BUFFALO - EPSF

Features and Benefits

Version: 25/09/2017

- *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*

Contents

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.

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

Approvals

- ETA ETAG 029 for Masonry Size M10
- ITB approved AT-15-6835:2011 - ITB-974/W
- Tested by Imperial College London
- Tested according to LEED 2009 EQ c4.1, SCAQMD rule 1168 (2005).
- WRAS Approved for use with Potable drinking water no. 1605529.
- 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 (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 $C_{cr,V}$	C_{min}, S_{min}	Nominal Embedment (mm)	concrete (mm)	fixture (mm)	Torque (Nm)
8	17.79		9.88		7.06						60	10	9	10
	19.00	9.00	12.70	7.20	9.07	5.14	80	160	80	40	80			
	19.00		12.70		9.07						160			
10	20.81		11.56		8.26						60	12	12	20
	30.20	15.00	20.10	12.00	14.36	8.57	100	200	90	50	90			
	30.20		20.10		14.36						200			
12	27.45		15.25		10.89						70	14	14	40
	43.13	21.00	23.96	16.80	17.11	12.00	120	240	110	60	110			
	43.80		29.20		20.86						240			
16	39.97		22.21		15.86						80	18	18	80
	62.46	39.00	34.70	31.20	24.78	22.29	160	320	125	80	125			
	81.60		54.40		38.86						320			
20	50.89		28.27		20.20						90	24	22	120
	96.13	61.00	53.41	48.80	38.15	34.86	200	400	180	100	170			
	127.40		84.90		60.64						400			
24	58.28		32.38		23.13						100	28	26	160
	122.39	88.00	68.00	70.40	48.57	50.29	240	480	220	120	210			
	183.60		122.40		87.43						480			
30	71.82		39.90		28.50						120	35	32	200
	167.57	142.50	93.10	114.00	66.50	81.43	280	560	280	150	280			
	292.00		194.50		138.93						600			

= steel failure Partial safety factor = 1.5 Version 1 : 6/6/2013

A StongFast Product.

For more information call 0844 887 1401. Or log on to www.strongfast-uk.com

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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
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	(mm)	(kN)
8	10	9.9	11.5	12.7																		77	12.7
10	12	11.6	13.5	15.4	17.3	19.3	20.1															104	20.1
12	14		15.3	17.4	19.6	21.8	24.0	26.2	28.3	29.2												134	29.2
16	18			22.2	25.0	27.8	30.5	33.3	36.1	38.9	44.4	54.4										196	54.4
20	24			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					32.4	35.6	38.8	42.1	45.3	51.8	64.7	77.6	90.6	103.5	122						378	122.4
27	32						36.4	39.7	43.0	46.3	52.9	66.2	79.4	92.6	105.9	132.3	158.8	159.1				481	159.1
30	35							39.9	43.3	46.6	53.2	66.5	79.9	93.2	106.5	133.1	159.7	179.7	194.5			584	194.5
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

= steel failure

8.8 Grade Steel Studding

Stud Diameter	Hole Diameter	Embedment Depth hef																				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	660	720	(mm)	(kN)
8	10	9.9	11.5	13.2	14.8	16.5	18.1	19.5														118	19.5
10	12	11.6	13.5	15.4	17.3	19.3	21.2	23.1	25.0	27.0	30.9											161	30.9
12	14		15.3	17.4	19.6	21.8	24.0	26.2	28.3	30.5	34.9	43.6	45.0									206	45.0
16	18			22.2	25.0	27.8	30.5	33.3	36.1	38.9	44.4	55.5	66.6	77.7	83.7							302	83.7
20	24			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					32.4	35.6	38.8	42.1	45.3	51.8	64.7	77.6	90.6	103.5	129.4	155.3					582	188.3
27	32						36.4	39.7	43.0	46.3	52.9	66.2	79.4	92.6	105.9	132.3	158.8	178.7				740	244.8
30	35							39.9	43.3	46.6	53.2	66.5	79.9	93.2	106.5	133.1	159.7	179.7	199.6			899	299.2
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

= steel failure

cont.

BUFFALO - EPSF

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

10.9 Grade Steel Studding

Stud Diameter	Hole Diameter	Embedment Depth hef																				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	660	720	(mm)	(kN)
8	10	9.9	11.5	13.2	14.8	16.5	18.1	19.8	21.4	23.1	26.4											165	27.2
10	12	11.6	13.5	15.4	17.3	19.3	21.2	23.1	25.0	27.0	30.8	38.5										224	43.1
12	14		15.3	17.4	19.6	21.8	24.0	26.2	28.3	30.5	34.9	43.6	52.3									287	62.6
16	18			22.2	25.0	27.8	30.5	33.3	36.1	38.9	44.4	55.5	66.6	77.7	88.8							420	116.6
20	24			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					32.4	35.6	38.8	42.1	45.3	51.8	64.7	77.6	90.6	103.5	129.4	155.3					811	262.2
27	32						36.4	39.7	43.0	46.3	52.9	66.2	79.4	92.6	105.9	132.3	158.8	178.7				1031	341.0
30	35							39.9	43.3	46.6	53.2	66.5	79.9	93.2	106.5	133.1	159.7	179.7	199.6			1252	416.7
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

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	660	720	(mm)	(kN)
8	10	9.9	11.5	13.2	13.7																	83	13.7
10	12	11.6	13.5	15.4	17.3	19.3	21.2	21.7														113	21.7
12	14		15.3	17.4	19.6	21.8	24.0	26.2	28.3	30.5	31.6											145	31.6
16	18			22.2	25.0	27.8	30.5	33.3	36.1	38.9	44.4	55.5	58.8									212	58.8
20	24			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					32.4	35.6	38.8	42.1	45.3	51.8	64.7	77.6	90.6	103.5	129.4	132.1					408	132.1
27	32						36.4	39.7	43.0	46.3	52.9	66.2	79.4	80.2							1	243	80.2
30	35							39.9	43.3	46.6	53.2	66.5	79.9	93.2	98.1						1	295	98.1
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

cont.

BUFFALO - EPSF

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
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	(mm)	(kN)
8	10	9.9	11.5	13.2	14.8	15.7																95	15.7
10	12		13.5	15.4	17.3	19.3	21.2	23.1	24.8													129	24.8
12	14		15.3	17.4	19.6	21.8	24.0	26.2	28.3	30.5	34.9	36.1										165	36.1
16	18			22.2	25.0	27.8	30.5	33.3	36.1	38.9	44.4	55.5	66.6	67.2								242	67.2
20	24			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					32.4	35.6	38.8	42.1	45.3	51.8	64.7	77.6	90.6	103.5	129.4	132.1					408	132.1
27	32						36.4	39.7	43.0	46.3	52.9	66.2	79.4	80.2							2	243	80.2
30	35							39.9	43.3	46.6	53.2	66.5	79.9	93.2	98.1						2	295	98.1
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

High bond reinforcing bars Fyk=500N/mm2

Rebar Diameter	Hole Diameter	Embedment Depth hef																					h_{ef} failure	$F_{d,s}$ yield load
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	720	800		(mm)	(kN)
8	12	8.6	10.0	11.5	12.9	14.3	15.8	17.2	18.6	20.1	21.9												153	21.9
10	14	10.4	12.1	13.8	15.6	17.3	19.0	20.7	22.5	24.2	27.6	34.1											198	34.1
12	16		12.9	14.8	16.6	18.5	20.3	22.2	24.0	25.9	29.6	36.9	44.3										266	49.2
16	20			18.0	20.3	22.5	24.8	27.0	29.3	31.5	36.0	45.0	54.1	63.1	72.1								388	87.4
20	25			19.1	21.5	23.9	26.3	28.7	31.0	33.4	38.2	47.8	57.3	66.9	76.4	95.5							572	136.6
25	30					25.0	27.5	30.0	32.5	35.0	40.0	50.0	60.0	70.1	80.1	100.1	125.1						786	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								35.3	38.0	43.4	54.3	65.2	76.0	86.9	108.6	135.7	152.0	173.7				1288	349.7
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	720	800			

*1 = Tensile strength 500N/mm2

*2 = Tensile strength 700N/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	17.79	9.00	9.89	7.20	7.06	5.14	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		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		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		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		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		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		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/mm2	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
Non-Cracked fc =	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

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Material Properties for grades of threaded rod and rebar

	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
18	140.0	100.0	70.0	46.7
20	173.0	123.6	86.5	57.7
22	209.0	149.3	104.5	69.7
25	270.0	192.9	135.0	90.0
28	339.0	242.1	169.0	112.7
32	442	315.7	221	147.3

BUFFALO - EPSF

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}	
	15.47		8.60		6.14								60
8	20.63	13.95	11.46	9.30	8.19	6.64	Not Applicable		Not Applicable		Not Applicable		**80**
	41.26		22.92		16.37								160
	18.66		10.37		7.41								60
10	27.99	21.45	15.55	14.30	11.11	10.21	Not Applicable		Not Applicable		Not Applicable		**90**
	62.20		34.56		24.68								200
	23.28		12.93		9.24								70
12	36.58	31.05	20.32	20.70	14.51	14.79	Not Applicable		Not Applicable		Not Applicable		**110**
	79.80		44.33		31.67								240
	29.45		16.36		11.69								80
14	42.34	42.45	23.52	28.30	16.80	20.21	Not Applicable		Not Applicable		Not Applicable		115
	103.08		57.27		40.90								280
	32.41		18.01		12.86								80
16	50.64	55.50	28.13	37.00	20.10	26.43	Not Applicable		Not Applicable		Not Applicable		**125**
	129.65		72.03		51.45								320
	33.93		18.85		13.46								80
18	63.62	69.66	35.34	46.44	25.25	33.17	Not Applicable		Not Applicable		Not Applicable		150
	152.68		84.82		60.59								360
	36.64		20.36		14.54								90
20	69.22	86.55	38.45	57.70	27.47	41.21	Not Applicable		Not Applicable		Not Applicable		**170**
	162.86		90.48		64.63								400
	42.16		23.42		16.73								100
22	80.10	104.01	44.50	69.34	31.79	49.53	Not Applicable		Not Applicable		Not Applicable		190
	185.51		103.06		73.61								440
	45.03		25.01		17.87								100
25	94.56	135.00	52.53	90.00	37.52	64.29	Not Applicable		Not Applicable		Not Applicable		**210**
	225.13		125.07		89.34								500
	62.07		29.56		21.11								112
28	155.17	168.75	73.89	112.50	52.78	80.36	Not Applicable		Not Applicable		Not Applicable		**280**
	310.34		147.78		105.56								560
	72.96		34.74		24.82								128
32	182.40	220.95	86.86	147.30	62.04	105.21	Not Applicable		Not Applicable		Not Applicable		**320**
	364.81		173.72		124.08								640

BUFFALO - EPSF

Bond Strength Factors - REBAR

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	1.03	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	1.00	1.00	1.00
Temp II 80°C / 50°C	Dry and Wet	0.90	0.90	0.88	0.88	0.88	0.86	0.86	0.84	0.84	0.84	0.84

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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	0.63
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	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	0.67	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	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	0.46	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

BUFFALO - EPSF

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

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	+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.

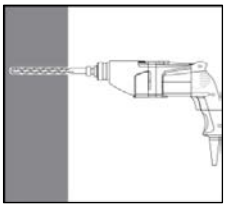
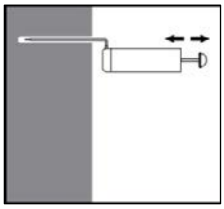
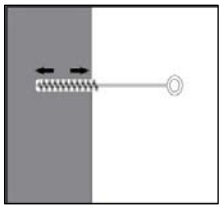
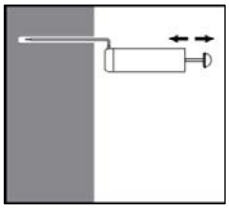
Long term temperatures will include constant or near constant temperatures, such as those experienced in cold stores or next to heating installations.

Physical Properties

	N/mm2	Test Method
Compressive Strength	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	-

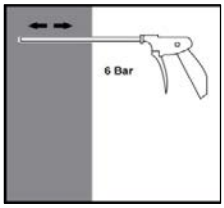
BUFFALO - EPSF

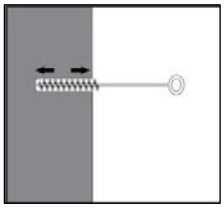
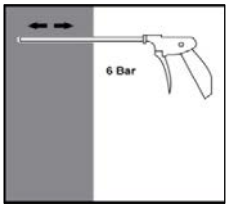
Installation parameters: drilling hole cleaning and installation

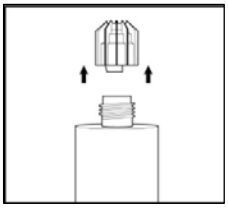
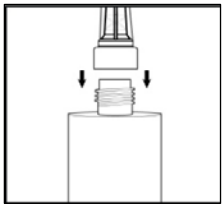
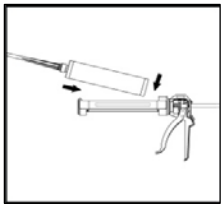
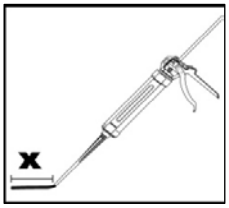
Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. The manual pump shall be used for blowing out bore holes up to diameters do ≤ 24mm and embedment 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

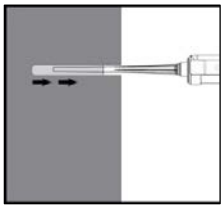
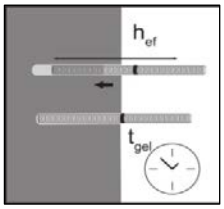


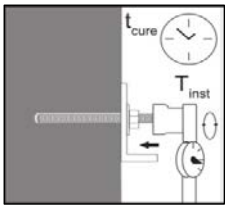



Blow 2 times from the back of the hole (if needed with a nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h). Brush 2 times with the specified brush size (see Table 6) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting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

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

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

5.8 grade stud

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

PAGE 3 :

Design Resistance with various stud strengths, material and rebar.

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

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

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

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

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