

CHEMFIx 1-1 Pure Epoxy



Features and Benefits

Version: 9 - 23/10/2015

- High bond strength with High load resistance
- Use with all grades of threaded rod and rebar
- For deep embedment installations
- Longer gelling times for large holes
- Used in dry and wet concrete and also in wood
- Used in flooded holes
- Used in corrosive environments
- Suitable for diamond drilled holes
- Used for elevated temperatures - temperature ranges I, II and III
- **European Approval TR023 for rebar installations**
- Low shrinkage enables large diameter installations
- 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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Version 1 : 6/6/2013

Shelf Life and Storage

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

The Shelf life of the product is 24 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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CHEMFIx 1-1 Pure Epoxy

Product Description

Chemfix 1-1 Pure Epoxy is a 2 component high strength pure epoxy chemical anchoring resin system. It is designed for deep embedment and large diameter holes due to its zero shrinkage, and longer working times. For diamond drilled holes, with rebar, and in areas of high chemical exposure eg. Seasalt and swimming pools. Available in sizes : 400ml 1:1 Side by Side Cartridge or 600ml 1:1 Side by Side Cartridge.

Specific Benefits

- Long working times
- High loads possible
- High chemical resistance
- Use with potable water
- Studs and rebar
- Diamond drilled holes
- Fixing studs in wood
- Zero shrinkage
- Low odour
- 24 Month shelf life

Approvals

- European Approval 15/0226 for Post-Installed Rebar TR023
- ITB approved AT-15-6895:2011 - ITB-973/W
- Tested to BS6920 for use with potable water* (Cured at 7°C for 7 days)
- Tested according to LEED 2009 EQ c4.1, SCAQMD rule 1168 (2005).
- A+ Rating VOC content

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

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 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 $C_{cr,V}$					
8	19.00		12.70		9.07						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	25.45		14.14		10.10						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	35.63		19.79		14.14						70			
	43.80	21.00	29.20	16.80	20.86	12.00	120	240	110	60	110	14	14	40
	43.80		29.20		20.86						240			
16	52.28		29.04		20.74						80			
	81.60	39.00	54.40	31.20	38.86	22.29	160	320	175	80	125	18	18	80
	81.60		54.40		38.86						320			
20	67.86		32.31		23.08						90			
	126.70	61.00	60.30	48.80	43.07	34.86	200	400	225	100	170	24	22	120
	127.40		84.90		60.64						400			
24	82.94		39.49		28.21						100			
	174.17	88.00	82.94	70.40	59.24	50.29	240	480	280	120	210	28	26	160
	183.60		122.40		87.43						480			
27	102.64		48.87		34.91						110			
	223.93	115.00	106.63	92.00	76.17	65.71	270	540	240	135	240	32	30	180
	238.00		159.10		109.50						540			
30	124.41		59.24		42.32						120			
	290.28	142.50	138.23	114.00	98.74	81.43	300	600	280	150	280	35	32	200
	292.00		194.50		133.33						600			
33	141.51		67.39		48.13						130			
	326.57	173.50	155.51	138.80	111.08	99.14	330	660	310	165	300	37	36	250
	360.00		240.60		165.23						660			
36	169.65		80.78		57.70						150			
	384.53	212.50	183.10	170.00	130.79	121.43	360	720	330	180	340	40	38	300
	425.00		283.33		202.38						720			

= steel failure

Table notes : see back page

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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)	Embedment Depth h_{ef}																	h_{ef} failure (mm)	$F_{d,s}$ design load (kN)			
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540			600	660	720
8	10	11.3	12.7																		67	12.7	
10	12	14.1	16.5	18.9	20.1																85	20.1	
12	14		19.8	22.6	25.5	28.3	29.2														103	29.2	
16	18			29.0	32.7	36.3	39.9	43.6	47.2	50.8	54.4										150	54.4	
20	24			30.4	34.2	38.0	41.8	45.6	49.4	53.2	60.8	76.0	84.9								223	84.9	
24	28					39.5	43.5	47.4	51.4	55.3	63.2	79.0	94.8	110.6	122.4						310	122.4	
27	32						48.9	53.3	57.8	62.2	71.1	88.9	106.7	124.5	142.2	159.1					358	159.1	
30	35							59.3	64.2	69.1	79.0	98.8	118.5	138.3	158.1	194.5					394	194.5	
33	38								67.4	72.6	82.9	103.7	124.4	145.2	165.9	207.4	240.6				464	240.6	
36	40									76.0	86.9	108.6	130.3	152.0	173.7	217.2	260.6	283.2			522	283.2	
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

8.8 Grade Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth h_{ef}																	h_{ef} failure (mm)	$F_{d,s}$ design load (kN)			
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540			600	660	720
8	10	11.3	13.2	15.1	17.0	18.9	19.5														104	19.5	
10	12	14.1	16.5	18.9	21.2	23.6	25.9	28.3	30.6	30.9											131	30.9	
12	14		19.8	22.6	25.5	28.3	31.1	33.9	36.8	39.6	45.0										159	45.0	
16	18			29.0	32.7	36.3	39.9	43.6	47.2	50.8	58.1	72.6	83.7								231	83.7	
20	24			30.4	34.2	38.0	41.8	45.6	49.4	53.2	60.8	76.0	91.2	106.5	121.7	130.7					344	130.7	
24	28					39.5	43.5	47.4	51.4	55.3	63.2	79.0	94.8	110.6	126.4	158.1	188.3				476	188.3	
27	32						48.9	53.3	57.8	62.2	71.1	88.9	106.7	124.5	142.2	177.8	213.4	240.0	244.8		551	244.8	
30	35						59.3	64.2	69.1	79.0	98.8	118.5	138.3	158.1	197.6	237.1	266.7	296.4	299.2		606	299.2	
33	38							67.4	72.6	82.9	103.7	124.4	145.2	165.9	207.4	248.8	280.0	311.1	342.2	370.1	714	370.1	
36	40								76.0	86.9	108.6	130.3	152.0	173.7	217.2	260.6	293.2	325.8	358.3	390.9	803	435.7	
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

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

10.9 Grade Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth hef																			hef failure (mm)	F _{d,s} design load (kN)	
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660			720
8	10	11.3	13.2	15.1	17.0	18.9	20.7	22.6	24.5	26.4	27.2										144	27.2	
10	12	14.1	16.5	18.9	21.2	23.6	25.9	28.3	30.6	33.0	37.7	43.1									183	43.1	
12	14		19.8	22.6	25.5	28.3	31.1	33.9	36.8	39.6	45.2	56.6	62.6								221	62.6	
16	18			29.0	32.7	36.3	39.9	43.6	47.2	50.8	58.1	72.6	87.1	101.6	116.6						321	116.6	
20	24			30.4	34.2	38.0	41.8	45.6	49.4	53.2	60.8	76.0	91.2	106.5	121.7	152.1					479	182.0	
24	28				39.5	43.5	47.4	51.4	55.3	63.2	79.0	94.8	110.6	126.4	158.1	189.7					664	262.2	
27	32					48.9	53.3	57.8	62.2	71.1	88.9	106.7	124.5	142.2	177.8	213.4	240.0				767	341.0	
30	35						59.3	64.2	69.1	79.0	98.8	118.5	138.3	158.1	197.6	237.1	266.7	296.4			844	416.7	
33	38							67.4	72.6	82.9	103.7	124.4	145.2	165.9	207.4	248.8	280.0	311.1	342.2		994	515.5	
36	40								76.0	86.9	108.6	130.3	152.0	173.7	217.2	260.6	293.2	325.8	358.3	390.9	1118	606.9	
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 (mm)	Hole Diameter (mm)	Embedment Depth hef																			hef failure (mm)	F _{d,s} design load (kN)	
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660			720
8	10	11.3	13.2	13.7																	73	13.7	
10	12	14.1	16.5	18.9	21.2	21.7															92	21.7	
12	14		19.8	22.6	25.5	28.3	31.1	31.6													112	31.6	
16	18			29.0	32.7	36.3	39.9	43.6	47.2	50.8	58.1	58.8									162	58.8	
20	24			30.4	34.2	38.0	41.8	45.6	49.4	53.2	60.8	76.0	91.2	91.7							241	91.7	
24	28				39.5	43.5	47.4	51.4	55.3	63.2	79.0	94.8	110.6	126.4	132.1						334	132.1	
27	32					48.9	53.3	57.8	62.2	71.1	80.2										181	80.2	
30	35						59.3	64.2	69.1	79.0	98.1										199	98.1	
33	38							67.4	72.6	82.9	103.7	121									234	121.3	
36	40								76.0	86.9	108.6	130.3	143								263	142.8	
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

*1 = Tensile strength 500N/mm²

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

A4-80 Stainless Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth h _{ef}																	h _{ef} failure (mm)	F _{d,s} design load (kN)				
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540			600	660	720	
8	10	11.3	13.2	15.1	15.7																	83	15.7	
10	12		16.5	18.9	21.2	23.6	24.8															105	24.8	
12	14		19.8	22.6	25.5	28.3	31.1	33.9	36.1													128	36.1	
16	18			29.0	32.7	36.3	39.9	43.6	47.2	50.8	58.1	67.2										185	67.2	
20	24			30.4	34.2	38.0	41.8	45.6	49.4	53.2	60.8	76.0	91.2	104.8								276	104.8	
24	28				39.5	43.5	47.4	51.4	55.3	63.2	79.0	94.8	110.6	126.4	132.1							2	334	132.1
27	32					48.9	53.3	57.8	62.2	71.1	80.2											1	181	80.2
30	35						59.3	64.2	69.1	79.0	98.1											1	199	98.1
33	38							67.4	72.6	82.9	103.7	121.3										1	234	121.3
36	40								76.0	86.9	108.6	130.3	142.8									1	263	142.8
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 F_{yk}=500N/mm²

Rebar Diameter (mm)	Hole Diameter (mm)	Embedment Depth h _{ef}																	h _{ef} failure (mm)	F _{d,s} yield load (kN)				
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560			640	720	800	
8	10	8.4	9.8	11.2	12.6	14.0	15.4	16.8	18.2	19.6	21.9												157	21.9
10	12	10.5	12.2	14.0	15.7	17.5	19.2	20.9	22.7	24.4	27.9	34.1											196	34.1
12	15		13.2	15.1	17.0	18.9	20.7	22.6	24.5	26.4	30.2	37.7	45.2	49.2									261	49.2
16	20			19.0	21.4	23.7	26.1	28.5	30.9	33.2	38.0	47.5	57.0	66.5	76.0								368	87.4
20	25			20.4	22.9	25.5	28.0	30.6	33.1	35.7	40.8	51.0	61.2	71.4	81.6	102.0							536	136.6
25	30				29.9	32.9	35.9	38.9	41.9	47.9	59.8	71.8	83.8	95.8	119.7	149.6							657	196.5
28	35					34.6	37.7	40.8	44.0	50.3	62.8	75.4	88.0	100.5	125.7	157.1	176.0						852	267.8
32	40							46.7	50.3	57.5	71.8	86.2	100.5	114.9	143.6	179.5	201.1	229.8					974	349.7
36	44								56.6	64.6	80.8	97.0	113.1	129.3	161.6	202.0	226.2	258.5	290.9				1098	443.5
40	50									67.0	83.8	100.5	117.3	134.1	167.6	209.5	234.6	268.1	301.6	335.1			1304	546.3
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

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

High bond reinforcing bars $F_{yk}=420N/mm^2$

Rebar Diameter (mm)	Hole Diameter (mm)	Embedment Depth h_{ef}																			h_{ef} failure (mm)	$F_{d,s}$ yield load (kN)			
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	720			800		
8	10	8.4	9.8	11.2	12.6	14.0	15.4	18.4													120	18.4			
10	12	10.5	12.2	14.0	15.7	17.5	19.2	20.9	22.7	24.4	28.7											149	28.7		
12	15	13.2		15.1	17.0	18.9	20.7	22.6	24.5	26.4	30.2	41.3									197	41.3			
16	18				19.0	21.4	23.7	26.1	28.5	30.9	33.2	38.0	47.5	57.0	73.4							277	73.4		
20	25				20.4	22.9	25.5	28.0	30.6	33.1	35.7	40.8	51.0	61.2	71.4	81.6	102.0					426	114.8		
25	30					29.9	32.9	35.9	38.9	41.9	47.9	59.8	71.8	83.8	95.8	119.7	165.1					490	165.1		
28	35						34.6	37.7	40.8	44.0	50.3	62.8	75.4	88.0	100.5	125.7	157.1	176.0				632	225.0		
32	40							46.7	50.3	57.5	71.8	86.2	100.5	114.9	143.6	179.5	201.1	229.8			722	293.7			
36	44								56.6	64.6	80.8	97.0	113.1	129.3	161.6	202.0	226.2	258.5	290.9		865	372.5			
40	50									67.0	83.8	100.5	117.3	134.1	167.6	209.5	234.6	268.1	301.6	335.1		959	458.9		
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	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 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	20.36	9.00	11.31	7.20	8.08	5.14	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60												
	27.14		15.08		10.77								80												
	54.29		30.16		21.54								160												
10	25.45	15.00	14.14	12.00	10.10	8.57							Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60						
	38.17		21.21		15.15														90						
	84.82		47.12		33.66														200						
12	35.63	21.00	19.79	16.80	14.14	12.00													Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	70
	55.98		31.10		22.22																				110
	122.15		67.86		48.47																				240
16	52.28	39.00	29.04	31.20	20.74	22.29																			Not Applicable
	81.68		45.38		32.41		125																		
	209.10		116.17		82.98		320																		
20	67.86	61.00	32.31	48.80	23.08	34.86	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable													
	128.18		61.04		43.60								170												
	301.59		143.62		102.58								400												
24	82.94	88.00	39.49	70.40	28.21	50.29							Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable							
	174.17		82.94		59.24														210						
	398.10		189.57		135.41														480						
27	102.64	115.00	48.87	92.00	34.91	65.71													Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
	223.93		106.63		76.17																				240
	503.85		239.93		171.38																				540
30	124.41	142.50	59.24	114.00	42.32	81.43																			Not Applicable
	290.28		138.23		98.74		280																		
	622.04		296.21		211.58		600																		
33	141.51	173.50	67.39	138.80	48.13	99.14	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable													
	326.57		155.51		111.08								300												
	718.45		342.12		244.37								660												
36	169.65	212.50	80.78	170.00	57.70	121.43							Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable							
	384.53		183.11		130.79														340						
	814.30		387.76		276.97														720						

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 (MPa)	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
f_c =	0.98	1.00	1.02	1.04	1.06	1.08	1.09	1.10

Influence of environmental conditions in non cracked concrete

		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36
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
	Flooded	1.00	0.94	0.87	0.79	0.71	0.65	0.65	0.60	0.57	0.55
Temp II 60°C / 43°C	Dry and Wet	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
	Flooded	0.65	0.63	0.61	0.59	0.57	0.54	0.52	0.50	0.48	0.46
Temp III 72°C / 43°C	Dry and Wet	0.57	0.56	0.54	0.53	0.52	0.51	0.50	0.48	0.47	0.46
	Flooded	0.57	0.54	0.52	0.51	0.50	0.49	0.47	0.45	0.44	0.42

Influence of environmental conditions in cracked concrete

		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36
Temp I 40°C / 24°C	Dry and Wet	n/a	n/a	0.50	0.48	0.46	0.45	0.43	0.41	0.40	0.38
	Flooded	n/a	n/a	0.50	0.42	0.38	0.38	0.32	0.28	0.24	0.20
Temp II 60°C / 43°C	Dry and Wet	n/a	n/a	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.25
	Flooded	n/a	n/a	0.32	0.29	0.28	0.27	0.25	0.23	0.22	0.20
Temp III 72°C / 43°C	Dry and Wet	n/a	n/a	0.27	0.27	0.26	0.25	0.25	0.24	0.23	0.20
	Flooded	n/a	n/a	0.27	0.27	0.26	0.25	0.25	0.24	0.23	0.22

Table notes : see back page

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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	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	15.08		8.38		5.98		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	20.11	13.95	11.17	9.30	7.98	6.64							80
	40.21		22.34		15.96								160
10	18.85		10.47		7.48		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	28.27	21.45	15.71	14.30	11.22	10.21							90
	62.83		34.91		24.93								200
12	23.75		13.19		9.42		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	70
	37.32	31.05	20.73	20.70	14.81	14.79							110
	81.43		45.24		32.31								240
14	30.78		17.10		12.21		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80
	44.25	42.45	24.58	28.30	17.56	20.21							115
	107.73		59.85		42.75								280
16	34.18		18.99		13.56		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80
	53.41	55.50	29.67	37.00	21.19	26.43							125
	136.72		75.96		54.25								320
18	37.32		20.73		14.81		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80
	69.98	69.66	38.88	46.44	27.77	33.17							150
	167.95		93.31		66.65								360
20	45.24		21.54		15.39		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	90
	85.45	86.55	40.69	57.70	29.07	41.21							170
	201.06		95.74		68.39								400
22	55.29		26.33		18.81		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	100
	105.06	104.01	50.03	69.34	35.73	49.53							190
	243.29		115.85		82.75								440
25	62.83		29.92		21.37		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	100
	131.95	135.00	62.83	90.00	44.88	64.29							210
	314.16		149.60		106.86								500
28	73.89		35.19		25.13		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	112
	184.73	168.75	87.96	112.50	62.83	80.36							280
	369.45		175.93		125.66								560
32	96.51		45.96		32.83		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	128
	241.27	220.95	114.89	147.30	82.07	105.21							320
	482.55		229.79		164.13								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/mm ² (MPa)	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
f_c =	0.98	1.00	1.02	1.04	1.06	1.08	1.09	1.10
Concrete Strength N/mm ² (MPa)	C55/67	C60/75	C70/85	C80/96	C90/105	-	-	-
f_c =	1.10	1.12	1.13	1.14	1.15	-	-	-

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
	Flooded	1.00	0.94	0.90	0.87	0.85	0.82	0.80	0.76	0.71	0.65	0.63
Temp II 60°C / 43°C	Dry and Wet	0.67	0.65	0.63	0.63	0.62	0.62	0.61	0.61	0.60	0.60	0.59
	Flooded	0.65	0.64	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.47
Temp III 72°C / 43°C	Dry and Wet	0.60	0.58	0.57	0.57	0.56	0.56	0.56	0.55	0.55	0.54	0.53
	Flooded	0.58	0.56	0.53	0.52	0.50	0.47	0.47	0.46	0.45	0.43	0.41

Influence of environmental conditions in 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	n/a	n/a	0.55	0.51	0.47	0.45	0.44	0.43	0.43	0.42	0.41
	Flooded	n/a	n/a	0.55	0.48	0.42	0.41	0.40	0.39	0.38	0.36	0.35
Temp II 60°C / 43°C	Dry and Wet	n/a	n/a	0.30	0.29	0.28	0.27	0.26	0.25	0.24	0.23	0.23
	Flooded	n/a	n/a	0.30	0.28	0.27	0.26	0.25	0.24	0.23	0.22	0.22
Temp I 72°C / 43°C	Dry and Wet	n/a	n/a	0.30	0.28	0.26	0.25	0.25	0.24	0.24	0.23	0.22
	Flooded	n/a	n/a	0.30	0.28	0.26	0.25	0.24	0.24	0.23	0.23	0.22

Table notes : see back page

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Material Properties for grades of other 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
M27	367.0	244.7	477.4	341.0	229.4	80.2	229.4	80.2
M30	448.8	299.2	583.0	416.4	280.6	98.1	280.6	98.1
M33	555.2	370.1	721.8	515.5	347.0	121.3	347.0	121.3
M36	653.6	435.7	849.7	606.9	408.4	142.8	408.4	142.8

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
M27	183.5	146.8	238.7	191.0	114.7	48.4	114.7	48.4
M30	224.4	179.5	291.5	215.9	140.3	89.9	140.3	89.9
M33	277.6	222.1	360.9	288.7	173.5	111.2	173.5	111.2
M36	326.8	261.4	424.8	283.2	204.2	130.9	204.2	130.9

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	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	84.4	67.0	42.5	28.3
16	111.0	79.3	55.5	37.0
18	139.5	100.0	70.0	46.7
20	173.0	123.6	86.5	57.7
22	208.3	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
36	563.2	443.5	281.6	187.7
40	693.8	546.3	346.9	231.3

Table notes : see back page

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Effect of Anchor Spacing - Tension

Anchor Spacing (mm)	Stud / Rebar Diameter										
	8	10	12	16	20	24	27	30	33	36	40
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	0.63				
150	0.96	0.86	0.80	0.73	0.68	0.65	0.64	0.63			
160	1.00	0.88	0.82	0.74	0.70	0.66	0.65	0.63	0.63	0.63	0.63
175		0.92	0.85	0.76	0.71	0.67	0.66	0.64	0.63	0.63	0.63
200		1.00	0.90	0.80	0.74	0.69	0.69	0.66	0.65	0.65	0.65
225			0.95	0.84	0.77	0.72	0.71	0.68	0.67	0.67	0.66
240			1.00	0.86	0.79	0.73	0.72	0.69	0.68	0.68	0.67
250				0.87	0.80	0.74	0.73	0.70	0.69	0.68	0.68
275				0.91	0.83	0.76	0.75	0.72	0.71	0.70	0.69
280				0.92	0.84	0.77	0.76	0.73	0.71	0.70	0.69
300				0.95	0.86	0.79	0.78	0.74	0.73	0.72	0.71
320				1.00	0.88	0.81	0.80	0.76	0.74	0.73	0.72
350					0.92	0.83	0.82	0.78	0.77	0.75	0.73
400					1.00	0.88	0.87	0.82	0.80	0.78	0.76
440						0.92	0.91	0.85	0.83	0.81	0.79
480						1.00	0.94	0.88	0.86	0.84	0.81
540							1.00	0.93	0.91	0.88	0.84
600								1.00	0.96	0.92	0.88
660									1.00	0.96	0.91
720										1.00	0.95
800											1.00

Effect of Edge Distance - Tension

Edge Distance (mm)	Stud / Rebar Diameter										
	8	10	12	16	20	24	27	30	33	36	40
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	0.63			
160				1.00	0.84	0.72	0.70	0.65	0.63	0.67	
180					0.91	0.78	0.75	0.70	0.66	0.71	0.68
200					1.00	0.84	0.81	0.76	0.71	0.74	0.71
220						0.89	0.86	0.81	0.75	0.78	0.75
240						1.00	0.92	0.86	0.80	0.82	0.78
270							1.00	0.94	0.87	0.87	0.83
300								1.00	0.94	0.93	0.88
330									1.00	0.98	0.93
360										1.00	0.98
400											1.00

Effect of Edge Distance - Shear

Edge (mm)	Stud / Rebar Diameter										
	8	10	12	16	20	24	27	30	33	36	40
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	0.35	0.30			
160					0.91	0.62	0.51	0.35	0.32	0.33	
180					1.00	0.77	0.63	0.46	0.37	0.43	
200						0.92	0.75	0.57	0.46	0.50	0.32
220						1.00	0.88	0.68	0.56	0.56	0.53
240							1.00	0.78	0.65	0.63	0.59
280								1.00	0.84	0.77	0.72
310									1.00	0.90	0.82
330										1.00	0.89
400											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
5°C	120 min	960 min	x2
15°C	60 min	600 min	x2
25°C	20 min	300 min	x2
35°C	12 min	180 min	x2
45°C	6 min	90 min	x2

- Full cure 24 hours

- All specifications based on supplied mixer

*Please note - For WRAS approval conditions

The material must be cured for 7 days at 7°C

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.

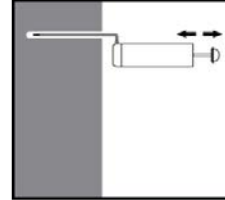
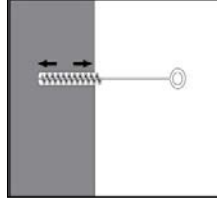
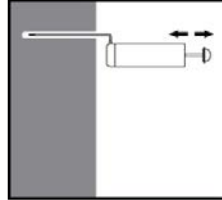
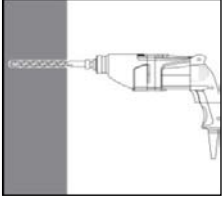
Long term temperatures will include constant or near constant temperatures, such as those experienced in cold stores or next to heating installations.

Physical Properties

	N/mm ² (MPa)	Test Method
Compressive Strength	88.56	EN ISO 604 / ASTM 695
Flexural Strength	52.79	EN ISO 178 / ASTM 790
Flexural Modulus	4331	EN ISO 178 / ASTM 790
Tensile Strength	26.94	EN ISO 527 / ASTM 638
E Modulus	7267	EN ISO 527 / ASTM 638
VOC Content	A+ Rating	-

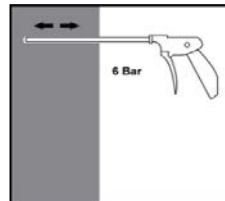
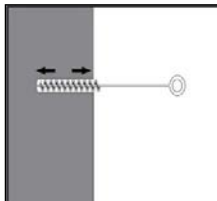
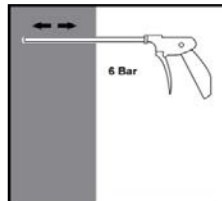
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Installation parameters: drilling hole cleaning and installation

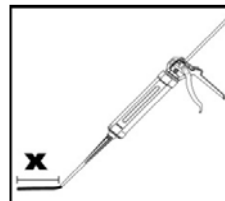
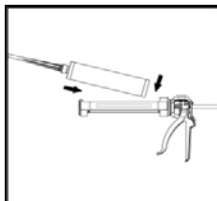
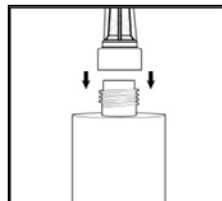
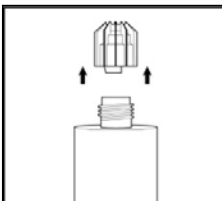


Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. The manual pump shall be used for blowing out bore holes up to diameters $d_o \leq 24\text{mm}$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

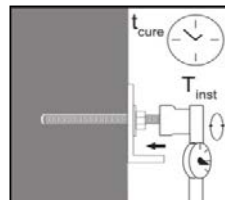
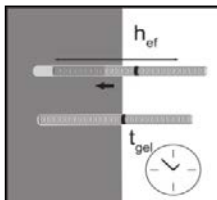
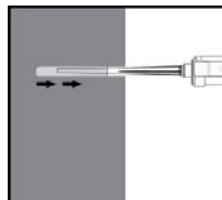
Compressed air cleaning (CAC) for all bore hole diameters d_o and all bore hole depths



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.

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Chemical Resistance Chart

Chemical	Chemicals Tested	Resistant	Not Resistant
Alkaline	Concrete Drilling Mud (10%) pH=12.6	+	
	Concrete Drilling Mud (10%) pH=13.2	+	
	Concrete Potash solution (10%) pH=14.0	+	
Acids	Acetic Acid (10%) ¹		--
	Nitric Acid (10%) ¹		--
	Hydrochloric Acid (10%) 3 Month		--
	Sulfuric Acid (10%)		--
Solvents	Benzyl Alcohol		--
	Ethanol		--
	Ethyl acetate		--
	Methyl ethyl ketone (MEK)		--
	Trichlorethylene		--
	Xylene (mixture)	+	
Chemicals used on job sites	Concrete plasticizer	+	
	Diesel oil	+	
	Oil	+	
	Petrol	+	
	Oil for form work (forming oil)	+	
Environmental Chemicals	Salt Water	+	
	de-mineralized water	+	
	salt spraying test	+	
	SO ₂	+	
	Environment / Weather	+	

1 - concrete was dissolved by acid

CHEMFIX 1-1 Pure Epoxy



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 (25 Mpa)

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 (700MPa)

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 :

1.8 for 8mm-16mm rebar and studs

2.1 for 16mm and above rebar and studs