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TECHNICAL DATA SHEET

PENOSIL SpeedFix Chemical Anchor 595

- Good bond strength with High load resistance
- Used with all grades of threaded rod
- Used in concrete and masonry
- Used in dry and wet conditions
- European approval for use in concrete ETAG001 Option 7
- European approval for use in masonry with nylon sleeves
- Close edge distance and small spacing
- Extremely versatile
- Close edge distance and small spacing
- Manual cleaning up to 20 mm diameter and embedment depths of 240 mm
- Suitable for fixing solar pannels

Contents

Shelf Life and Storage

This product should be stored between +5˚C & +25˚C.
The Shelf life of the product is 18 months from the manufacture date.

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Product Description

Chemfix PESF Top is a 2 component high strength 10:1 ratio chemical anchoring resin system.
It is designed as a fast curing high strength resin fixing anchor for high loads and medium loads and is particularly advantageous for fixings in masonry due to the European approval and gives excellent value for money.

Specific Benefits

- European Approved
- High loads possible
- Chemical resistance
- Studs and other fixings
- Approved for Concrete & Masonry

Approvals

- ETA Option 7 Non-Cracked Concrete. Includes flooded holes. M8-M16
- ETA - EAD 330076-00-0604 Hollow Wall / Masonry Installations M6-M12
- Tested according to LEED 2009 EQ c4.1, SCAQMD rule 1168 (2005).
- A+ Rating VOC content

Loads, Edge and Spacings based on Characteristic bond strengths - Showing steel failure

	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic distances (mm)			Min Edge and Spacing (mm)		Hole Diameter	Hole Diameter	Max
Size	Tension	Shear	Tension	Shear	Tension	Shear	Edge	Spacing	Edge		Nominal Embedment	concrete	fixture	Torque
(mm)	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	$C_{cr,N}$	$S_{cr,N}$	$C_{cr,V}$	C_{min}, S_{min}	(mm)	(mm)	(mm)	(Nm)
	15,84		8,80		6,29						60			
8	19,00	9,00	11,70	7,20	8,36	5,14	80	160	80	40	80	10	9	10
	19,00		12,70		9,07						160			
	19,80		11,00		7,86						60			
10	29,70	15,00	16,50	12,00	11,79	8,57	100	200	90	50	90	12	12	20
	30,20		20,10		14,36						200			
	27,72		15,40		11,00						70			
12	43,56	21,00	24,20	16,80	17,29	12,00	120	240	110	60	110	14	14	40
	43,80		29,20		20,86						240			
	40,14		22,30		15,93						80			
16	62,82	39,00	34,90	31,20	24,93	22,29	160	320	125	80	125	18	18	80
	81,60		54,40		38,86						320			
	50,94		28,30		20,21						90			
20	96,12	61,00	53,40	48,80	38,14	34,86	200	400	180	100	170	22	22	120
	127,40		84,90		60,64						400			
	60,30		33,50		23,93						100			
24	126,72	88,00	70,40	70,40	50,29	50,29	225	450	220	120	210	28	26	160
	183,60		122,40		87,43						480			
	73,44		40,80		29,14						120			
30	171,54	142,50	95,30	114,00	68,07	81,43	260	520	280	150	280	35	32	200
	292,00		194,50		138,93						600			

= steel failure Partial safety factor = 1.5

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Design Resistance used with various stud strengths, material and rebar

5.8 Grade Steel Studding

Stud Diameter	Hole Diameter	Embedment Depth hef																		h_{ef} failure	$F_{d,s}$ design load
		= steel failure																			
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	(mm)	(kN)
8	10	8,8	10,3	11,7	12,7															87	12,7
10	12	11,0	12,8	14,7	16,5	18,3	20,1													110	20,1
12	14		15,4	17,6	19,8	22,0	24,2	26,4	28,6	29,2										133	29,2
16	18			22,3	25,1	27,9	30,7	33,5	36,3	39,1	44,7	54,4								195	54,4
20	22			25,1	28,3	31,4	34,6	37,7	40,8	44,0	50,3	62,8	75,4	84,9						270	84,9
24	28					33,5	36,9	40,2	43,6	46,9	53,6	67,0	80,4	93,8	107,2	122,4				365	122,4
27	30						38,9	42,4	46,0	49,5	56,6	70,7	84,8	99,0	113,1	141,4	159,1			450	159,1
30	35							40,8	44,2	47,7	54,5	68,1	81,7	95,3	108,9	136,2	163,4	183,8	194,5	571	194,5
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600		

8.8 Grade Steel Studding

Stud Diameter	Hole Diameter	Embedment Depth hef																		h_{ef} failure	$F_{d,s}$ design load
		= steel failure																			
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	(mm)	(kN)
8	10	8,8	10,3	11,7	13,2	14,7	16,1	17,6	19,1	19,5										133	19,5
10	12	11,0	12,8	14,7	16,5	18,3	20,2	22,0	23,8	25,7	29,3	30,9								169	30,9
12	14		15,4	17,6	19,8	22,0	24,2	26,4	28,6	30,8	35,2	44,0	45,0							204	45,0
16	18			22,3	25,1	27,9	30,7	33,5	36,3	39,1	44,7	55,9	67,0	78,2	83,7					300	83,7
20	22			25,1	28,3	31,4	34,6	37,7	40,8	44,0	50,3	62,8	75,4	88,0	100,5	125,7				416	130,7
24	28					33,5	36,9	40,2	43,6	46,9	53,6	67,0	80,4	93,8	107,2	134,1	160,9			562	188,3
27	30						38,9	42,4	46,0	49,5	56,6	70,7	84,8	99,0	113,1	141,4	169,7	190,9		693	244,8
30	35							40,8	44,2	47,7	54,5	68,1	81,7	95,3	108,9	136,2	163,4	183,8	204,2	879	299,2
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600		

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Design Resistance used with various stud strengths, material and rebar

10.9 Grade Steel Studding

Stud Diameter	Hole Diameter	Embedment Depth hef													= steel failure					h_{ef} failure	$F_{d,s}$ design load
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	(mm)	(kN)
8	10	8,8	10,3	11,7	13,2	14,7	16,1	17,6	19,1	20,5	23,4									186	27,2
10	12	11,0	12,8	14,7	16,5	18,3	20,2	22,0	23,8	25,7	29,3	36,7								235	43,1
12	14		15,4	17,6	19,8	22,0	24,2	26,4	28,6	30,8	35,2	44,0	52,8							285	62,6
16	18			22,3	25,1	27,9	30,7	33,5	36,3	39,1	44,7	55,9	67,0	78,2	89,4					418	116,6
20	22			25,1	28,3	31,4	34,6	37,7	40,8	44,0	50,3	62,8	75,4	88,0	100,5	125,7				579	182,0
24	28					33,5	36,9	40,2	43,6	46,9	53,6	67,0	80,4	93,8	107,2	134,1	160,9			782	262,2
27	30						38,9	42,4	46,0	49,5	56,6	70,7	84,8	99,0	113,1	141,4	169,7	190,9		965	341,0
30	35							40,8	44,2	47,7	54,5	68,1	81,7	95,3	108,9	136,2	163,4	183,8	204,2	1224	416,7
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600		

A4-70 Stainless Steel Studding

Stud Diameter	Hole Diameter	Embedment Depth hef													= steel failure					h_{ef} failure	$F_{d,s}$ design load
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	(mm)	(kN)
8	10	8,8	10,3	11,7	13,2	13,7														93	13,7
10	12	11,0	12,8	14,7	16,5	18,3	20,2	21,7												118	21,7
12	14		15,4	17,6	19,8	22,0	24,2	26,4	28,6	30,8	31,6									143	31,6
16	18			22,3	25,1	27,9	30,7	33,5	36,3	39,1	44,7	55,9	58,8							210	58,8
20	22			25,1	28,3	31,4	34,6	37,7	40,8	44,0	50,3	62,8	75,4	88,0	91,7					292	91,7
24	28					33,5	36,9	40,2	43,6	46,9	53,6	67,0	80,4	93,8	107,2	132,1				394	132,1
27	30						38,9	42,4	46,0	49,5	56,6	70,7	80,2						*1	227	80,2
30	35							40,8	44,2	47,7	54,5	68,1	81,7	95,3	98,1				*1	288	98,1
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600		

*1 = Tensile strength 500 N/mm²

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Design Resistance used with various stud strengths, material and rebar

A4-80 Stainless Steel Studding

Stud Diameter	Hole Diameter	Embedment Depth hef																		h_{ef} failure	$F_{d,s}$ design load
															= steel failure						
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	(mm)	(kN)
8	10	8,8	10,3	11,7	13,2	14,7	15,7													107	15,7
10	12		12,8	14,7	16,5	18,3	20,2	22,0	23,8	24,8										135	24,8
12	14		15,4	17,6	19,8	22,0	24,2	26,4	28,6	30,8	35,2	36,1								164	36,1
16	18			22,3	25,1	27,9	30,7	33,5	36,3	39,1	44,7	55,9	67,2							240	67,2
20	22			25,1	28,3	31,4	34,6	37,7	40,8	44,0	50,3	62,8	75,4	88,0	100,5	104,8				334	104,8
24	28					33,5	36,9	40,2	43,6	46,9	53,6	67,0	80,4	93,8	107,2	132,1				394	132,1
27	30						38,9	42,4	46,0	49,5	56,6	70,7	80,2						*2	227	80,2
30	35							40,8	44,2	47,7	54,5	68,1	81,7	95,3	98,1				*2	288	98,1
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600		

High bond reinforcing bars Fyk=500N/mm2

Rebar Diameter	Hole Diameter	Embedment Depth hef																		h_{ef} failure	$F_{d,s}$ yield load
															= steel failure						
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	(mm)	(kN)
8	10	7,8	9,1	10,5	11,8	13,1	14,4	15,7	17,0	18,3	20,9									167	21,9
10	12	9,8	11,4	13,1	14,7	16,3	18,0	19,6	21,2	22,9	26,1	32,7								209	34,1
12	14		12,7	14,5	16,3	18,1	19,9	21,7	23,5	25,3	29,0	36,2	43,4							272	49,2
16	20			17,3	19,5	21,6	23,8	25,9	28,1	30,3	34,6	43,2	51,9	60,5	69,2					404	87,4
20	25			20,1	22,6	25,1	27,6	30,2	32,7	35,2	40,2	50,3	60,3	70,4	80,4	100,5				543	136,6
25	30					27,5	30,2	33,0	35,7	38,5	44,0	55,0	66,0	77,0	88,0	110,0	137,5			715	196,5
28	35						29,0	31,7	34,3	36,9	42,2	52,8	63,3	73,9	84,5	105,6	132,0	147,8		1015	267,8
32	40								39,2	42,2	48,3	60,3	72,4	84,5	96,5	120,7	150,8	168,9	193,0	1159	349,7
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640		

*1 = Tensile strength 500 N/mm²

*2 = Tensile strength 700 N/mm²

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

	Non Cracked Concrete						Cracked Concrete						
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Nominal Embed-ment
Size	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	(mm)
(mm)	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	
8	15,84	9,00	8,80	7,20	6,29	5,14	Not Applicable		Not Applicable		Not Applicable		60
	21,06		11,70		8,36								**80**
	42,12		23,40		16,71								160
10	19,80	15,00	11,00	12,00	7,86	8,57	Not Applicable		Not Applicable		Not Applicable		60
	29,70		16,50		11,79								**90**
	66,06		36,70		26,21								200
12	27,72	21,00	15,40	16,80	11,00	12,00	Not Applicable		Not Applicable		Not Applicable		70
	43,56		24,20		17,29								**110**
	95,04		52,80		37,71								240
16	40,14	39,00	22,30	31,20	15,93	22,29	Not Applicable		Not Applicable		Not Applicable		80
	62,82		34,90		24,93								**125**
	160,92		89,40		63,86								320
20	50,94	61,00	28,30	48,80	20,21	34,86	Not Applicable		Not Applicable		Not Applicable		90
	96,12		53,40		38,14								**170**
	226,26		125,70		89,79								400
24	60,30	88,00	33,50	70,40	23,93	50,29	Not Applicable		Not Applicable		Not Applicable		100
	126,72		70,40		50,29								**210**
	241,38		134,10		95,79								480
30	73,44	142,50	40,80	114,00	29,14	81,43	Not Applicable		Not Applicable		Not Applicable		120
	171,54		95,30		68,07								**280**
	367,56		204,20		145,86								600

Table notes : see back page

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Bond Strength Factors

Influence of concrete strength on combined pull out and concrete cone resistance

Concrete Strength N/mm2	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
Non-Cracked fc =	0,97	1,00	1,02	1,04	1,07	1,10	1,12	1,15

Influence of environmental conditions in non cracked concrete

		M8	M10	M12	M16	M20	M24	M30
Temp I 40°C / 24°C	Dry and Wet	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Temp II 80°C / 50°C	Dry and Wet	0,90	0,88	0,87	0,86	0,85	0,84	0,82

Select concrete strength and environmental condition and apply to bond strength table on page 4.

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

	Non Cracked Concrete						Cracked Concrete						
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Nominal Embed-ment
Rebar	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	(mm)
ø	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	
8	14,04	13,95	7,80	9,30	5,57	6,64	Not Applicable		Not Applicable		Not Applicable		60
	18,90		10,50		7,50								**80**
	37,62		20,90		14,93								160
10	17,64	21,45	9,80	14,30	7,00	10,21							60
	26,46		14,70		10,50								**90**
	58,86		32,70		23,36								200
12	22,86	31,05	12,70	20,70	9,07	14,79	Not Applicable		Not Applicable		Not Applicable		70
	35,82		19,90		14,21								**110**
	78,12		43,40		31,00								240
16	31,14	55,50	17,30	37,00	12,36	26,43							80
	48,60		27,00		19,29								**125**
	124,56		69,20		49,43								320
20	40,68	86,55	22,60	57,70	16,14	41,21	Not Applicable		Not Applicable		Not Applicable		90
	76,86		42,70		30,50								**170**
	180,90		100,50		71,79								400
25	49,50	135,00	27,50	90,00	19,64	64,29							100
	103,86		57,70		41,21								**210**
	247,50		137,50		98,21								500
28	52,20	168,75	29,00	112,50	20,71	80,36	Not Applicable		Not Applicable		Not Applicable		110
	133,02		73,90		52,79								**280**
	266,04		147,80		105,57								560
32	70,56	220,95	39,20	147,30	28,00	105,22							130
	173,70		96,50		68,93								**320**
	347,40		193,00		137,86								640

Table notes : see back page

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Bond Strength Factors - REBAR

Influence of concrete strength on combined pull out and concrete cone resistance

Concrete Strength N/mm² (MPa)	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
non cracked fc =	0,97	1,00	1,02	1,04	1,07	1,10	1,12	1,15

Influence of environmental conditions in non cracked concrete

		Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Temp I 40°C / 24°C	Dry and Wet	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Temp II 80°C / 50°C	Dry and Wet	0,90	0,90	0,88	0,88	0,86	0,86	0,84	0,84

Table notes : see back page

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Material Properties for grades of threaded rod

	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
Stud Diameter	$N_{rk,\,s}$	$N_{rd,\,s}$	$N_{rk,\,s}$	$N_{rd,\,s}$	$N_{rk,\,s}$	$N_{rd,\,s}$	$N_{rk,\,s}$	$N_{rd,\,s}$
(mm)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
M8	29,2	19,5	38,1	27,2	25,6	13,7	29,2	15,6
M10	46,4	30,9	60,3	43,1	40,6	21,7	46,4	24,8
M12	67,4	44,9	87,7	62,6	59,0	31,6	67,4	36,0
M16	125,6	83,7	163,0	116,4	109,9	58,8	125,7	67,2
M20	196,1	130,7	255,0	182,1	171,5	91,7	196,0	104,8
M24	282,5	188,3	367,0	262,1	247,1	132,1	293,0	132,1
M30	448,8	299,2	583,0	416,4	280,5	150,0	392,7	210,0

	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
Stud Diameter	$V_{rk,\,s}$	$V_{rd,\,s}$	$V_{rk,\,s}$	$V_{rd,\,s}$	$V_{rk,\,s}$	$V_{rd,\,s}$	$V_{rk,\,s}$	$V_{rd,\,s}$
(mm)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
M8	14,6	11,7	19,0	15,2	12,8	8,2	14,6	9,4
M10	23,2	18,6	30,2	24,1	20,3	13,0	23,2	14,9
M12	33,7	27,0	43,8	35,1	29,5	18,9	33,7	21,6
M16	62,8	50,2	81,6	65,3	55,0	35,2	62,8	40,3
M20	98,0	78,4	127,4	101,9	85,8	55,0	98,0	62,8
M24	141,2	113,0	183,6	146,8	123,6	79,2	141,2	90,5
M30	224,4	179,5	291,5	215,9	140,3	89,9	196,4	125,9

	Rebar BSt 500 to DIN 488		Rebar BSt 500 to DIN 488	
Rebar Diameter	$N_{rk,\,s}$	$N_{rd,\,s}$	$V_{rk,\,s}$	$V_{rd,\,s}$
(mm)	(kN)	(kN)	(kN)	(kN)
8	28,0	20,0	14,0	9,3
10	43,0	30,7	21,5	14,3
12	62,0	44,3	31,0	20,7
14	85,0	60,7	42,5	28,3
16	111,0	79,3	55,5	37,0
20	173,0	123,6	86,5	57,7
25	270,0	192,9	135,0	90,0
32	442	315,7	221	147,3

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Effect of Anchor Spacing - Tension

Anchor Spacing	Stud / Rebar Diameter						
(mm)	8	10	12	16	20	24	30
40	0,64						
50	0,67	0,63					
60	0,70	0,65	0,63				
70	0,73	0,67	0,64				
80	0,76	0,69	0,66	0,63			
90	0,79	0,72	0,68	0,64			
100	0,82	0,74	0,70	0,65	0,63		
120	0,87	0,79	0,74	0,68	0,65	0,63	
150	0,96	0,86	0,80	0,73	0,68	0,65	0,63
160	1,00	0,88	0,82	0,74	0,70	0,66	0,64
175		0,92	0,85	0,76	0,71	0,68	0,65
200		1,00	0,90	0,80	0,74	0,71	0,68
225			0,95	0,84	0,77	0,74	0,70
240			1,00	0,86	0,79	0,76	0,72
250				0,87	0,80	0,77	0,73
275				0,91	0,83	0,80	0,75
280				0,92	0,84	0,80	0,76
300				0,95	0,86	0,82	0,78
320				1,00	0,88	0,85	0,80
350					0,92	0,88	0,83
400					1,00	0,94	0,88
425						0,97	0,90
450						1,00	0,93
480							0,96
520							1,00

Effect of Edge Distance - Tension

Edge Distance	Stud / Rebar Diameter						
(mm)	8	10	12	16	20	24	30
40	0,64						
50	0,73	0,63					
60	0,82	0,70	0,63				
70	0,90	0,77	0,68				
80	1,00	0,84	0,74	0,63			
90		0,91	0,80	0,67			
100		1,00	0,86	0,71	0,63		
110			0,92	0,76	0,66		
120			1,00	0,80	0,70	0,64	
140				0,89	0,77	0,68	0,63
160				1,00	0,84	0,76	0,66
180					0,91	0,84	0,72
200					1,00	0,92	0,78
225						1,00	0,86
250							0,94
260							1,00

Effect of Edge Distance - Shear

Edge Distance	Stud / Rebar Diameter						
(mm)	8	10	12	16	20	24	30
40	0,25						
50	0,44	0,30					
60	0,63	0,48	0,30				
70	0,81	0,65	0,44				
80	1,00	0,83	0,58	0,40			
90		1,00	0,72	0,53			
100			0,86	0,67	0,35		
110			1,00	0,80	0,44		
125				1,00	0,58	0,35	
140					0,72	0,45	0,30
160					0,91	0,58	0,36
180					1,00	0,71	0,47
200						0,84	0,59
225						1,00	0,74
250							0,88
280							1,00

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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

* All specifications based on supplied mixer

Temperature Ranges

Temperature Range	Concrete Service Temperature	Maximum Long Term Concrete Temp	Maximum Short Term Concrete Temp
Range I	-40°C to +40°C	+24°C	+40°C
Range II	-40°C to +80°C	+50°C	+80°C

Service temperature range: Range of ambient temperatures after installation and during the lifetime of the anchor.

Short term temperature: Temperatures within the service temperature range which vary over short intervals,

e.g. day/night cycles and freeze/thaw cycles.

Long term temperature: Temperature, within the service temperature range, which will be approximately constant

over significant periods of time.

Long term temperatures will include constant or near constant temperatures, such as those experienced in cold stores or next to heating installations.

Physical Properties

	N/mm²	Test Method
Compressive Strength	43,5	EN ISO 604 / ASTM 695
Flexural Strength	15,9	EN ISO 178 / ASTM 790
Flexural Modulus	2803	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+ Rating	-

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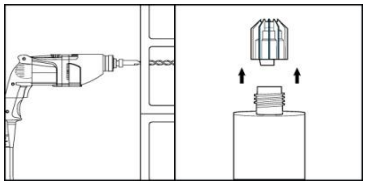
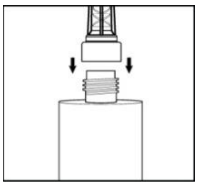
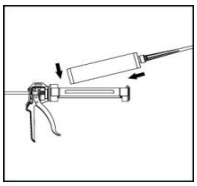
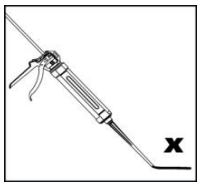
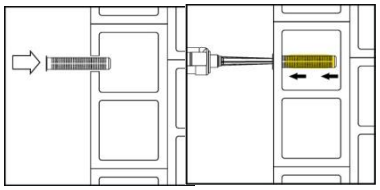
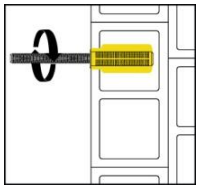
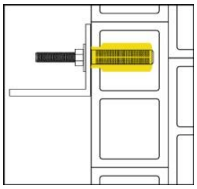
Installation parameters: drilling hole cleaning and installation HOLLOW WALL

Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. Remove the threaded cap from the cartridge. Tightly attach the mixing nozzle. Do not modify the mixer in any way. Made sure the mixing element is inside the mixer. Use only the supplied mixer. Insert the cartridge into the dispenser gun. Discard the initial trigger pulls of adhesive. Discard the first 10ml of resin until an even colour is achieved.

Introduce the sleeve of suitable dimensions. Insert the nozzle to the end of the sleeve and inject the resin so long till the sleeve will fill into 100%. Insert the anchor, slowly with a slight twisting motion into the sleeve. Remove excess resin and leave the fixing until minimum couring (loading) times has elapsed.

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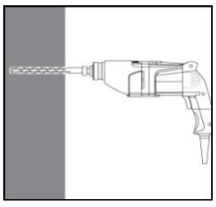
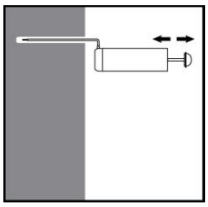
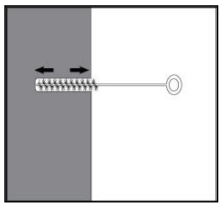
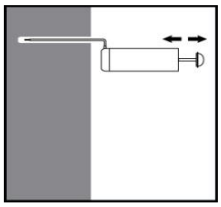
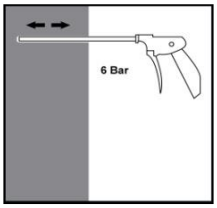
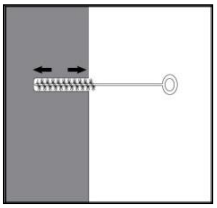
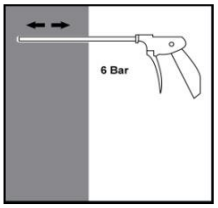
Installation parameters: drilling hole cleaning and installation

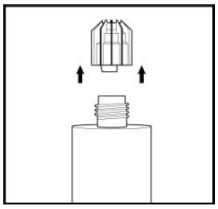
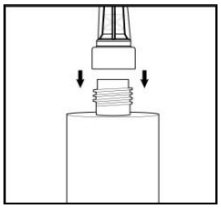
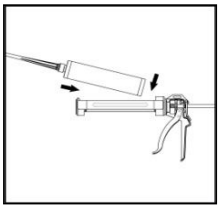
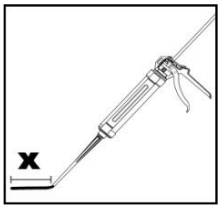
Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. The manual pump shall be used for blowing out bore holes up to diameters do ≤ 24mm and embedment depths up to hef ≤ 10d. Blow out at least 4 times from the back of the bore hole, using an extension if needed. Brush 4 times with the specified brush size (see Table 6) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it. Blow out again with manual pump at least 4 times.

Compressed air cleaning (CAC) for all bore hole diameters do and all bore hole depths

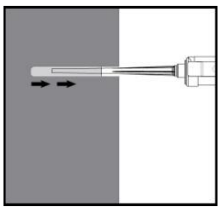
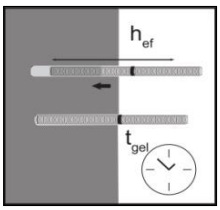


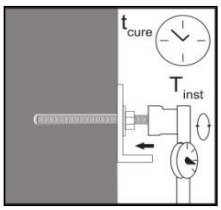



Blow 2 times from the back of the hole (if needed with a nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h). Brush 2 times with the specified brush size (see Table 6) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it.
X 2 Blow out again with compressed air at least 2 times.

Remove the threaded cap from the cartridge. Tightly attach the mixing nozzle. Do not modify the mixer in any way. Made sure the mixing element is inside the mixer. Use only the supplied mixer. Insert the cartridge into the dispenser gun. Discard the initial trigger pulls of adhesive. Discard the first 10ml of resin.



Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull. Fill holes approximately 2/3 full, to ensure that the annular gap between the anchor and the concrete is completely filled with adhesive along the embedment depth. Before use, verify that the threaded rod is dry and free of contaminants. Install the threaded rod to the required embedment depth during the open gel time tgel has elapsed. The working time tgel is given in Table 7. The anchor can be loaded after the required curing time tcure (see Table 7). The applied torque shall not exceed the values Tmax given in Table 1.

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Characteristic and recommended loads for masonry:

The design details are fully disclosed in the ETA. The recommended load are valid under the following conditions:

- dry environment
- masonry mortar class more than M2.5
- space distance s ≥ scr
- edge distance c ≥ ccr
- joints (vertical and horizontal) are visible and filled with mortar
- no pre-stressing force on the wall
- steel strength of anchor 5.8 or higher
- no interaction of tension and shear loads considered
- temperature range from -40 to +40°C

Brick type and strength: solid clay brick with compressive strength ≥ 18 Mpa **Bulk density 1,60 kg/dm3**

Brick "Mattone Pieno"			**M6**	**M8**	**M10**	**M12**
Anchorage depth	h_{ef}	mm	80	80	85	85
Drill diameter (hole diameter)	d_0	mm	8	10	12	14
Minimum wall thickness	h_{min}	mm	h_{ef} + 5mm			
Minimal space distance	s_{min}	mm	240		255	
Minimal edge distance	c_{min}	mm	120		127,5	
Critical space distance	$s_{cr,N}$	mm	240		255	
Critical edge distance	$c_{cr,N}$	mm	120		127,5	
Installation torque	T_{ins}	Nm	2			
Characteristic tension load	N rk	kN	4	4	4	4
Recommended tension load	N rec	kN	1,14			
Characteristic shear load	V rk	kN	6	6	6	6
Recommended shear load	V rec	kN	1,71		2	

Brick type and strength: hollow brick - compressive strength ≥ 6 Mpa **Bulk density 0,9 kg/dm3**

Brick "Doppio UNI"			**M6**	**M8**	**M10**	**M12**
Sleeve dimention (nylon or plastic)		mm	12 x 80		16 x 85	
Anchorage depth	h_{ef}	mm	80	80	85	85
Drill diameter (hole diameter)	d_0	mm	12	12	16	16
Minimum wall thickness	h_{min}	mm	h_{ef} + 5mm			
Critical space distance parallel to horizontal joint	$s_{cr,\|\|}$	mm	250	250	250	250
Critical space distance perpendicular to horizontal joint	$s_{cr,\perp}$	mm	120	120	120	120
Minimal space distance parallel to horizontal joint	$s_{min,\|\|}$	mm	250			
Minimal space distance perpendicular to horizontal joint	$s_{min,\perp}$	mm	120			
Critical edge distance	c_{cr}	mm	100	100	100	100
Minimal edge distance	c_{min}	mm	100			
Installation torque	T_{ins}	Nm	1,5			
Characteristic tension load	N rk	kN	2	2	2	2
Recommended tension load	N rec	kN	0,57			
Characteristic shear load	V rk	kN	2	2	2	2
Recommended shear load	V rec	kN	0,57			

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Properties for installation in vary type of wood

Wood Type	Bar size	Hole size [mm]	Embedment depth [mm]	Characteristic Tension Load [kN]	Characteristic Bond strength [MPa]
OAK	M8	10	60	5	3,3
Glulam spruce	M12	16	120	15	3,3
Glulam spruce	M16	19/20	150	25	3,3

Wood Type	Bar size	Hole size [mm]	*Load for 60mm embedment depth [kg]	*Load for 120 mm embedment depth [kg]	*Load for 150 mm embedment depth [kg]
OAK	M8	10	510	1020	1275
Glulam spruce	M12	16	765	1530	1913
Glulam spruce	M16	19/20	1020	2040	2550

* **Note:** The load is in function of the embedment depth and should be factored down with a safety factor (≥4)

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Notes

PAGE 2 :

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

All data is based on correct installation - see instructions

No influence of edge and spacing

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

h_{ef} range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - f_c cube = 25 N/mm^2 (25 MPa)

Temperature range i maximum long term / short term temperature +24/40^{o}C

PAGE 3 to 5 :

Design Resistance with various stud strengths, material and rebar

Note 1 for stainless steel tensile strength is 500 N/mm^2 (500 MPa)

Note 2 for stainless steel tensile strength is 700 N/mm^2 (500 MPa)

Data shown below the minimum embedment depth is for reference only. Please refer to manufacturer for advice.

PAGE 6 and 8 :

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

All data is based on correct installation - see instructions

No influence of edge and spacing

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

h_{ef} range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - f_c cube = 25 N/mm^2 (25 MPa)

Temperature range i maximum long term / short term temperature +24/40^{o}C

PAGE 7 & 9 :

Bond Strength Factors

Select concrete strength and environmental condition and apply to bond strength table on page 6

PAGE 10 :

Material Properties for grades of other threaded rod and rebar

All grades shown for information

M30 studding is 8.8 grade instead of 5.8 grade

M30 for A4-70 tensile strength of 500 N/mm2 (500 MPa), instead of 700 N/mm2 (700 MPa)

Safety factor is 1.5 tension and 1.25 shear for all carbon steel

Safety factor is 1.56 for stainless steel, up to M24, M30 and M36 is 2.0

Safety factor is 1.4 tension and 1.5 shear for BSt 500 rebar

Partial Safety Factors for pages 2,3,4,5,6,8 :

1.8 for all sizes studs

1.8 for all sizes rebar