SVM-EPX – Pure epoxy resin for use in concrete

Bonded anchor with rebar of sizes Ø8 to Ø25 for use in concrete

Basic product information

Features

- Low shrinkage
- Can be installed in diamond drilled holes

Substrate

- Non-cracked concrete C20/25 – C50/60 (Option 7)
- Reinforced and unreinforced concrete
- Dry or wet concrete (Category 1)
- Flooded holes, except sea water (Category 2)

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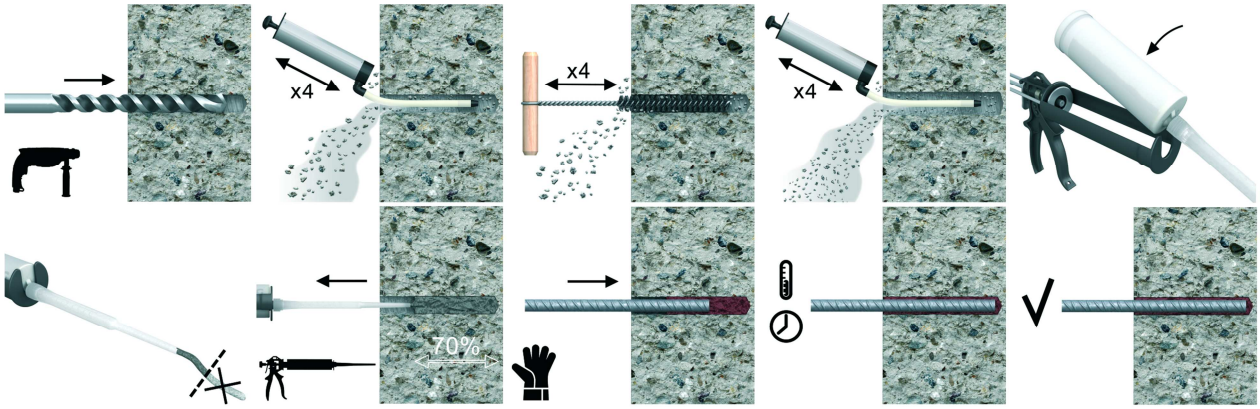
Installation guide



1. Drill hole to the correct diameter and depth for stud size being used.
2. Clean the hole with brush and hand pump at least four times each.
3. Insert cartridge into gun and attach nozzle.
4. Dispense to waste until an even color is obtained. Insert the mixing nozzle to the far end of the hole and inject the resin, slowly withdrawing the nozzle as the hole is filled to 70% of its depth.
5. Immediately insert the rebar, slowly and with a slight twisting motion. Remove any excess resin around the hole before it sets and leave it undisturbed until the curing time elapses.

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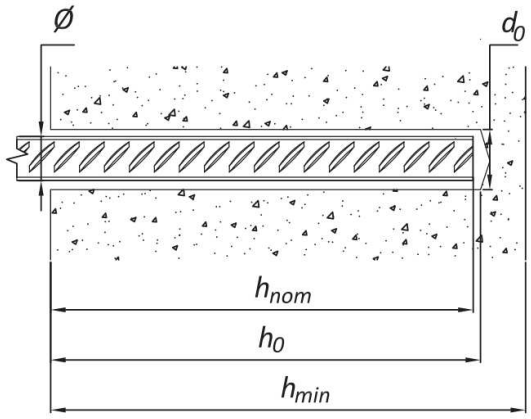
Installation data



Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Thread diameter	d	[mm]	8	10	12	14	16	20	24
Hole diameter in substrate	d_0	[mm]	12	14	16	18	22	25	30
Min. hole depth in substrate	h_0	[mm]	85	95	115	130	130	215	275
Installation depth	h_{nom}	[mm]	80	90	110	125	170	210	270
Min. substrate thickness	h_{min}	[mm]	120	130	140	180	230	270	360
Min. spacing	s_{min}	[mm]	40	45	55	62	85	105	135
Min. edge distance	c_{min}	[mm]	40	45	55	62	85	105	135

Minimum curing and working time

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	5	960	180
10	10	600	120
15	15	300	60
20	20	270	50
25	25	240	40
25	30	180	20
5	5	960	180
10	10	600	120

* For wet concrete the curing time must be doubled.

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Mechanical properties

Size				Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Nominal tensile strength	RB500[1] / BSt500S[2]	f_{uk}	[N/mm²]	550	550	550	550	550	550	550
	B500SP[1]			575	575	575	575	575	575	575
	34GS[1]			500	500	500	500	500	500	500
	18G2[1]			480	480	480	480	480	480	480
Nominal yield stress	RB500[1] / BSt500S[2]	f_{yk}	[N/mm²]	500	500	500	500	500	500	500
	B500SP[1]			500	500	500	500	500	500	500
	34GS[1]			410	410	410	410	410	410	410
	18G2[1]			355	355	355	355	355	355	355
Cross-sectional area		A_s	[mm²]	50.3	78.5	113.1	153.9	201.1	314.2	490.9
Section modulus		W_{el}	[mm³]	50.3	98.2	169.6	269.4	402.1	785.4	1534.0
Characteristic bending moment	RB500[1] / BSt500S[2]	M^0_{Rks}	[Nm]	33	65	112	178	265	518	1012
	B500SP[1]			35	68	117	186	277	542	1059
	34GS[1]			30	59	102	162	241	471	920
	18G2[1]			29	57	98	155	232	452	884
Allowable bending moment	RB500[1] / BSt500S[2]	M	[Nm]	19	37	64	102	152	296	579
	B500SP[1]			20	39	67	106	159	310	605
	34GS[1]			17	34	58	92	138	269	526
	18G2[1]			17	32	56	89	132	259	505

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Basic performance data for single anchor

Performance data for single anchor without influence of edge distance and spacing.

STANDARD EMBEDMENT DEPTH – NON CRACKED CONCRETE

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Embedment depth			**80**	**90**	**110**	**125**	**170**	**210**	**270**
CHARACTERISTIC LOAD									
Steel class A-II	TENSION N_{Rk}	[kN]	24.1	36.7	53.6	67.9	80.1	125.9	181.8
	SHEAR V_{Rk}	[kN]	14.5	22.6	32.6	44.3	57.9	90.5	141.4
Steel class A-III	TENSION N_{Rk}	[kN]	25.2	39.6	56.6	77	100.6	157.1	245.5
	SHEAR V_{Rk}	[kN]	15.1	23.6	33.9	46.2	60.3	94.3	147.3
Steel class A-III-N	TENSION N_{Rk}	[kN]	27.6	43.1	62.1	84.7	110.5	172.7	270
	SHEAR V_{Rk}	[kN]	16.6	25.9	37.3	50.8	66.4	103.7	162
DESIGN LOAD									
Steel class A-II	TENSION N_{Rd}	[kN]	16.1	24.5	35.7	45.3	53.4	83.9	121.2
	SHEAR V_{Rd}	[kN]	9.7	15.1	21.7	29.5	38.6	60.3	94.3
Steel class A-III	TENSION N_{Rd}	[kN]	16.8	26.4	37.7	51.3	67.1	104.7	163.7
	SHEAR V_{Rd}	[kN]	10.1	15.7	22.6	30.8	40.2	62.9	98.2
Steel class A-III-N	TENSION N_{Rd}	[kN]	18.4	28.7	41.4	56.5	73.7	115.1	180.0
	SHEAR V_{Rd}	[kN]	11.1	17.3	24.9	33.9	44.3	69.1	108.0
RECOMMENDED LOAD*									
Steel class A-II	TENSION N_{Rec}	[kN]	11.5	17.5	25.5	32.3	38.1	60.0	86.6
	SHEAR V_{Rec}	[kN]	6.9	10.8	15.5	21.1	27.6	43.1	67.3
Steel class A-III	TENSION N_{Rec}	[kN]	12.0	18.9	27.0	36.7	47.9	74.8	116.9
	SHEAR V_{Rec}	[kN]	7.2	11.2	16.1	22.0	28.7	44.9	70.1
Steel class A-III-N	TENSION N_{Rec}	[kN]	13.1	20.5	29.6	40.3	52.6	82.2	128.6
	SHEAR V_{Rec}	[kN]	7.9	12.3	17.8	24.2	31.6	49.4	77.1
				Steel failure					

*Partial safety factor 1.4

Performance data for dry or wet concrete (Category 1) and flooded holes, except sea water (Category 2)
In the area of reinforcement with (Ø≤10mm with spacing <100mm or Ø>10mm with spacing <150mm) use partial safety factor
$\psi_{re} = 0.5 + h_{ef} / 200 \leq 1$

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Basic performance data for single anchor (cont.)

Edge distance and spacing

Edge distance (tensile)

Reduction factors for edge distance $<c_{cr,N}$ applicable to N_{Rd} or N_{rec} for non-cracked concrete

Table only valid for one edge $<c_{cr,N}$ and $s \geq s_{cr,N}$

c_N [mm]	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
40	0.64	-	-	-	-	-	-
45	0.68	0.64	-	-	-	-	-
50	0.72	0.67	-	-	-	-	-
60	0.81	0.75	0.67	-	-	-	-
70	0.90	0.83	0.73	0.66	0.66	-	-
80	1.00	0.91	0.79	0.71	0.71	-	-
90	-	1.00	0.86	0.77	0.77	0.70	-
100	-	-	0.93	0.82	0.82	0.75	-
120	-	-	1.00	0.94	0.94	0.85	0.73
140	-	-	-	1.00	1.00	0.95	0.80
160	-	-	-	-	-	1.00	0.88
180	-	-	-	-	-	-	0.96
200	-	-	-	-	-	-	1.00

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Basic performance data for single anchor (cont.)

Edge distance (shear)

Increasing factors for edge distance >c_{min} applicable to $V_{Rd,c}$ for non-cracked concrete

Tables only valid for one edge >c_{min} and s ≥ $3c_V$

c_V [mm]	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
40	0.40	-	-	-	-	-	-
50	0.5	0.38	-	-	-	-	-
60	0.60	0.46	0.40	-	-	-	-
70	0.70	0.54	0.47	0.41	0.41	-	-
80	0.80	0.62	0.53	0.47	0.47	-	-
90	0.90	0.69	0.60	0.53	0.53	0.47	-
100	1.00	0.77	0.67	0.59	0.59	0.53	-
120	-	0.92	0.80	0.71	0.71	0.63	0.50
140	-	1.00	0.93	0.82	0.82	0.74	0.58
160	-	-	1.00	0.94	0.94	0.84	0.67
180	-	-	-	1.00	1.00	0.95	0.75
200	-	-	-	-	-	1.00	0.83
240	-	-	-	-	-	-	1.00

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Basic performance data for single anchor (cont.)

Spacing

Reduction factors for spacing $<s_{cr,N}$ applicable to N_{Rd} / V_{Rd} or N_{rec} / V_{rec} for non-cracked concrete

Table only valid for one spacing $<s_{cr,N}$ and $c \geq c_{cr,N}$

s [mm]	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
40	0.70	-	-	-	-	-	-
50	0.75	0.69	-	-	-	-	-
60	0.80	0.73	0.71	-	-	-	-
70	0.85	0.77	0.75	0.71	0.71	-	-
80	0.90	0.81	0.79	0.74	0.74	-	-
90	0.95	0.85	0.82	0.76	0.76	0.71	-
100	1.00	0.88	0.86	0.79	0.79	0.74	-
120	-	0.96	0.93	0.85	0.85	0.79	0.75
140	-	1.00	1.00	0.91	0.91	0.83	0.79
160	-	-	-	0.97	0.97	0.88	0.83
180	-	-	-	1.00	1.00	0.93	0.88
200	-	-	-	-	-	0.98	0.92
240	-	-	-	-	-	1.00	1.00

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Design performance data for group of anchors

Size				M8	M10	M12	M16	M20	M24	M30
TENSION LOAD										
STEEL FAILURE (TR 029, 5.2.2.2)										
Steel class A-II[1] Characteristic resistance		N_{Rks}	[kN]	24.1	37.7	54.3	73.9	96.5	150.8	235.6
Partial safety factor		γ_{Ms}	-				1.5			
Steel class A-III[2] Characteristic resistance		N_{Rks}	[kN]	25.2	39.6	56.6	77.0	100.6	157.1	245.5
Partial safety factor		γ_{Ms}	-				1.5			
Steel class A-III-N[3] Characteristic resistance		N_{Rks}	[kN]	27.6	43.1	62.1	84.7	110.5	172.7	270
Partial safety factor		γ_{Ms}	-				1.87			
COMBINED PULL-OUT AND CONCRETE CONE FAILURE										
NON-CRACKED CONCRETE C20/25										
Characteristic bond resistance		$N_{Rk,p}$	[N/mm^2]	21,5	36.7	53.6	67.9	80.1	125.9	181.8
Partial safety factor for use category 1 + 2		γ_{Mp}	-				2.52			
Increasing factors for τ_{ucr}	C30/37	Ψ_c	-	1.04	1.04	1.04	1.04	1.04	1.04	1.00
	C40/50	Ψ_c	-	1.07	1.07	1.07	1.07	1.07	1.07	1.00
	C50/60	Ψ_c	-	1.09	1.09	1.09	1.09	1.09	1.09	1.00
CONCRETE CONE FAILURE (acc.TR 029, 5.2.2.4)										
Effective embedment depth		h_{ef}	[mm]	80	90	110	125	170	210	270
Partial safety factor for use category 1 + 2*		γ_{Mc}	-				2.52			
SHEAR LOAD										
STEEL FAILURE										
Steel class A-II[1] Characteristic resistance without lever arm		V_{Rks}	[kN]	14.5	22.6	32.6	44.3	57.9	90.5	141.4
Partial safety factor		γ_{Ms}	-				1.5			
Steel class A-III[2] Characteristic resistance without lever arm		V_{Rks}	[kN]	15.1	23.6	33.9	46.2	60.3	94.3	147.3
Partial safety factor		γ_{Ms}	-				1.5			
Steel class A-III-N[3] Characteristic resistance without lever arm		V_{Rks}	[kN]	16.6	25.9	37.3	50.8	66.4	103.7	162.0
Partial safety factor		γ_{Ms}	-				1.5			
CONCRETE EDGE FAILURE (TR 029 5.2.3.4)										
Diameter		d	[kN]	8	10	12	14	16	20	25
Effective embedment depth		h_{ef}	[mm]	80	90	110	125	170	210	270
Partial safety factor		γ_{Mc}	-				1.5			

* Use category: 1 – dry or wet concrete; 2 – flooded holes
[1] eg. 18G2
[2] eg. 34GS
[3] eg. RB500, BST500S, B500SP

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