CHEMFIX CH200

chemfix
TOTAL SERVICE

Features and Benefits

Version 03/02/2021

- *Used with all grades of threaded rod and rebar in accordance with TR029*
- *Used in non-cracked, cracked concrete and* ***seismic C1 and C2***
- *Fast gelling and curing*
- *Used in dry, wet and flooded concrete*
- *Used in critical or overhead applications*
- *Used in corrosive environments*
- *Used for elevated temperatures - temperature ranges I, II and III*
- *Used for post installed rebar installations under TR029 and TR023*
- *Close edge distance and small spacing*
- *Manual cleaning up to 20mm diameter and embedment depths of 240mm*

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 CH200 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 very high loads and critical and overhead fixings especially in corrosive environments, or damp conditions.

Specific Benefits

- European Approved
- High loads possible
- High chemical resistance
- Studs and rebar
- Cracked or Non-Cracked
- A+ Rating VOC content
- Styrene Free Low odour
- Suitable to apply underwater
- Seismic C1 and C2 application approved
- EAD 330499-00-0601 studs M8-M30 Rebar 8mm - 32mm
- EAD 330087-00-0601 Post-Installed-Rebar 8mm - 32mm + Fire Approval
- EAD 330076-00-0604 masonry M8-M16
- ICC-ES Approval ESR 4366 Cracked and Uncracked IBC & IRC compliant.

Loads, Edge and Spacings based on Characteristic bond strengths - Showing steel failure (5.8)

	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic distances (mm)			Min Edge and Spacing (mm)		Hole	Hole	
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)	Diameter concrete (mm)	Diameter fixture (mm)	Max Torque (Nm)
	19.00		12.70		9.07						60			
8	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			
	27.33		15.18		10.85						60			
10	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			
	38.27		21.26		15.19	1.40					70			
12	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			
	58.31		32.39		23.14						80			
16	81.60	39.00	54.40	31.20	38.86	22.29	160	320	125	80	125	18	18	80
	81.60		54.40		38.86						320			
	82.00		45.56		32.54						90			
20	127.40	61.00	84.90	48.80	60.64	34.86	200	400	180	100	170	22	22	120
	127.40		84.90		60.64						400			
	94.10		52.28		37.34						96			
24	183.60	88.00	122.40	70.40	87.43	50.29	230	460	220	120	210	28	26	160
	183.60		122.40		87.43						480			
	112.00		62.22		44.44						110			
27	238.00	115.00	159.10	92.00	113.64	65.71	270	540	240	135	240	30	30	180
	238.00		159.10		113.64						540			
	124.40		69.11		49.37						120			
30	290.30	142.50	161.28	114.00	115.20	81.43	280	560	280	150	280	35	33	200
	292.00		194.50		138.93						600			
	134.80		74.89		53.49						130			
33	311.00	173.50	172.78	138.80	123.41	121.43	310	620	310	165	300	37	36	250
	360.00		240.60		171.86						660			
	152.70		84.83		60.60						150			
36	346.10	212.50	192.28	170.00	137.34	121.43	330	660	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)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	h_{ef} failure (mm)	$F_{d,s}$ design load (kN)
		Embedment Depth hef (steel failure shaded)																					
8	10	12.7																				56	12.7
10	12	15.2	17.7	20.1																		79	20.1
12	14		21.3	24.3	27.3	29.2																96	29.2
16	18			32.4	36.4	40.5	44.5	48.6	52.6	54.4												134	54.4
20	22			40.5	45.6	50.6	55.7	60.7	65.8	70.9	81.0	84.9										168	84.9
24	28					54.5	59.9	65.4	70.8	76.2	87.1	108.9	122.4									225	122.4
27	30						62.2	67.9	73.5	79.2	90.5	113.1	135.7	158.4	159.1							281	159.1
30	35							69.1	74.9	80.6	92.2	115.2	138.2	161.3	184.3	195						338	194.5
33	38								74.9	80.6	92.2	115.2	138.2	161.3	184.3	230.4	240.6					418	240.6
36	40									79.2	90.5	113.1	135.7	158.4	181.0	251.4	271.5	271.5	283.2			501	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)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	h_{ef} failure (mm)	$F_{d,s}$ design load (kN)
		Embedment Depth hef (steel failure shaded)																					
8	10	13.6	15.8	18.1	19.5																	86	19.5
10	12	15.2	17.7	20.2	22.8	25.3	27.8	30.4	30.9													122	30.9
12	14		21.3	24.3	27.3	30.4	33.4	36.4	39.5	42.5	45.0											148	45.0
16	18			32.4	36.4	40.5	44.5	48.6	52.6	56.7	64.8	81.0	83.7									207	83.7
20	22			40.5	45.6	50.6	55.7	60.7	65.8	70.9	81.0	101.2	121.5	130.7								258	130.7
24	28					54.5	59.9	65.4	70.8	76.2	87.1	108.9	130.7	152.5	174.3	188.3						346	188.3
27	30						62.2	67.9	73.5	79.2	90.5	113.1	135.7	158.4	181.0	226.2	244.8					433	244.8
30	35							69.1	74.9	80.6	92.2	115.2	138.2	161.3	184.3	230.4	276.5	299.2				519	299.2
33	38								74.9	80.6	92.2	115.2	138.2	161.3	184.3	230.4	276.5	311.1	345.6	370.1		643	370.1
36	40									79.2	90.5	113.1	135.7	158.4	181.0	226.2	271.5	305.4	339.3	373.3	407.2	770	435.7
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

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

10.9 Grade Steel Studding

steel failure

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth hef 60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	h_{ef} failure (mm)	$F_{d,s}$ design load (kN)
8	10	13.6	15.8	18.1	20.4	22.6	24.9	27.2														120	27.2
10	12	15.2	17.7	20.2	22.8	25.3	27.8	30.4	32.9	35.4	40.5	43.1										170	43.1
12	14		21.3	24.3	27.3	30.4	33.4	36.4	39.5	42.5	48.6	60.7	62.6									206	62.6
16	18			32.4	36.4	40.5	44.5	48.6	52.6	56.7	64.8	81.0	97.2	113.4	116.6							288	116.6
20	22			40.5	45.6	50.6	55.7	60.7	65.8	70.9	81.0	101.2	121.5	141.7	162.0	182.0						360	182.0
24	28					54.5	59.9	65.4	70.8	76.2	87.1	108.9	130.7	152.5	174.3	217.8	261.4					481	262.2
27	30						62.2	67.9	73.5	79.2	90.5	113.1	135.7	158.4	181.0	226.2	271.5	305.4				603	341.0
30	35							69.1	74.9	80.6	92.2	115.2	138.2	161.3	184.3	230.4	276.5	311.1	345.6			723	416.7
33	38								74.9	80.6	92.2	115.2	138.2	161.3	184.3	230.4	276.5	311.1	345.6	380.2		895	515.5
36	40									79.2	90.5	113.1	135.7	158.4	181.0	226.2	271.5	305.4	339.3	373.3	407.2	1073	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

steel failure

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth hef 60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	h_{ef} failure (mm)	$F_{d,s}$ design load (kN)
8	10	13.6	13.7																			61	13.7
10	12	15.2	17.7	20.2	21.7																	86	21.7
12	14		21.3	24.3	27.3	30.4	31.6															104	31.6
16	18			32.4	36.4	40.5	44.5	48.6	52.6	56.7	58.8											145	58.8
20	22			40.5	45.6	50.6	55.7	60.7	65.8	70.9	81.0	91.7										181	91.7
24	28					54.5	59.9	65.4	70.8	76.2	87.1	108.9	130.7	132.1								243	132.1
27	30						62.2	67.9	73.5	79.2	80.2										1	142	80.2
30	35							69.1	74.9	80.6	92.2	98.1									1	170	98.1
33	38								74.9	80.6	92.2	115.2	121.3								1	211	121.3
36	40									79.2	90.5	113.1	135.7	142.8							1	253	142.8
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

Notes *1 Tensile strength 500N/mm2

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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)	Embedment Depth hef 60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	h_{ef} failure (mm)	$F_{d,s}$ design load (kN)
8	10	13.6	15.7																			69	15.7
10	12		17.7	20.2	22.8	24.8																98	24.8
12	14		21.3	24.3	27.3	30.4	33.4	36.1														119	36.1
16	18			32.4	36.4	40.5	44.5	48.6	52.6	56.7	64.8	67.2										166	67.2
20	22			40.5	45.6	50.6	55.7	60.7	65.8	70.9	81.0	101.2	104.2									207	104.2
24	28					54.5	59.9	65.4	70.8	76.2	87.1	108.9	130.7	132.1							2	243	132.1
27	30						62.2	67.9	73.5	79.2	80.2										1	142	80.2
30	35							69.1	74.9	80.6	92.2	98.1									1	170	98.1
33	38								74.9	80.6	92.2	115.2	121.3								1	211	121.3
36	40									79.2	90.5	113.1	135.7	142.8							1	253	142.8
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

Notes *1 Tensile strength 500N/mm2

*2 Tensile strength 700N/mm2

High bond reinforcing bars Fyk=500N/mm2

Rebar Diameter (mm)	Hole Diameter (mm)	Embedment Depth hef 60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	720	800	h_{ef} failure (mm)	$F_{d,s}$ yield load (kN)
8	10	9.2	10.8	12.3	13.8	15.4	16.9	18.4	20.0	21.5	21.9											142	21.9
10	12	13.6	15.9	18.2	20.4	22.7	25.0	27.2	29.5	31.8	34.1											150	34.1
12	14		19.1	21.8	24.5	27.2	30.0	32.7	35.4	38.1	43.6	49.2										181	49.2
16	20			29.0	32.7	36.3	39.9	43.6	47.2	50.8	58.1	72.6	87.1	87.4								241	87.4
20	25			31.1	35.0	38.9	42.8	46.7	50.6	54.5	62.2	77.8	93.4	108.9	124.5	136.6						351	136.6
25	30					44.9	49.4	53.9	58.4	62.8	71.8	89.8	107.7	125.7	143.6	179.5	196.5					438	196.5
28	35						50.7	55.3	59.9	64.5	73.7	92.2	110.6	129.0	147.5	184.3	230.4	258.1				581	267.8
32	40								59.1	63.7	72.8	91.0	109.2	127.4	145.5	181.9	227.4	254.7	291.1			769	349.7
36	44									67.9	77.6	97.0	116.3	135.7	155.1	193.9	242.4	271.5	310.3	349.0		915	443.5
40	50										86.2	107.7	129.3	150.8	172.4	215.5	269.3	301.6	344.7	387.8	430.9	1014	546.3
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

	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}	
	20.36		13.57		9.70		9.05		6.03		4.31		60
8	27.15	9.00	18.10	7.20	12.93	5.14	12.07	9.00	8.05	7.20	5.75	5.14	**80**
	54.30		36.20		25.86		24.14		16.09		11.50		160
	27.33		15.18		10.85		13.20		7.33		5.24		60
10	41.00	15.00	22.78	12.00	16.27	8.57	19.80	15.00	11.00	12.00	7.86	8.57	**90**
	91.10		50.61		35.39		44.00		24.44		17.46		200
	38.26		21.26		15.18		19.80		11.00		7.86		70
12	60.12	21.00	33.40	16.80	23.86	12.00	31.10	21.00	17.28	16.80	12.34	12.00	**110**
	131.20		72.89		52.06		67.85		37.69		26.92		240
	58.30		32.39		23.13		30.16		16.76		11.97		80
16	91.10	39.00	50.61	31.20	36.15	22.29	47.13	39.00	26.18	31.20	18.70	22.29	**125**
	233.20		129.56		92.54		120.65		67.03		47.88		320
	82.00		45.56		32.54		42.41		23.56		16.83		90
20	154.90	61.00	86.06	48.80	61.47	34.86	80.11	61.00	44.51	48.80	31.79	34.86	**170**
	364.40		202.44		144.60		188.50		104.72		74.80		400
	94.10		52.28		37.34		54.29		30.16		21.54		96
24	205.84	88.00	114.36	70.40	81.68	50.29	118.75	88.00	65.97	70.40	47.12	50.29	**210**
	470.50		261.39		186.71		271.45		150.81		107.72		480
	112.00		62.22		44.44		79.31		44.06		31.47		110
27	244.30	115.00	135.72	92.00	96.94	65.71	173.03	115.00	96.13	92.00	68.66	65.71	**240**
	549.70		305.39		218.13		389.35		216.31		154.50		540
	124.40		69.11		49.37		96.13		53.41		38.15		120
30	290.30	142.50	161.28	114.00	115.20	81.43	224.31	142.50	124.62	114.00	89.01	81.43	**280**
	622.00		345.56		246.83		480.66		267.04		190.74		600
	134.80		74.89		53.49		114.56		63.64		45.46		130
33	311.00	173.50	172.78	138.80	123.41	99.14	264.37	173.50	146.87	138.80	104.91	99.14	**300**
	684.40		380.22		271.59		581.60		323.11		230.79		660
	152.70		84.83		60.60		144.20		80.11		57.22		150
36	346.20	212.50	192.33	170.00	137.38	121.43	326.85	212.50	181.58	170.00	129.70	121.43	**340**
	733.00		407.22		290.87		692.16		384.53		274.66		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
non cracked fc =	0.98	1.00	1.02	1.04	1.07	1.08	1.09	1.10
cracked fc =	0.98	1.00	1.02	1.04	1.07	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
Temp II 80°C / 50°C	Dry and Wet	0.75	0.75	0.75	0.75	0.75	0.77	0.75	0.72	0.72	0.72

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	0.40	0.42	0.46	0.46	0.46	0.50	0.65	0.72	0.72	0.72
Temp II 80°C / 50°C	Dry and Wet	0.25	0.29	0.33	0.33	0.33	0.36	0.45	0.50	0.50	0.50

Table notes : see back page

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Characteristic and Design Load resistances for <u>REBAR</u> 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}	
	16.58		11.05		7.89		7.54		5.02		3.59		60
8	22.11	13.95	14.74	9.30	10.53	6.64	10.05	13.95	6.70	9.30	4.78	6.64	**80**
	44.21		29.47		21.05		20.10		13.40		9.57		160
	24.49		13.61		9.72		11.30		6.28		4.49		60
10	36.74	21.45	20.41	14.30	14.58	10.21	16.96	21.45	9.42	14.30	6.73	10.21	**90**
	81.64		45.36		32.40		37.68		20.93		14.95		200
	34.29		19.05		13.61		17.14		9.52		6.80		70
12	53.88	31.05	29.93	20.70	21.38	14.79	26.94	31.05	14.97	20.70	10.69	14.79	**110**
	117.56		65.31		46.65		58.78		32.66		23.33		240
	45.72		25.40		18.14		22.86		12.70		9.07		80
14	65.72	42.45	36.51	28.30	26.08	20.21	32.86	42.45	18.26	28.10	13.04	20.07	**115**
	160.01		88.90		63.50		80.01		44.45		31.75		280
	52.25		29.03		20.73		26.12		14.51		10.37		80
16	81.64	55.50	45.36	37.00	32.40	26.43	40.82	55.50	22.68	37.00	16.20	26.43	**125**
	209.00		116.11		82.94		104.50		58.06		41.47		320
	58.78		32.66		23.33		29.39		16.33		11.66		80
18	110.21	69.66	61.23	46.44	43.74	33.17	55.11	69.66	30.62	46.44	21.87	33.17	**150**
	264.51		146.95		104.97		132.26		73.48		52.48		360
	73.48		40.82		29.16		36.74		20.41		14.58		90
20	138.79	86.55	77.10	57.70	55.07	41.21	69.39	86.55	38.55	57.70	27.54	41.21	**170**
	326.56		181.42		129.59		163.28		90.71		64.79		400
	82.90		46.05		32.90		44.90		24.95		17.82		100
22	157.50	104.01	87.50	69.34	62.50	49.53	85.31	104.00	47.40	69.34	33.85	49.53	**190**
	364.74		202.63		144.74		197.57		109.76		78.40		440
	94.20		52.33		37.38		51.03		28.35		20.25		100
25	197.82	135.00	109.90	90.00	78.50	64.29	107.15	135.00	59.53	90.00	42.52	64.29	**210**
	471.00		261.67		186.90		255.13		141.74		101.24		500
	108.32		60.18		42.98		73.85		41.03		29.31		112
28	270.79	168.75	150.44	112.50	107.46	80.36	184.63	168.75	102.57	112.50	73.27	80.36	**280**
	541.59		300.88		214.92		369.26		205.15		146.53		560
	122.18		67.88		48.49		96.46		53.59		38.28		128
32	305.46	220.95	169.70	147.30	121.21	105.21	241.15	220.95	133.97	147.30	95.70	105.21	**320**
	610.92		339.40		242.43		482.30		267.95		191.39		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 =	0.98	1.00	1.02	1.04	1.07	1.08	1.09	1.10
cracked fc =	0.98	1.00	1.02	1.04	1.07	1.08	1.09	1.10

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	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.73	0.73	0.70	0.70

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	0.40	0.42	0.46	0.46	0.46	0.46	0.46	0.50	0.50	0.65	0.76
Temp II 80°C / 50°C	Dry and Wet	0.25	0.30	0.33	0.33	0.33	0.33	0.33	0.36	0.36	0.45	0.53

Table notes : see back page

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Material Properties for grades of other 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	
M27	367.0	244.7	477.4	341.0	229.4	80.2	229.4	80.2	*1
M30	448.8	299.2	583.0	416.4	280.6	98.1	280.6	98.1	*1
M36	653.6	435.7	849.7	606.9	408.4	142.8	408.4	142.8	*1

*1 = Tensile strength 500N/mm2

	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
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	59.2	140.3	59.2
M36	326.8	261.4	424.8	283.2	204.2	86.2	204.2	86.2

	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	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

More notes : see back page

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Effect of Anchor Spacing - Tension

Anchor Spacing	Stud / Rebar Diameter										
(mm)	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					
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	0.62		0.63
180		0.93	0.86	0.77	0.72	0.68	0.65	0.65	0.64	0.64	0.64
200		1.00	0.90	0.80	0.74	0.69	0.67	0.66	0.65	0.65	0.65
225			0.95	0.84	0.77	0.72	0.69	0.68	0.67	0.67	0.66
240			1.00	0.86	0.79	0.73	0.71	0.69	0.69	0.68	0.67
250				0.87	0.80	0.74	0.72	0.70	0.70	0.68	0.68
275				0.91	0.83	0.76	0.74	0.72	0.72	0.70	0.69
280				0.92	0.84	0.77	0.75	0.73	0.72	0.70	0.69
300				0.95	0.86	0.79	0.76	0.74	0.74	0.72	0.71
320				1.00	0.88	0.81	0.78	0.76	0.75	0.73	0.72
350					0.92	0.83	0.81	0.78	0.78	0.75	0.73
400					1.00	0.88	0.86	0.82	0.82	0.78	0.76
440						0.92	0.89	0.85	0.85	0.81	0.79
460						1.00	0.91	0.87	0.87	0.82	0.80
500							0.95	0.90	0.90	0.85	0.82
540							1.00	0.93	0.93	0.88	0.84
560								1.00	0.95	0.89	0.86
620									1.00	0.93	0.89
660										1.00	0.91
720											1.00

Effect of Edge Distance - Tension

Edge Distance	Stud / Rebar Diameter										
(mm)	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	0.62		
180					0.91	0.78	0.75	0.66	0.70	0.67	0.68
200					1.00	0.84	0.81	0.76	0.76	0.78	0.71
220						0.89	0.86	0.81	0.81	0.82	0.75
240						1.00	0.92	0.86	0.86	0.87	0.78
270							1.00	0.94	0.94	0.93	0.83
280								1.00	0.97	0.96	0.85
310									1.00	0.98	0.90
330										1.00	0.93
360											1.00

Effect of Edge Distance - Shear

Edge Distance	Stud / Rebar Diameter										
(mm)	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	0.44	0.30			
160					0.91	0.62	0.57	0.35	0.34		
180					1.00	0.77	0.69	0.46	0.41	0.33	
200						0.92	0.82	0.57	0.50	0.42	0.32
220						1.00	0.94	0.68	0.59	0.51	0.53
240							1.00	0.78	0.68	0.60	0.59
280								1.00	0.86	0.78	0.72
310									1.00	0.91	0.82
330										1.00	0.89
360											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 to -6°C*	90 min	24 h	x2
-5°C to -1°C*	90 min	14 h	x2
0°C to +4°C*	45 min	7 h	x2
+5°C to +9°C	25 min	2 h	x2
+10°C to +19°C	15 min	80 min	x2
+20°C to +29°C	6 min	45 min	x2
+30°C to +34°C	4 min	25 min	x2
+35°C to +40°C	2min	20min	x2

* Resin temperature must be at least 15°C

- All specifications based on supplied mixer

- Full cure time is 24 hours for dry conditions

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
Range III	-40°C to +120°C	+72°C	+120°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 (MPa)	Test Method
Compressive Strength	100.0	EN 196 Teil1
Flexural Strength	15.0	EN 196 Teil1
E Modulus	14000.0	EN 196 Teil1
VOC Content	A+ Rating	-

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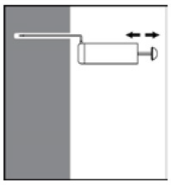
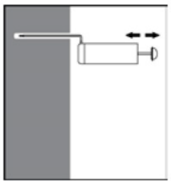
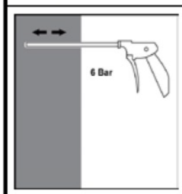
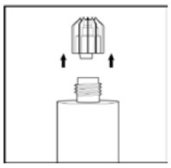
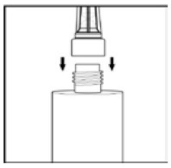
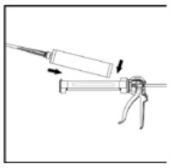
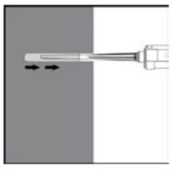
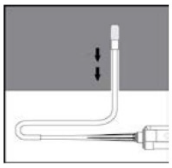
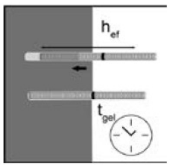
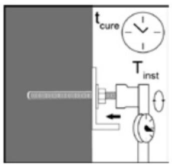
Installation parameters: drilling hole cleaning and installation - Concrete Installation under ETA

Instructions for use	
Bore hole drilling	
	Drill with hammer drill a hole into the base material to the size and embedment depth required by the selected anchor (Table B1 or B2,), with hammer (HD), hollow (HDB) or compressed air (CD) drilling. The use of a hollow drill bit is only in combination with a sufficient vacuum permitted. In case of aborted drill hole: the drill hole shall be filled with mortar **Attention! Standing water in the bore hole must be removed before cleaning.**
Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris.	
MAC: Cleaning for bore hole diameter $d_0 \leq 20mm$ and bore hole depth $h_0 \leq 10d_{nom}$ (uncracked concrete only!)	
 **X 4**	Starting from the bottom or back of the bore hole, blow the hole clean by a hand pump 1) (Annex B 3) a minimum of four times.
 **X 4**	Check brush diameter (Table B3). Brush the hole with an appropriate sized wire brush > d_b,min (Table B3) a minimum of four times in a twisting motion. If the bore hole ground is not reached with the brush, a brush extension must be used.
 **X 4**	Finally blow the hole clean again with a hand pump (Annex B3) a minimum of four times. 1)It is permitted to blow bore holes with diameter between 14 mm and 20 mm and an embedment depth up to 10_{dnom} also in cracked concrete with hand-pump
CAC: Cleaning for all bore hole diameter in uncracked and cracked concrete	
 **X 4**	Starting from the bottom or back of the bore hole, blow the hole clean with compressed air (min. 6 bar) (Annex B 3) a minimum of four times until return air stream is free of noticeable dust. If the bore hole ground is not reached an extension must be used.
 **X 4**	Check brush diameter (Table B3). Brush the hole with an appropriate sized wire brush > $d_{b,min}$ (Table B3) a minimum of four times. If the bore hole ground is not reached with the brush, a brush extension must be used.
 **X 4**	Finally blow the hole clean again with compressed air (min. 6 bar) (Annex B 3) a minimum of four times until return air stream is free of noticeable dust. If the bore hole ground is not reached an extension must be used. **After cleaning, the bore hole has to be protected against re-contamination in an appropriate way, until dispensing the mortar in the bore hole. If necessary, the cleaning has to be repeated directly before dispensing the mortar.** **In-flowing water must not contaminate the bore hole again**.

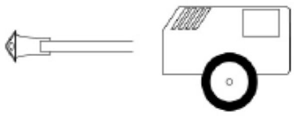
Instructions for use	
	Remove the threaded cap from the cartridge without cutting.
	Attach the supplied T-Flow™ mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. Cut off the foil tube clip before use if necessary. For every working interruption longer than the recommended working time (Table B4) as well as for new cartridges, a new mixer shall be used.
	Insert the cartridge into the Chemfix dispenser. Press the release trigger to retract the plunger and insert the cartridge neatly into the cradle without any distortion. Prior to inserting the anchor rod into the filled bore hole, the position of the embedment depth shall be marked on the anchor rods.
	Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour. For foil tube cartridges it must be discarded a minimum of six full strokes.
	Starting from the bottom or back of the cleaned anchor hole, fill the hole up to approximately two-thirds with adhesive. Slowly withdraw the mixing nozzle as the hole fills to avoid creating air pockets. For embedment larger than 190 mm an extension nozzle shall be used. Observe the gel-/ working times given in Table B4.
	Piston Plugs and mixer nozzle extensions shall be used according to Table B3 for the following applications: • Horizontal assembly (horizontal direction) and ground erection (vertical downwards direction): Drill bit-Ø d0 ≥ 18 mm and embedment depth hef > 250mm • Overhead assembly (vertical upwards direction): Drill bit-Ø d0 ≥ 18 mm
	Push the threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor shall be free of dirt, grease, oil or other foreign material. Be sure that the anchor is fully seated at the bottom of the hole and that excess mortar is visible at the top of the hole. If these requirements are not maintained, the application has to be renewed. For overhead application the anchor rod shall be fixed (e.g. wedges).
	Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (attend Table B4). After full curing, the add-on part can be installed with up to the max. torque (Table B1) by using a calibrated torque wrench. It can be optional filled the annular gap between anchor and fixture with mortar. Therefor substitute the washer by the filling washer and connect the mixer reduction nozzle to the tip of the mixer. The annular gap is filled with mortar, when mortar oozes out of the washer.

Installation parameters: drilling hole cleaning and installation - Post-Installed Rebar under ETA

A) Bore hole drilling

1 Drill a hole into the base material to the size and embedment depth required by the selected reinforcing bar with carbide hammer drill (HD) or a compressed air drill (CD).
In case of aborted drill hole: the drill hole shall be filled with mortar.

Hammer drill (HD)
Hollow drill (HDB)

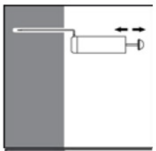


Compressed air drill (CD)

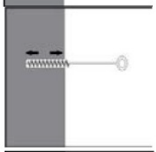
Rebar - ϕ	Drill - ∅ [mm]
8 mm	12
10 mm	14
12 mm	16
14 mm	18
16 mm	20
20 mm	25
22 mm	28
24 mm	32
25 mm	32
28 mm	35
32 mm	40

B) Bore hole cleaning (HD, HDB and CD)

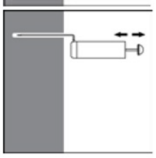
MAC: Cleaning for bore hole diameter $d_0 \leq 20$mm and bore hole depth $h_0 \leq 10d_s$



2a. Starting from the bottom or back of the bore hole, blow the hole clean a hand pump (Annex B 7) a minimum of four times.

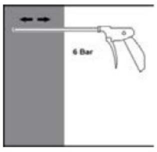


2b. Check brush diameter (Table B5). Brush the hole with an appropriate sized wire brush > $d_{b,min}$ (Table B5) a minimum of four times in a twisting motion.
If the bore hole ground is not reached with the brush, a brush extension shall be used.

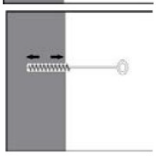


2c. Finally blow the hole clean again with a hand pump (Annex B 7) a minimum of four times.

CAC: Cleaning for all bore hole diameter and bore hole depth



2a. Starting from the bottom or back of the bore hole, blow the hole clean with compressed air (min. 6 bar) (Annex B 7) a minimum of four times until return air stream is free of noticeable dust. If the bore hole ground is not reached an extension shall be used.



2b. Check brush diameter (Table B5). Brush the hole with an appropriate sized wire brush > $d_{b,min}$ (Table B5) a minimum of four times.
If the bore hole ground is not reached with the brush, a brush extension shall be used (Table B5).

2c. Finally blow the hole clean again with compressed air (min. 6 bar) (Annex B 7) a minimum of four times until return air stream is free of noticeable dust. If the bore hole ground is not reached an extension shall be used.

C) Preparation of bar and cartridge

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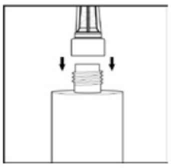
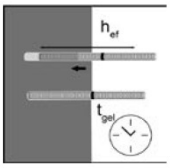
C) Preparation of bar and cartridge



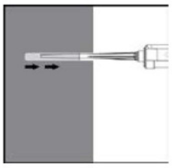
3. Attach the supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool.
For every working interruption longer than the recommended working time (Table B3) as well as for every new cartridges, a new static-mixer shall be used.



4. Prior to inserting the reinforcing bar into the filled bore hole, the position of the embedment depth shall be marked (e.g. with tape) on the reinforcing bar and insert bar in empty hole to verify hole and depth ℓ_v.
The reinforcing bar should be free of dirt, grease, oil or other foreign material.

5. Prior to dispensing into the anchor hole, squeeze out separately the mortar until it shows a consistent grey colour, but a minimum of three full strokes, and discard non-uniformly mixed adhesive components.

D) Filling the bore hole

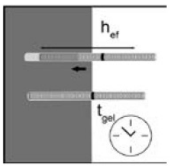


6. Starting from the bottom or back of the cleaned anchor hole fill the hole up to approximately two-thirds with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid creating air pockets. For embedment larger than 190 mm an extension nozzle shall be used.

For overhead and horizontal installation and bore holes deeper than 240 mm a piston plug and the appropriate mixer extension must be used.

Observe the gel-/ working times given in Table B3.

E) Inserting the rebar



7. Push the reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached.

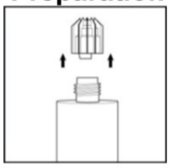
The bar should be free of dirt, grease, oil or other foreign material.

8. Be sure that the bar is inserted in the bore hole until the embedment mark is at the concrete surface and that excess mortar is visible at the top of the hole. If these requirements are not maintained, the application has to be renewed. For overhead installation fix embedded part (e.g. wedges).

9. Observe gelling time t_{gel}. Attend that the gelling time can vary according to the base material temperature (see Table B3). It is not allowed to move the bar after geling time t_{gel} has elapsed.
Allow the adhesive to cure to the specified time prior to applying any load. Do not move or load the bar until it is fully cured (attend Table B3). After full curing time $\mathbf{t_{cure}}$ has elapsed, the add-on part can be installed.

Installation parameters: drilling hole cleaning and installation - Masonry under ETA

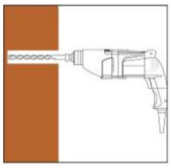
Preparation of cartridge



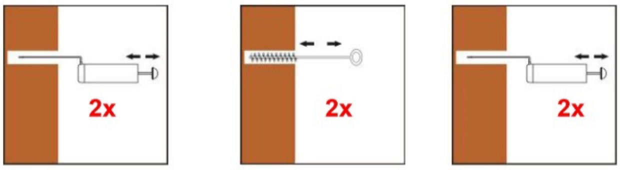
1. Remove the cap and attach the supplied T-Flow™ static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. Cut open the foil bag below the clip if necessary (Chubpack cartridges). For every working interruption longer than the recommended working time (Annex B5) as well as for new cartridges, a new static-mixer shall be used.

2. Initial adhesive is not suitable for fixing the anchor. Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes, for foil tube cartridges six full strokes and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour.

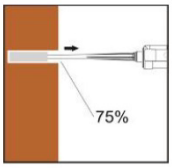
Installation in solid masonry (without sleeve)



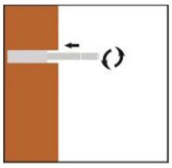
3. Holes to be drilled perpendicular to the surface of the base material by using a hard-metal tipped hammer drill bit. Drill a hole, with drilling method according to Annex C4-C45, into the base material, with nominal drill hole diameter and bore hole depth according to the size and embedment depth required by the selected anchor. In case of aborted drill hole the drill hole shall be filled with mortar.



4. Blow out from the bottom of the bore hole two times. Attach the appropriate sized brush (> $d_{b,min}$ Table B2 or B3) to a drilling machine or a battery screwdriver, brush the hole clean two times, and finally blow out the hole again two times.



5. Starting from the bottom or back of the cleaned anchor hole, fill the hole up to min two-thirds with adhesive. Slowly withdraw the static mixing nozzle will avoid creating air pockets. Observe the gel-/ working times given in Annex B5.



6. The position of the embedment depth shall be marked on the threaded rod. Push the threaded rod into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor shall be free of dirt, grease, oil or other foreign material.

7. Be sure that the anular gap is fully filled with mortar. If no excess mortar is visible at the top of the hole, the application has to be renewed.

8. Allow the adhesive to cure to the specified curing time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (attend Annex B5).

9. After full curing, the fixture can be installed with up to the max. installation torque (see Annex B4) by using a calibrated torque wrench.

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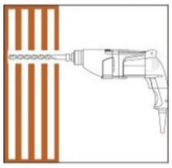
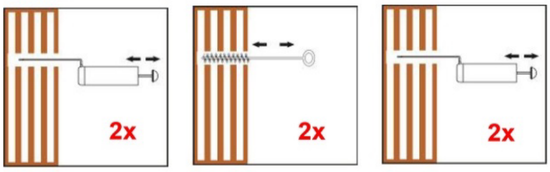
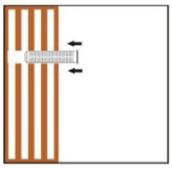
Installation in solid and hollow masonry (with sleeve)



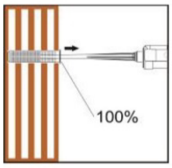
3. Holes to be drilled perpendicular to the surface of the base material by using a hard-metal tipped hammer drill bit. Drill a hole, with drill method according to Annex C4 – C45, into the base material, with nominal drill hole diameter and bore hole depth according to the size and embedment depth required by the selected anchor.



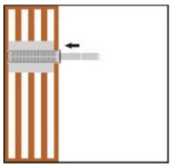
4. Blow out from the bottom of the bore hole two times. Attach the appropriate sized brush (> $d_{b,min}$ Table B3) to a drilling machine or a battery screwdriver, brush the hole clean two times, and finally blow out the hole again two times.



5. Insert the perforated sleeve flush with the surface of the masonry or plaster. Only use sleeves that have the right length. Never cut the sleeve.



6. Starting from the bottom or back fill the sleeve with adhesive. For embedment depth equal to or larger than 130 mm an extension nozzle shall be used. For quantity of mortar attend cartridges label installation instructions.
Observe the gel-/ working times given in Annex B5.



7. The position of the embedment depth shall be marked on the threaded rod. Push the threaded rod into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor shall be free of dirt, grease, oil or other foreign material.

8. Allow the adhesive to cure to the specified curing time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (attend Annex B5).

9. After full curing, the fixture can be installed with up to the max. installation torque (see Annex B4) by using a calibrated torque wrench.

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)

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

PAGES 3 to 5

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 manufacturter for advice.

PAGE 6 and8 :

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 7 & 11 :

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. >M27 for A4-70 tensile strength of 500N/mm2, instead of 700N/mm2

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 1.87 for stainless steel, up to M24, M27 to M36 is 2.86

Safety factor is 1.56 for stainless steel in shear, up to M24, M27 to M36 is 2.37

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 :

1.5 for all sizes studs

1.8 for all sizes rebar