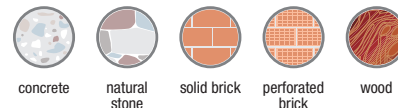


chemical anchors

Vorpa PSF

Styrene free polyester chemical anchor with European Technical Assessment for non cracked concrete and masonry

products group

**Approved for**

- non cracked concrete M8-M16
- masonry use category b,c M6-M12

Tested for

- lamellar wood GL24

Also suitable for

- natural stone
- solid brick
- perforated brick

To fix

- non-structural fixings
- light metal structures
- light structural works
- solar panel fixing
- scaffolding links
- floor reinforcement
- construction joints
- railings



ETAG 001-05
non cracked concrete
M8-M16



EAD 330076-00-0604
masonry cat.b,c,w/w M6-M12

Steel elements according to
ETA-19/0496



Test report nr. 276986 14/12/2010
on wood substrates



product code

Code	Description	Content ml	Gun to be used	Shelf life
1129	PSF 165	165	silicone type	12 months
1124	PSF 300	300	silicone type	12 months
1002P	PSF 400	400	coaxial	12 months



+5°C/+25°C

Store upright

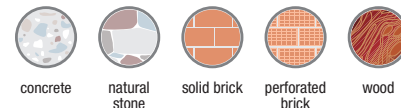
Examples of applications



Vorpa PSF

Styrene free polyester chemical anchor with European Technical Assessment for non cracked concrete and masonry

product information



Characteristics

- polyester styrene free chemical anchors
- suitable for medium loads for non-critical applications
- fast working times for early loading in time sensitive applications
- no styrene allows for use indoors and enclosed spaces
- use in damp & wet environment and flooded fixing holes
- extremely versatile in masonry, hollow, aerated concrete
- crack and gap filling repairs in concrete vertical or horizontal 10:1 resin available in variety of cartridges types
- cartridge can be used up to the end of the validity date by replacing the static mixer or releasing cartridge with the sealing cap
- for applications on hollow materials use the appropriate perforated sleeves
- performance based on clean holes.

Approval/certifications/testing

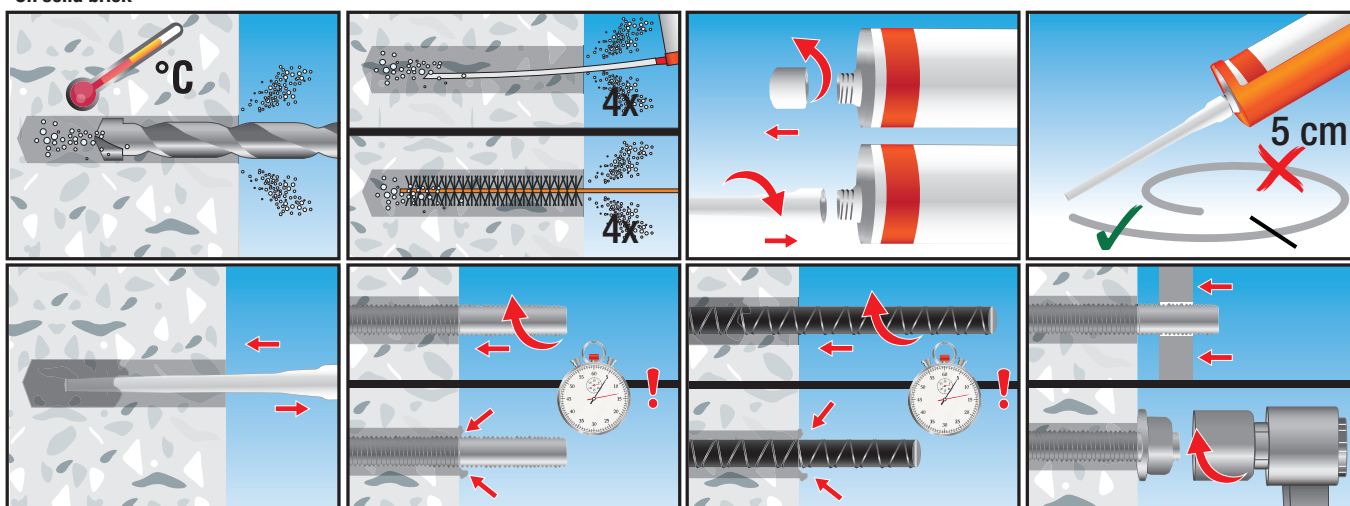
- 15/0030 - non-Cracked Concrete. Includes flooded holes
- 19/0496 - ETA EAD 330076-00-0604 hollow Wall / masonry Installations M6-M8-M10-M12
- ITB Approval (Poland) 0978/W
- LEED tested 2009 EQ. c4, 1 SCAQMD rule 1168 (2005)

Suggestion for use

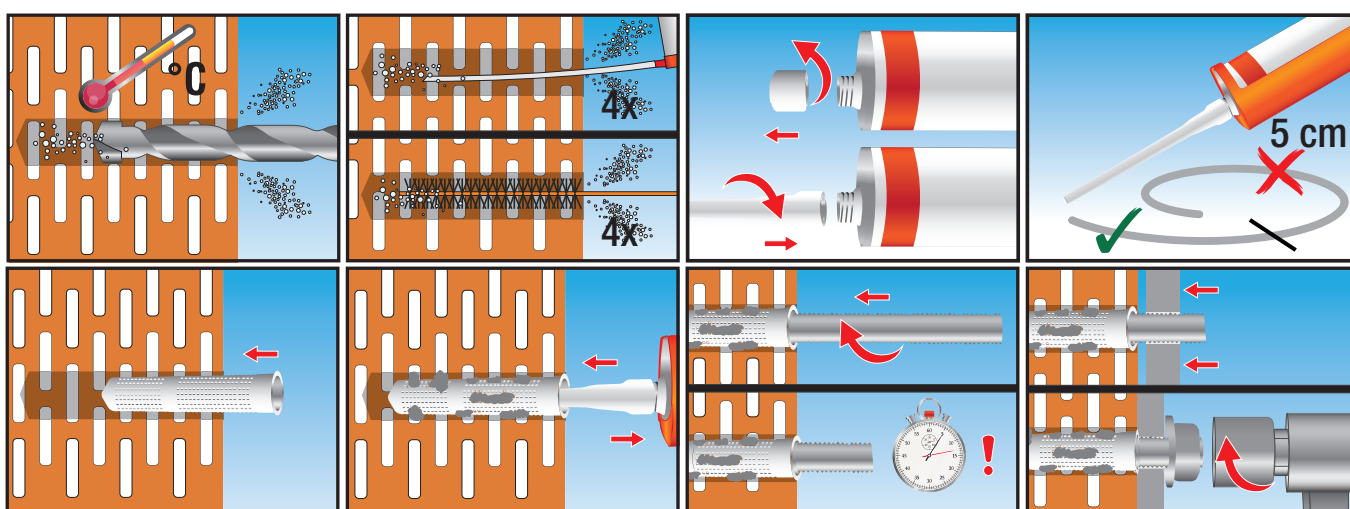
- **Clean the hole before the installation**
- HAMMER DRILLED – blown and then brushed with a stiff metal brush and blown again

installation sequence

On solid brick



On hollow brick

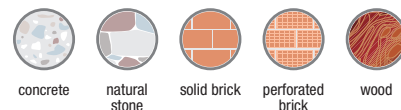


chemical anchors

Vorpa PSF

Styrene free polyester chemical anchor with European Technical Assessment for non cracked concrete and masonry

technical data



Minimum Curing Time

Concrete Temperature	Gel-working Time	Minimum curing time in dry concrete	Minimum curing time in wet concrete
-10°C *	50 min	240 min	x2
-5°C *	40 min	180 min	x2
5°C	20 min	90 min	x2
15°C	9 min	60 min	x2
25°C	5 min	30 min	x2
35°C	3 min	20 min	x2

*resin temperature must be at least 20°C

Full cure 24 hours. All specifications based on supplied mixer

Store at temperatures between +5 and +25 degrees, away from direct heat, rain and moisture

Physical Properties

	N/mm2 (MPa)	Test Method
Compressive Strength	43,5	EN ISO 604 / ASTM 695
Flexural Strength	15,9	EN ISO 178 / ASTM 790
Flexural Modulus	2803,0	EN ISO 178 / ASTM 790
Tensile Strength	9,3	EN ISO 527 / ASTM 638
E Modulus	4874,5	EN ISO 527 / ASTM 638
VOC Content	A+	

Typical characteristic and design resistance performance with 5.8 grade studding and associated installation data

Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic distances (mm)		Min Edge and Spacing (mm)		Nominal Embedment (mm)	Hole diameter concrete (mm)	Hole diameter fixture (mm)	Max Torque (Nm)
Ø mm	Tension (N _{rk})	Shear (V _{rk})	Tension (N _{rd})	Shear (V _{rd})	Tension (N _{rec})	Shear (V _{rec})	Edge (C _{cr,N})	Spacing (S _{cr,N})	Edge (C _{cr,V})	(mm) (C _{min} S _{min})			
8	15,71	9,00	7,27	7,20	5,20	5,14	80	160	80	40	60	10	9
	19,00		12,70		9,07						80		10
	19,00		12,70		9,07						160		
10	17,53	15,00	8,12	12,00	5,80	8,57	100	200	90	50	60	12	12
	26,30		12,17		8,70						90		20
	30,20		20,10		14,36						200		
	23,09		10,69		7,64						70		
12	36,29	21,00	16,80	16,80	12,00	12,00	120	240	110	60	110	14	14
	43,80		29,20		20,86						240		40
	33,38		15,45		11,04						80		
16	52,15	39,00	24,14	31,20	17,25	22,29	160	320	125	80	125	18	18
	81,60		54,40		38,86						320		80
	43,60		20,18		14,42						90		
20	82,35	61,00	38,13	48,80	27,23	34,86	200	400	180	100	170	24	22
	127,40		84,90		60,64						400		120
	49,01		22,69		16,21						100		
24	102,92	88,00	47,65	70,40	34,03	50,29	225	450	220	120	210	28	26
	183,60		122,40		87,43						480		160
	61,07		28,27		20,20						120		
30	142,50	142,50	65,97	114,00	47,12	81,43	260	520	280	150	280	35	32
	292,00		194,50		138,93						600		200

All data is based on correct installation - see instructions. No influence of edge and spacing

Minimum base material thickness hef +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d

Steel failure

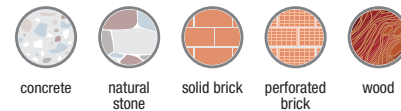
Design resistance of resin with various stud strenghts and rebar. 5.8 grade steel studding

Ø stud (mm)	Ø hole (mm)	embedment depth (mm)																h _{ef} failure (mm)	F _{d,s} design load (kN)
8	10	7.3	8.5	9.7	10.9	12.1	12.7	16.3	17.6	19.0	20.1	20.1	20.1	20.1	20.1	20.1	20.1	105	12.7
10	12	8.1	9.5	10.8	12.2	13.5	14.9	16.3	17.6	19.0	20.1	20.1	20.1	20.1	20.1	20.1	20.1	148	20.1
12	14		10.8	12.4	13.9	15.5	17.0	18.6	20.1	21.6	24.7	29.2	29.2	29.2	29.2	29.2	29.2	189	29.2
16	18			15.4	17.4	19.3	21.2	23.2	25.1	27.0	30.9	38.6	46.3	54.1	54.4	54.4	54.4	282	54.4
20	24			17.9	20.2	22.4	24.7	26.9	29.2	31.4	35.9	44.9	53.8	62.8	71.8	84.9	84.9	379	84.9
24	28				22.6	24.9	27.1	29.4	31.7	36.2	45.2	54.3	63.3	72.4	90.5	108.6	108.6	541	122.4
27	32					26.1	28.5	30.9	33.3	38.0	47.5	57.0	66.5	76.0	95.0	114.0	128.3	670	159.1
30	35						28.3	30.6	33.0	37.7	47.1	58.6	66.0	75.4	94.3	113.1	127.3	825	194.5

Vorpa PSF

Styrene free polyester chemical anchor with European Technical Assessment for non cracked concrete and masonry

technical data



Characteristic and Design Load resistances REBAR based on characteristic bond strengths for hef 4d (minimum embedment) to 20d

Non cracked concrete							Cracked concrete						
Ø mm	Characteristic resistance (kN)		Design resistance (kN)		Recommended load (kN)		Ø mm	Characteristic resistance (kN)		Design resistance (kN)		Recommended load (kN)	
	Tension (N_{rk})	Shear (V_{rk})	Tension (N_{rd})	Shear (V_{rd})	Tension (N_{rec})	Shear (V_{rec})		Tension (N_{rk})	Shear (V_{rk})	Tension (N_{rd})	Shear (V_{rd})	Tension (N_{rec})	Shear (V_{rec})
8	13,30		6,33		4,52			Not applicable	Not applicable	Not applicable			
	17,73	13,95	8,44	9,30	6,03	6,64							
	35,47		16,89		12,06								
10	15,91		7,58		5,41			Not applicable	Not applicable	Not applicable			
	23,86	21,45	11,36	14,30	8,12	10,21							
	53,03		25,25		18,04								
12	19,84		9,45		6,75			Not applicable	Not applicable	Not applicable			
	31,18	31,05	14,85	20,70	10,61	14,79							
	68,04		32,40		23,14								
16	27,87		13,27		9,48			Not applicable	Not applicable	Not applicable			
	43,54	55,50	20,73	37,00	14,81	26,43							
	111,47		53,08		37,91								
20	32,23		15,35		10,96			Not applicable	Not applicable	Not applicable			
	60,88	86,55	28,99	57,30	20,71	41,21							
	143,26		68,22		48,73								
25	38,80		18,48		13,20			Not applicable	Not applicable	Not applicable			
	81,48	135,00	38,80	90,00	27,71	64,29							
	193,99		92,38		65,98								
28	46,30		22,05		15,75			Not applicable	Not applicable	Not applicable			
	115,76	168,75	55,12	112,50	39,37	80,36							
	231,52		110,25		78,75								
32	54,05		25,74		18,38			Not applicable	Not applicable	Not applicable			
	135,11	220,95	64,34	147,30	45,96	105,22							
	270,23		128,68		91,91								

All data is based on correct installation - see instructions. No influence of edge and spacing. Minimum base material thickness hef +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d. Temperature range i maximum long term / short term temperature +24/40°C

TECHNICAL DATA FOR APPLICATION ON WOOD

Recommended load for applications on glued lamellar wood in conformity with UNI EN 1194

Characteristics of glued lamellar wood UNI EN 1194

Strenght	N/mm2	GL24
Flexion	$f_{m,k}$	24
Parallel Tensile Strenght	$f_{t,0,k}$	16,5
Perpendicular Tensile Strenght	$f_{t,90,k}$	0,4
Parallel Compressive Strenght	$f_{c,0,k}$	24
Perpendicular Compressive Strenght	$f_{c,90,k}$	2,7
Shear Strenght	$f_{v,k}$	2,7
Average Modulus of Elasticity	$E_{o,mean}$	11.600
Average Modulus of Shear	G_{mean}	720
Volume	P_k	380

Technical data and recommended loads on glued lamellar wood type GL24h

Stud size	Hole diameter (mm)	Hole depth (mm)	Permissible loads kN
M8	10	80	3,3
M10	12	90	4,5
M12	14	100	8,1



Test Report nr. 276986 - 14/12/2010

Examples of installation

