

Features and Benefits

Version: 23/12/2013

- High bond strength with High load resistance
- Used with all grades of threaded rod and rebar
- Used in concrete and masonry
- Fast gelling and curing
- Used in dry and wet concrete
- Resistance to chemicals and damp conditions
- Close edge distance and small spacing
- European approval for use in masonry with nylon sleeves
- Economical fixing resin
- Extremely versatile
- Styrene free with low odour
- Close edge distance and small spacing
- Manual cleaning up to 20mm diameter and embedment depths of 240mm
- Independently tested and approved

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Shelf Life and Storage

This product should be stored between +5°C & +25°C.

The Shelf life of the product is 12 months from the manufacture date.

IMPORTANT The information and data given is based on our own experience, research and testing and is believed to be reliable and accurate.

However, as we cannot know the varied uses to which its products may be applied, or the methods of application used, no warranty as to the fitness or suitability of its products is given or implied. It is the users responsibility to determine suitability of use. For further information please contact Our Technical Department.



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BUFFALO - EPSF



Product Description

EPSF 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 damp environments or with chemical exposure.

Available in sizes : 300ml & 410ml Foil Bag 10:1 Cartridges

Specific Benefits

- European Approved
- Styrene Free Low odour
- High loads possible
- Economical fixing resin
- Chemical resistance
- Studs and rebar
- Approved for Masonry

Approvals

- ETA ETAG 029 for Masonry Size M10
- ITB approved AT-15-6835:2011 - ITB-974/W
- Tested by Imperial College London

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

Size (mm)	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)
	Tension	Shear	Tension	Shear	Tension	Shear	Edge	Spacing	Edge					
	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}				
8	17.79		9.88		7.06							60		
	19.00	9.00	12.70	7.20	9.07	5.14	80	160	80	40	80	10	9	10
	19.00		12.70		9.07							160		
10	20.81		11.56		8.26							60		
	30.20	15.00	20.10	12.00	14.36	8.57	100	200	90	50	90	12	12	20
	30.20		20.10		14.36							200		
12	27.45		15.25		10.89							70		
	43.13	21.00	23.96	16.80	17.11	12.00	120	240	110	60	110	14	14	40
	43.80		29.20		20.86							240		
16	39.97		22.21		15.86							80		
	62.46	39.00	34.70	31.20	24.78	22.29	160	320	125	80	125	18	18	80
	81.60		54.40		38.86							320		
20	50.89		28.27		20.20							90		
	96.13	61.00	53.41	48.80	38.15	34.86	200	400	180	100	170	24	22	120
	127.40		84.90		60.64							400		
24	58.28		32.38		23.13							100		
	122.39	88.00	68.00	70.40	48.57	50.29	240	480	220	120	210	28	26	160
	183.60		122.40		87.43							480		
30	71.82		39.90		28.50							120		
	167.57	142.50	93.10	114.00	66.50	81.43	280	560	280	150	280	35	32	200
	280.00		186.67		133.34							600		

= steel failure

Partial safety factor = 1.5

Version 1 : 6/6/2013

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Design Resistance used with various stud strengths, material and rebar.

5.8 Grade Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)													
8	10	6.6	8.2	9.9	12.7									
10	12	7.7	9.6	11.6	15.4	19.3	20.1							
12	14	10.9		13.1	17.4	21.8	27.2	29.2						
16	20				22.2	27.8	34.7	44.42	54.4					
Depth (mm)		40	50	60	80	100	125	160	200	240	280	320		
20	24	25.1	31.4	37.7	47.1	56.6	66.0	75.41	84.9					
24	28	32.4		38.9	48.6	58.3	68.0	77.7	97.2	113.3	122.4			
30	35	39.9			49.9	59.9	69.8	79.8	99.8	116.4	133.0	159.6	194.5	
36	40	46.7				56.0	65.3	74.7	93.3	108.9	124.4	149.3	186.6	224.0
Depth (mm)		80	100	120	150	180	210	240	300	350	400	480	600	720

h_{ef} Failure (mm)	$F_{d,s}$ Design Load (kN)
77	12.7
104	20.1
134	29.2
196	54.4

270	84.93
378	122.4
585	194.5
911	283.2

8.8 Grade Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)													
8	10	6.6	8.2	9.9	13.2	16.5	19.5							
10	12	7.7	9.6	11.6	15.4	19.3	24.1	30.9						
12	14	10.9		13.1	17.4	21.8	27.2	34.9	43.59	45				
16	20				22.2	27.8	34.7	44.4	55.5	66.6	77.7	83.7		
Depth (mm)		40	50	60	80	100	125	160	200	240	280	320		
20	24	25.1	31.4	37.7	47.1	56.6	66.0	75.4	94.3	110.0	125.7			
24	28	32.4		38.8	48.5	58.2	67.9	77.6	97.1	113.2	129.4	155.3		
30	35	39.9			49.9	59.9	69.9	79.9	99.8	116.5	133.1	159.7	199.6	
36	40	46.7				56.0	65.3	74.7	93.3	108.9	124.4	149.3	186.6	224.0
Depth (mm)		80	100	120	150	180	210	240	300	350	400	480	600	720

h_{ef} Failure (mm)	$F_{d,s}$ Design Load (kN)
118	19.52
161	30.93
206	45.0
302	83.73

416	130.7
582	188.3
899	299.2
1401	435.7

= steel failure

cont.

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Design Resistance used with various stud strengths, material and rebar.

10.9 Grade Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Design Resistance (kN)												h_{ef} Failure (mm)	$F_{d,s}$ Design Load (kN)			
8	10	6.6	8.2	9.9	13.2	16.5	20.6	26.4									165	27.19
10	12	7.7	9.6	11.6	15.4	19.3	24.1	30.8	38.5								224	43.09
12	14		10.9	13.1	17.4	21.8	27.2	34.9	43.6	52.3							287	62.62
16	20				22.2	27.8	34.7	44.4	55.5	66.6	77.7	88.8					420	116.6
Depth (mm)		40	50	60	80	100	125	160	200	240	280	320						
20	24	25.1	31.4	37.7	47.1	56.6	66.0	75.4	94.3	110.0	125.7						579	182.0
24	28		32.4	38.8	48.5	58.2	67.9	77.6	97.1	113.2	129.4	155.3					811	262.2
30	35			39.9	49.9	59.9	69.9	79.9	99.8	116.5	133.1	159.7	199.6				1252	416.7
36	40				46.7	56.0	65.3	74.7	93.3	108.9	124.4	149.3	186.6	224.0			1951	606.9
Depth (mm)		80	100	120	150	180	210	240	300	350	400	480	600	720				

A4-70 Stainless Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Design Resistance (kN)												h_{ef} Failure (mm)	$F_{d,s}$ Design Load (kN)				
8	10	6.6	8.2	9.9	13.2	13.7											83	13.7	
10	12	7.7	9.6	11.6	15.4	19.3	21.7										113	21.7	
12	14		10.9	13.1	17.4	21.8	27.2	31.6									145	31.6	
16	20				22.2	27.8	34.7	44.4	55.5	58.8							212	58.8	
Depth (mm)		40	50	60	80	100	125	160	200	240	280	320							
20	24	25.1	31.4	37.7	47.1	56.6	66.0	75.4	91.7								292	91.7	
24	28		32.4	38.8	48.5	58.2	67.9	77.6	97.1	113.2	129.4	132.1					408	132.1	
30	35			39.9	49.9	59.9	69.9	79.9	98.1								*1	295	98.1
36	40				46.7	56.0	65.3	74.7	93.3	108.9	124.4	142.8					*1	459	142.8
Depth (mm)		80	100	120	150	180	210	240	300	350	400	480	600	720					

cont.

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Design Resistance used with various stud strengths, material and rebar.

A4-80 Stainless Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Design Resistance (kN)												h _{ef} Failure (mm)	F _{d,s} Design Load (kN)		
8	10	6.6	8.2	9.9	13.2	15.7									95	15.7	
10	12		9.6	11.6	15.4	19.3	24.1	24.8							129	24.8	
12	14		10.9	13.1	17.4	21.8	27.2	34.87	36.1						165	36.1	
16	20				22.2	27.8	34.7	44.4	55.5	67.2					242	67.2	
Depth (mm)		40	50	60	80	100	125	160	200	240	280	320					
20	24	25.1	31.4	37.7	47.1	56.6	66.0	75.4	94.3	104.8					334	104.8	
24	28		32.4	38.8	48.5	58.2	67.9	77.6	97.1	113.2	129.4	132.1			*2	408	132.1
30	35			39.9	49.9	59.9	69.9	79.9	98.1							295	98.1
36	40				46.7	56.0	65.3	74.7	93.3	108.9	124.4	142.8			*1	459	142.8
Depth (mm)		80	100	120	150	180	210	240	300	350	400	480	600	720			

High bond reinforcing bars F_{yk} = 500N/mm²

Rebar Diameter (mm)	Hole Diameter (mm)	Design Resistance (kN)															h _{ef} Failure (mm)	F _{d,s} Design Load (kN)
8	10 – 12	11.5	14.3	17.2	21.5	21.9											153	21.9
10	12	13.8	17.3	20.7	25.9	31.1	34.1										198	34.1
12	15	14.8	18.5	22.2	27.7	33.3	38.8	44.3	49.2								266	49.2
14	16		20.5	24.5	30.7	36.8	43.0	49.1	61.4								327	67.0
16	20		22.5	27.0	33.8	40.5	47.3	54.1	67.6	78.8							388	87.4
18	22		23.5	28.2	35.2	42.2	49.3	56.3	70.4	82.1							471	110.7
Depth (mm)		80	100	120	150	180	210	240	300	350								
20	25	22.6	27.1	33.9	40.7	47.5	54.3	61.1	67.9	79.2	90.5						604	136.6
22	27		28.0	35.0	42.1	49.1	56.1	63.1	70.1	81.8	93.5	116.8					708	165.3
25	30		30.0	37.5	45.0	52.5	60.0	67.5	75.1	87.6	100.1	125.1					786	196.5
28	35		31.7	39.6	47.5	55.4	63.3	71.3	79.2	92.4	105.6	132.0	158.4				1015	267.8
32	40			40.7	48.9	57.0	65.2	73.3	81.4	95.0	108.6	135.7	162.9	195.5			1288	349.7
36	44			41.6	49.9	58.2	66.5	74.8	83.1	97.0	110.8	138.6	166.3	199.5	221.7		1600	443.5
Depth (mm)		100	120	150	180	210	240	270	300	350	400	500	600	720	800			

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

Size (mm)	Non Cracked Concrete						Cracked Concrete						Nominal Embedment (mm)
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		
	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	
	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	17.79	9.00	9.89	7.20	7.06	5.14	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	23.73		13.18		9.41								80
	47.45		26.36		18.83								160
10	20.81	15.00	11.56	12.00	8.26	8.57	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	31.21		17.34		12.39								90
	69.37		38.54		27.53								200
12	27.45	21.00	15.25	16.80	10.89	12.00	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	70
	43.13		23.96		17.11								110
	94.10		52.28		37.34								240
16	39.97	39.00	22.21	31.20	15.86	22.29	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80
	62.46		34.70		24.78								125
	159.88		88.82		63.45								320
20	50.89	61.00	28.27	48.80	20.20	34.86	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	90
	96.13		53.41		38.15								170
	226.20		125.66		89.76								400
24	58.28	88.00	32.38	70.40	23.13	50.29	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	100
	122.39		68.00		48.57								210
	279.76		155.42		111.02								480
30	71.82	207.00	39.90	165.60	28.50	118.29	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	120
	167.57		93.10		66.50								280
	359.08		199.49		142.49								600

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Bond Strength Factors

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

Concrete Strength N/mm ²	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
Non-Cracked $f_c =$	0.98	1.00	1.03	1.06	1.09	1.13	1.16	1.20

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

Material Properties for grades of threaded rod and rebar

Stud Diameter (mm)	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
	$N_{rk,s}$ (kN)	$N_{rd,s}$ (kN)	$N_{rk,s}$ (kN)	$N_{rd,s}$ (kN)	$N_{rk,s}$ (kN)	$N_{rd,s}$ (kN)	$N_{rk,s}$ (kN)	$N_{rd,s}$ (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
M36	653.6	435.7	849.7	606.9	408.4	218.4	571.8	305.8

Stud Diameter (mm)	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
	$V_{rk,s}$ (kN)	$V_{rd,s}$ (kN)	$V_{rk,s}$ (kN)	$V_{rd,s}$ (kN)	$V_{rk,s}$ (kN)	$V_{rd,s}$ (kN)	$V_{rk,s}$ (kN)	$V_{rd,s}$ (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
M36	326.8	261.4	424.8	283.2	204.2	130.9	285.9	183.3

Rebar Diameter (mm)	Rebar BSt 500 to DIN 488		Rebar BSt 500 to DIN 488	
	$N_{rk,s}$ (kN)	$N_{rd,s}$ (kN)	$V_{rk,s}$ (kN)	$V_{rd,s}$ (kN)
8	28.0	21.9	16.6	11.1
10	43.0	34.1	25.9	17.3
12	62.0	49.2	37.3	24.9
14	85.0	60.7	50.8	33.9
16	111.0	87.4	66.4	44.3
20	173.0	136.6	103.9	69.3
25	270.0	196.5	162.0	108.0
32	442.0	349.7	265.1	176.7
36	563.2	443.5	337.9	225.3
40	693.8	546.3	416.4	276.4

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

Rebar Ø	Non Cracked Concrete						Cracked Concrete						Nominal Embedment (mm)
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		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	15.47	13.95	8.60	9.30	6.14	6.64	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	20.63		11.46		8.19								80
	41.26		22.92		16.37								160
10	18.66	21.45	10.37	14.30	7.41	10.21	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	27.99		15.55		11.11								90
	62.20		34.56		24.68								200
12	23.28	31.05	12.93	20.70	9.24	14.79	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	70
	36.58		20.32		14.51								110
	79.80		44.33		31.67								240
14	29.45	42.45	16.36	28.30	11.69	20.21	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80
	42.34		23.52		16.80								115
	103.08		57.27		40.90								280
16	32.41	55.50	18.01	37.00	12.86	26.43	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80
	50.64		28.13		20.10								125
	129.65		72.03		51.45								320
18	33.93	69.66	18.85	46.44	13.46	33.17	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80
	63.62		35.34		25.25								150
	152.68		84.82		60.59								360
20	36.64	86.55	20.36	57.70	14.54	41.21	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	90
	69.22		38.45		27.47								170
	162.86		90.48		64.63								400
22	42.16	104.01	23.42	69.34	16.73	49.53	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	100
	80.10		44.50		31.79								190
	185.51		103.06		73.61								440
25	45.03	135.00	25.01	90.00	17.87	64.29	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	100
	94.56		52.53		37.52								210
	225.13		125.07		89.34								500
28	62.07	168.75	29.56	112.50	21.11	80.36	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	112
	155.17		73.89		52.78								280
	310.34		147.78		105.56								560
32	72.96	220.95	34.74	147.30	24.82	105.21	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	128
	182.40		86.86		62.04								320
	364.81		173.72		124.08								640

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Bond Strength Factors - REBAR

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

Concrete Strength N/mm ²	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
non-cracked $f_c =$	0.97	1.00	1.03	1.06	1.09	1.12	1.16	1.20

Influence of environmental conditions in non cracked concrete

		Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 18	Ø 20	Ø 22	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		0.84	0.84	0.84

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Effect of Anchor Spacing - Tension

Anchor Spacing (mm)	Stud / Rebar Diameter						
	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	0.63
175		0.92	0.85	0.76	0.71	0.67	0.64
200		1.00	0.90	0.80	0.74	0.69	0.66
225			0.95	0.84	0.77	0.72	0.68
240			1.00	0.86	0.79	0.73	0.69
250				0.87	0.80	0.74	0.70
275				0.91	0.83	0.76	0.72
280				0.92	0.84	0.77	0.73
300				0.95	0.86	0.79	0.74
320				1.00	0.88	0.81	0.76
350					0.92	0.83	0.78
400					1.00	0.88	0.82
440						0.92	0.85
460						1.00	0.87
500							0.90
560							1.00

Effect of Edge Distance - Tension

Edge Distance (mm)	Stud / Rebar Diameter						
	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	0.67	0.63
160				1.00	0.84	0.72	0.65
180					0.91	0.78	0.70
200					1.00	0.84	0.76
220						0.89	0.81
240						1.00	0.86
280							1.00

Effect of Edge Distance - Shear

Edge (mm)	Stud / Rebar Diameter						
	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	0.46	0.30
160					0.91	0.62	0.35
180					1.00	0.77	0.46
200						0.92	0.57
220						1.00	0.68
240							0.78
280							1.00

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BUFFALO - EPSF



Minimum Curing Time

Concrete Temperature	Gel - Working Time	Minimum curing time in dry concrete	Minimum curing time in wet concrete
- 10°C *	40 min	240 min	x2
-5°C *	40 min	240 min	x2
5°C	15 min	120 min	x2
15°C	8 min	60 min	x2
25°C	5 min	45 min	x2
35°C	3 min	30 min	x2

* Resin temperature must be at least 20°C

- Full cure 24 hours

- 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 +60°C	+43°C	+60°C
Range III	-40°C to +72°C	+43°C	+72°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.

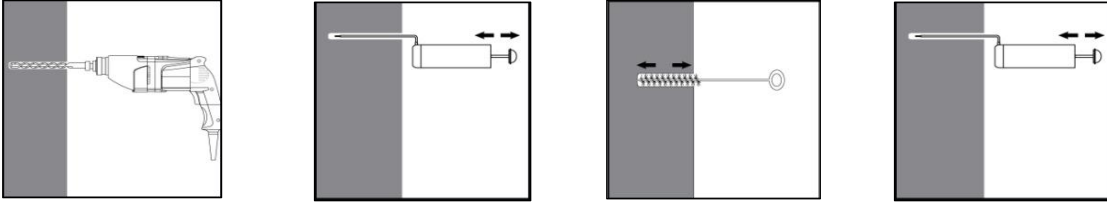
Physical Properties

	N/mm ²	Test Method
Compressive Strength	45	EN ISO 604 / ASTM 695
Flexural Strength	15.4	EN ISO 178 / ASTM 790
Flexural Modulus	3111.7	EN ISO 178 / ASTM 790
Tensile Strength	9.4	EN ISO 527 / ASTM 638
E Modulus	5488.5	EN ISO 527 / ASTM 638
VOC Content	A+ Rating	-

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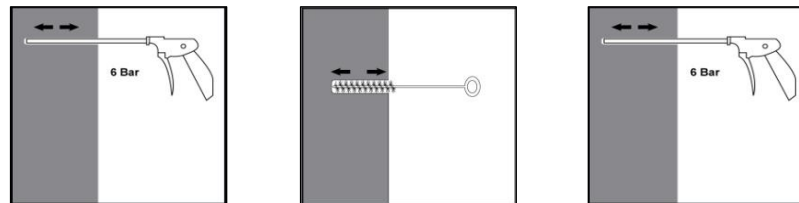
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Installation parameters: drilling hole cleaning and installation

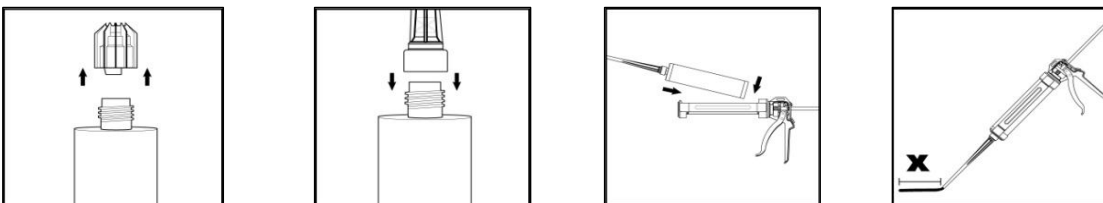


Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. The manual pump shall be used for blowing out bore holes up to diameters $d_o \leq 24\text{mm}$ and embedment depths up to $h_{ef} \leq 10d$. 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.

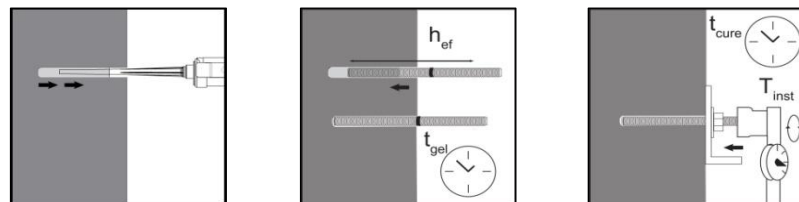
Compressed air cleaning (CAC) for all bore hole diameters d_o and all bore hole depths



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 $6\text{ m}^3/\text{h}$). 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 t_{gel} has elapsed. The working time t_{gel} is given in Table 7. The anchor can be loaded after the required curing time t_{cure} (see Table 7). The applied torque shall not exceed the values T_{max} given in Table 1.



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 +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d

hef range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - f_c cube = 25N/mm² (25MPa)

5.8 grade stud

Temperature range i maximum long term / short term temperature +24/40°C

PAGE 3 :

Design Resistance with various stud strengths, material and rebar.

Note 1 for stainless steel tensile strength is 500N/mm² (500MPa)

Note 2 for stainless steel tensile strength is 700N/mm² (500MPa)

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

PAGE 4 and 6 :

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 +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d

hef range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - f_c cube = 25N/mm² (25MPa)

Temperature range i maximum long term / short term temperature +24/40°C

PAGE 5 & 7 :

Bond Strength Factors

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

PAGE 8 :

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 500N/mm² (500MPa), instead of 700N/mm² (700MPa)

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 2,3,4,5,6,7 :

1.8 for all sizes studs

1.8 for all sizes rebar

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