is non-toxic, however, it is advisable to wear gloves in order to avoid direct skin contact. In the event of skin or eye contact, rinse thoroughly and immediately with water. Seek medical assistance if irritation or discomfort persists. Keep out of reach of children! Refer to our Safety Data Sheets for further toxicological information and comprehensive handling instructions.

Directions for use

The minimum application temperature is -10°C while the maximum is 35°C . The cartridge temperature must be at least 20°C .

Fixing on concrete with threaded rod

The product is homologated for being used with a wide range of threaded rods (from M8 to M30) and anchorage depths. Certified service temperatures are in the ranges $-40^{\circ}\text{C}/+40^{\circ}\text{C}$ (T° max long period = 24°C); $-40^{\circ}\text{C}/+80^{\circ}\text{C}$ (T° max long period = 50°C) and $-40^{\circ}\text{C}/+120^{\circ}\text{C}$ (T° max long period = 72°C). Suitable for fixing in wet concrete and flooded hole.

Product Data

Fixing on concrete C20/25 with zinc plated threaded rods class 5.8

Characteristic measurements			M8	M10	M12	M16	M20	M24	M27	M30
d_0	Hole diameter	[mm]	10	12	14	18	24	28	30	35
T_{inst}	Fixing torque	[Nm]	10	20	40	80	130	200	250	280
S_w	Hex key	[mm]	13	17	19	24	30	36	41	46
d_f	Hole through fixture	[mm]	9	12	14	18	22	26	30	33

Minimum anchorage depth

Characteristic measurements			M8	M10	M12	M16	M20	M24	M27	M30
h_1	Hole depth	[mm]	65	75	85	105	125	150	150	150
h_{nom}	Embedment depth	[mm]	60	70	80	100	120	145	145	145
h_{min}	Minimum base material thickness	[mm]	100	100	110	136	168	201	210	220
s_{cr}	Centre spacing	[mm]	180	210	240	300	360	435	435	435
c_{cr}	Edge distance	[mm]	90	105	120	150	180	218	218	218
s_{min}	Minimum spacing	[mm]	40	50	60	75	100	115	120	140
C_{min}	Minimum edge distance	[mm]	40	50	60	75	100	115	120	140

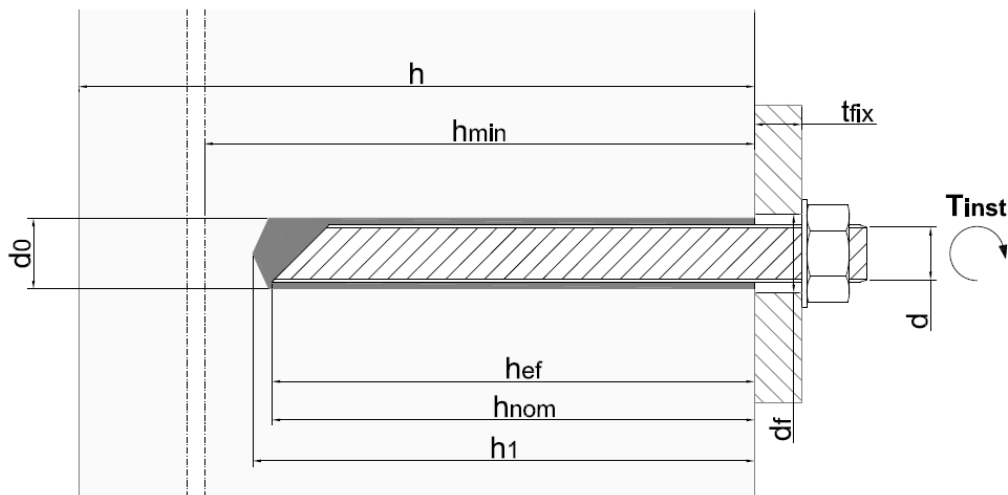
Medium anchorage depth

Characteristic measurements			M8	M10	M12	M16	M20	M24	M27	M30
h_1	Hole depth	[mm]	85	95	115	130	175	215	245	275
h_{nom}	Embedment depth	[mm]	80	90	110	125	170	210	240	270
h_{min}	Minimum base material thickness	[mm]	100	114	138	161	218	266	300	340
s_{cr}	Centre spacing	[mm]	240	270	330	375	510	630	720	810

C_{cr}	Edge distance	[mm]	120	135	165	187	255	315	360	405
S_{min}	Minimum spacing	[mm]	40	50	60	75	100	115	120	140
C_{min}	Minimum edge distance	[mm]	40	50	60	75	100	115	120	140

Maximum anchorage depth

Characteristic measurements			M8	M10	M12	M16	M20	M24	M27	M30
h₁	Hole depth	[mm]	165	205	245	325	405	485	545	605
h_{nom}	Embedment depth	[mm]	160	200	240	320	400	480	540	600
h_{min}	Minimum base material thickness	[mm]	180	224	268	356	448	536	600	670
s_{cr}	Centre spacing	[mm]	480	600	720	960	1200	1440	1620	1800
c_{cr}	Edge distance	[mm]	240	300	360	480	600	720	810	900
S_{min}	Minimum spacing	[mm]	40	50	60	75	100	115	120	140
C_{min}	Minimum edge distance	[mm]	40	50	60	75	100	115	120	140



Curing conditions

Base material temperature	Gel time (working time)	Cure time
-10°C	1 hour 45 min	24 hours
-5°C	65 min	14 hours
0°C	45 min	7 hours
5°C	25 min	1 hour 30 min
10°C	16 min	60 min
20°C	7,5 min	40 min
25°C	5 min	35 min
30°C	3 min	30 min
35°C	2 min	25 min

*The temperature of the bond material must be $\geq 5^{\circ}\text{C}$
In presence of water, the curing time must be doubled.*

Recommended Loads

Fixing on uncracked concrete C20/25 with threaded rods class 5.8

Minimum anchorage depth

		M8	M10	M12	M16	M20	M24	M27	M30
Tensile	[kN]	9,0	12,0	17,0	24,0	31,6	41,9	42,0	42,0
Shear	[kN]	5,4	8,6	12,5	23,3	36,3	52,5	68,2	83,4

General safety factor included

Medium anchorage depth

		M8	M10	M12	M16	M20	M24	M27	M30
Tensile	[kN]	9,0	14,3	20,8	33,6	49,8	72,9	80,3	99,2
Shear	[kN]	5,4	8,6	12,5	23,3	36,3	52,5	68,2	83,4

General safety factor included

Fixing on uncracked concrete C20/25 with threaded rods class 8.8

Maximum anchorage depth

		M8	M10	M12	M16	M20	M24	M27	M30
Tensile	[kN]	13,9	22,1	32,1	59,5	96,6	139,5	180,6	108,8
Shear	[kN]	8,3	13,2	19,2	35,7	58,0	83,7	220,5	133,1

General safety factor included

- Load for service temperature range between -40°C/+40°C.
- Loads for single anchor with no influence of spacing and edge distance and with thickness of concrete $\geq 2h_{ef}$.
- Shear directed away from the edge.
- With flooded hole the loads must be reduced of 20%.

Fixing on uncracked concrete C20/25 with threaded rods class 5.8

Minimum anchorage depth

		M8	M10	M12	M16	M20	M24
Tensile	[kN]	-	9,1	12,2	17,1	22,5	-
Shear	[kN]	-	8,6	12,5	23,3	34,3	-

Medium anchorage depth

		M8	M10	M12	M16	M20	M24
Tensile	[kN]	-	11,7	17,8	23,9	33,8	-
Shear	[kN]	-	8,6	12,5	23,3	36,2	-

Fixing on uncracked concrete C20/25 with threaded rods class 8.8

Maximum anchorage depth

		M8	M10	M12	M16	M20	M24
Tensile	[kN]	-	22,1	32,1	59,5	79,5	-
Shear	[kN]	-	13,2	19,2	35,7	58,0	-

- Load for service temperature range between -40°C/+40°C
- Loads for single anchor with no influence of spacing and edge distance and with thickness of concrete $\geq 2h_{ef}$
- Shear directed away from the edge
- With flooded hole the loads must be reduced of 20%

Fixing on concrete with reinforced bar (rebar)

The product is homologated, for being used with a wide range of reinforced bar (from \varnothing 8 mm a \varnothing 32 mm) and anchorage depths up to 1 m. Certified service temperatures are in the range -40°C/+80°C (T° max long period = 50°C). Can be installed in wet concrete. Design according to EC2 for post-installed rebar connection.

Fixing on concrete C20/25 with reinforced bar (rebar)

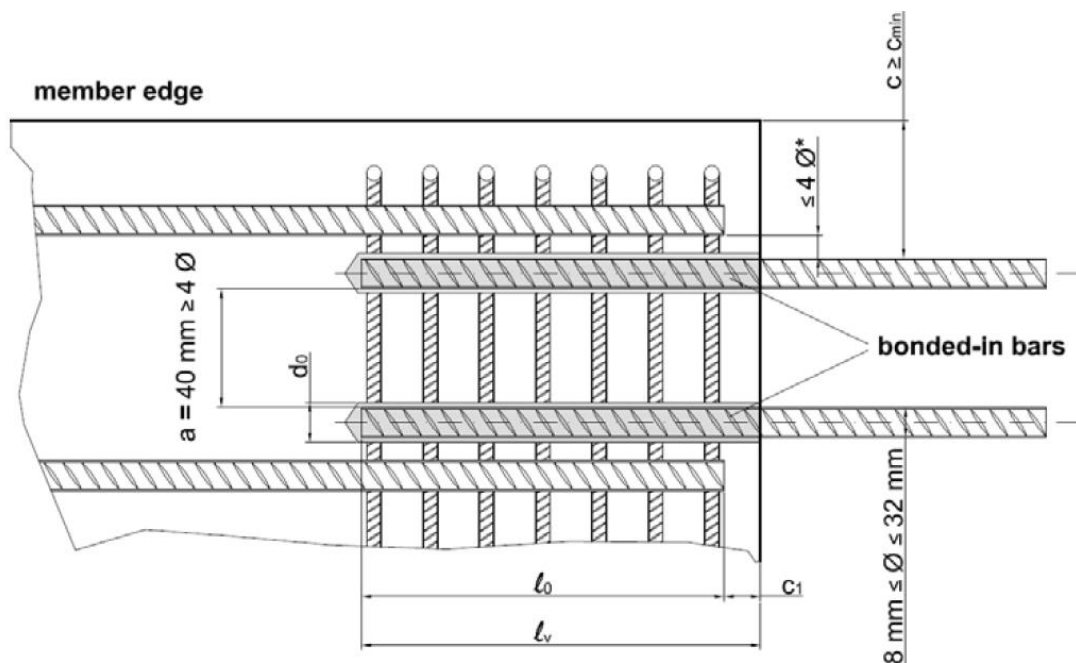
Rebar diameter	$\varnothing 8$	$\varnothing 10$	$\varnothing 12$	$\varnothing 14$	$\varnothing 16$	$\varnothing 20$	$\varnothing 25$	$\varnothing 28$	$\varnothing 32$
Hole diameter	12	14	16	18	20	25	30	35	40
Minimum anchorage depth	115	145	170	200	230	285	355	400	455
Minimum overlap joint depth	200	200	200	210	240	300	375	420	480
Max anchorage depth	400	500	600	700	800	1000	1000	1000	1000

Values in mm

Minimum concrete cover: $c_{min} = 30 \text{ mm} + 0,06 l_v \geq 2 \cdot \varnothing$ per $\varnothing < 25 \text{ mm}$

$c_{min} = 40 \text{ mm} + 0,06 l_v \geq 2 \cdot \varnothing$ per $\varnothing \geq 25 \text{ mm}$

Minimum rebar spacing: $a = 40 \text{ mm} \geq 4 \cdot \varnothing$



Intended use with reinforced bar

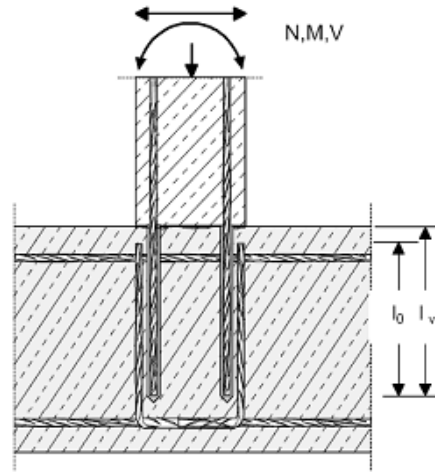
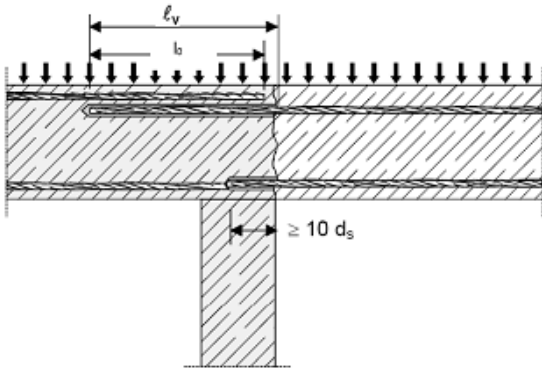


Figure 1: joint for overlapping plates and beams

Figure 2: overlapping joint of pillars stressed in bending or walls with foundations

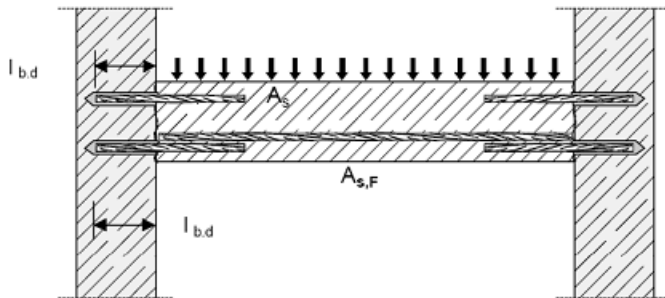


Figure 3: terminal anchoring of plates and beams

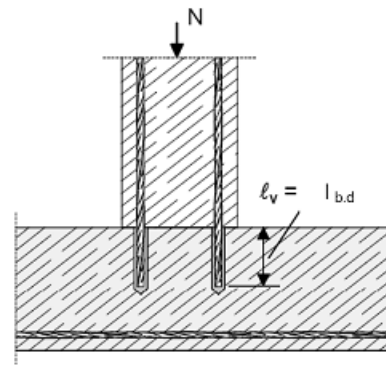


Figure 4: anchoring of construction elements stressed by compression

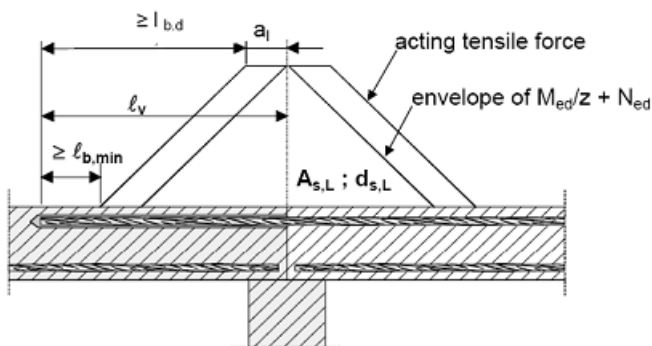


Figure 5: anchoring rebars to meet the envelope line

Note per figure da 1 a 5: no shear reinforcement is shown in the images, the necessary shear reinforcement according to EN 1992-1-1 must be present. The transmission of shear loads between new and existing concrete must be verified according to EN 1992-1-1.

Design load – anchorage of post installed rebar

Values for pre-calculation of anchoring rebars connections							
Examples for anchorage length ¹⁾ ($f_{y,k} = 500 \text{ N/mm}^2$; concrete C20/25; $f_{bd} = 2,3 \text{ N/mm}^2$)							
Rebar Ø	Tensile load B500	$\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_c = 1,0$			$\alpha_1 = \alpha_2 = \alpha_4 = 1,0$ and α_3 or $\alpha_c = 0,7$		
		Anchorage length $l_{bd}^{1)}$	Tension load	Mortar volume V	Anchorage length $l_{bd}^{1)}$	Tension load	Mortar volume V
[mm]	[kN]	[mm]	[kN]	[ml]	[mm]	[kN]	[ml]
8	21,85	115	6,65	8,50	115	9,50	8,50
		180	10,40	13,31	180	14,86	13,31
		250	14,45	18,48	200	16,52	14,78
		320	18,50	23,65	220	18,17	16,26
		378	21,85	27,95	265	21,85	19,56
10	34,15	145	10,48	12,86	145	14,97	12,86
		230	16,62	20,40	230	23,74	20,40
		310	22,40	27,50	260	26,84	23,06
		390	28,18	34,59	290	29,93	25,72
		473	34,15	41,92	331	34,15	29,34
12	49,17	170	14,74	17,59	170	21,06	17,59
		270	23,41	27,94	270	33,44	27,94
		370	32,08	38,29	300	37,16	31,05
		470	40,75	48,64	330	40,88	34,15
		567	49,17	58,69	397	49,17	41,08
14	66,93	200	20,23	23,65	200	28,90	23,65
		320	32,37	37,85	320	46,24	37,85
		440	44,51	52,04	360	52,02	42,58
		560	56,65	66,23	400	57,81	47,31
		662	66,93	78,25	463	66,93	54,78
16	87,42	230	26,59	30,60	230	37,99	30,60
		360	41,62	47,90	360	59,46	47,90
		490	56,65	65,20	400	66,06	53,22
		620	71,68	82,49	440	72,67	58,54
		756	87,42	100,61	529	87,42	70,43
20	136,59	285	41,19	59,25	285	58,84	59,25
		450	65,03	93,55	450	92,90	93,55
		620	89,60	128,90	500	103,22	103,95
		790	114,17	164,24	550	113,55	114,34
		945	136,59	196,50	662	136,59	137,55
25	213,42	355	64,13	90,21	355	91,61	90,21
		520	93,93	132,13	520	134,19	132,13
		680	122,64	172,79	600	154,84	152,46
		840	151,74	213,44	650	167,74	165,16
		1000	180,64	254,10	700	180,64	177,87
28	267,72	400	80,93	162,99	400	115,61	162,99
		550	111,28	224,12	550	158,96	224,12
		700	141,62	285,24	700	202,32	285,24
		850	171,97	346,36	850	245,67	346,36
		1000	202,32	407,48	926	267,72	377,44
32	349,67	455	105,21	242,16	455	150,29	242,16
		590	136,42	314,01	500	165,16	266,11
		730	168,79	388,52	550	181,67	292,72
		870	201,16	463,03	600	198,19	319,33
		1000	231,22	532,22	700	231,22	372,56

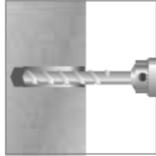
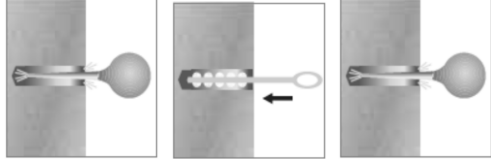
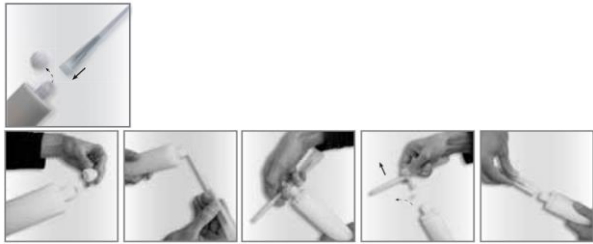
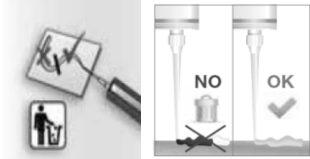
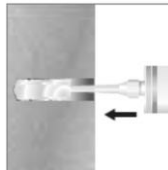
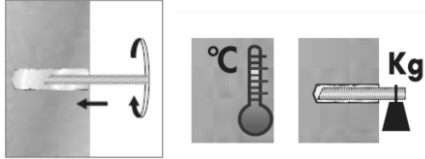
The given values are valid for good bond condition according to EN 1992-1-1. For all other bond condition the values for tension load shall be multiplied by 0,7. The mortar volume V can be calculated using the equation: $V = l_{bd} \cdot \pi \cdot (d_2^2 - d^2) / (4 \cdot 0,85)$ with the nominal hole diameter.

Design load – anchorage of post installed rebar as overlap

Values for pre-calculation of overlap joint connections							
Examples for the lap splice length ¹⁾ ($f_{y,k} = 500 \text{ N/mm}^2$; concrete C20/25; $f_{bd} = 2,3 \text{ N/mm}^2$)							
Rebar Ø	Tensile load B500	$\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 1,0$			$\alpha_1 = \alpha_2 = \alpha_3 = 1,0$ and α_4 or $\alpha_5 = 0,7$		
		Lap splice length $l_b^{1)}$	Tension load	Mortar volume V	Lap splice length $l_b^{1)}$	Tension load	Mortar volume V
[mm]	[kN]	[mm]	[kN]	[ml]	[mm]	[kN]	[ml]
8	21,85	200	11,56	14,78	200	16,52	14,78
		240	13,87	17,74	-	-	-
		280	16,19	20,70	-	-	-
		320	18,50	23,65	-	-	-
		378	21,85	27,95	-	-	-
10	34,15	200	14,45	17,74	200	20,64	17,74
		270	19,51	23,95	235	24,26	20,85
		340	24,57	30,16	270	27,87	23,95
		410	29,63	36,37	305	31,48	27,05
		473	34,15	41,92	331	34,15	29,34
12	49,17	200	17,34	20,70	200	24,77	20,70
		290	25,15	30,01	250	30,97	25,87
		380	32,95	39,33	300	37,16	31,05
		470	40,75	48,64	350	43,35	36,22
		567	49,17	58,69	397	49,17	41,08
14	66,93	210	21,24	24,84	210	30,35	24,84
		320	32,37	37,85	270	39,02	31,93
		430	43,50	50,86	330	47,69	39,03
		540	54,63	63,87	390	56,36	46,13
		662	66,93	78,25	463	66,93	54,78
16	87,42	240	27,75	31,93	240	39,64	31,93
		370	42,78	49,23	310	51,20	41,25
		500	57,81	66,53	380	62,76	50,56
		630	72,83	83,83	450	74,32	59,88
		756	87,42	100,61	529	87,42	70,43
20	136,59	300	43,35	62,37	300	61,93	62,37
		460	66,48	95,63	390	80,51	81,08
		620	89,60	128,90	480	99,09	99,79
		780	112,72	162,16	570	117,68	118,50
		945	136,59	196,50	662	136,59	137,55
25	213,42	375	67,74	95,29	375	96,77	95,29
		530	95,74	134,67	670	172,90	170,25
		690	124,64	175,33	780	201,29	198,20
		850	153,55	215,98	800	206,45	203,28
		1000	180,64	254,10	827	213,42	210,14
28	267,72	420	84,97	171,14	420	121,39	171,14
		570	115,32	232,27	720	208,10	293,39
		720	145,67	293,39	810	234,11	330,06
		870	176,02	354,51	900	260,12	366,73
		1000	202,32	407,48	926	267,72	377,44
32	349,67	480	110,99	255,47	480	158,55	255,47
		610	141,04	324,66	610	201,49	324,66
		740	171,10	393,84	740	244,43	393,84
		870	201,16	463,03	870	287,37	463,03
		1000	231,22	532,22	1000	330,32	532,22

The given values are valid for good bond condition according to EN 1992-1-1. For all other bond condition the values for tension load shall be multiplied by 0,7. The mortar volume V can be calculated using the equation: $V = l_{bd} \cdot \pi \cdot (d_s^2 - d^2) / (4 \cdot 0,85)$ with the nominal hole diameter.

Installation

1		<p>Drill the hole with the correct diameter and depth using a rotary percussive machine. Check the perpendicularity of the hole during the drilling operation.</p>
2	 <p>4x Blower Pump 4x Brush 4x Blower Pump <i>(Instead of the blower manual pump it is also possible to use the compressed air free oil)</i></p>	<p>Clean the hole from drilling dust: the hole shall be cleaned by at least 4 blowing operations, by at least 4 brushing operations followed again by at least 4 blowing operations; before brushing clean the brush and check if the brush diameter is sufficient.</p>
3		<p>For the size 300 ml, unscrew the front cup, pull-out the steel closing clip according to the following operations:</p> <ul style="list-style-type: none"> - insert the mixer in the eye of the plastic extractor, - pull the extractor to unhook the steel closing clip of the foil. After that, screw on the mixer and insert the cartridge in the gun.
4		<p>Before starting to use the cartridge, eject a first part of the product, being sure that the two components are completely mixed. The complete mixing is reached only after that the product, obtained by mixing the two components, comes out from the mixer with a uniform color.</p>
5		<p>Fill the drilled hole uniformly starting from the drilled hole bottom, in order to avoid entrapment of the air; remove the mixer slowly bit by bit during pressing out; filling the drill hole with a quantity of the injection mortar corresponding to 2/3 of the drill hole depth.</p>
6		<p>Insert immediately the rod, marked according to the proper anchorage depth, slowly and with a slight twisting motion, removing excess of injection mortar around the rod. Observe the processing time according and curing time.</p>

Cleaning

Uncured adhesive can easily be removed from the hands or tools using a clean solvent-soaked cloth, e.g. turpentine or paraffin.

Storage stability

ALCOLIN VINYLESTER CHEMICAL ANCHOR can be kept for 12 months if stored in a cool dry place between +5°C to +30°C in its original moisture-tight container. Keep away from heat sources and direct sunlight. Cartridge can be open for up to 3 months. During this time the chemical anchor can be used, however a new mixer nozzle will be required. If the material is kept beyond the recommended shelf life, it is not necessarily unusable, but a check should be performed to observe whether the product is still workable.

Product packaging

- 300ml cartridge

Head Office: +27(0)21 555 7400
Toll free no: 0800 222 400
1 Beverley Close, Montague Gardens
PO Box 37008, Chempet, 7442
www.alcolin.com



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