



TIMCO Multi-Fix™

POLYESTER STYRENE FREE RESIN

Features and Benefits

Version: 07/07/2014

- Good bond strength with High load resistance
- Used with all grades of threaded rod
- Used in concrete and masonry
- Fast gelling and curing
- Used in dry and wet conditions
- **European approval** for use in concrete ETAG001 Option 7
- **European approval** for use in masonry with nylon sleeves
- Close edge distance and small spacing
- Also suitable as a filler for gap and crack filling
- 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

PAGE 1 - Features and Benefits

PAGE 2 - Loads, Edge and Spacings based on Characteristic bond strengths
Showing steel failure

PAGE 3 - Design Resistance of resin used with various stud strengths,
material and rebar.

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

PAGE 5 - Bond Strength Factors

PAGE 6 - Characteristic and Design load resistances for REBAR based on
characteristic bond strengths for hef 4d (minimum embedment) to 20d

PAGE 7 - Bond Strength Factors for REBAR

PAGE 8 - Material properties for threaded rods and rebar

PAGE 9 - Tension Edge and Spacing reduction factors

PAGE 10 - Curing Time / Temperature Range

PAGE 11 - Installation parameters: drilling hole cleaning and installation

Shelf Life and Storage

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

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

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

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

MULTI-FIX POLYESTER STYRENE FREE RESIN

Product Description

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

Specific Benefits

- European Approved
- Styrene Free Low odour
- High loads possible
- Economical fixing resin
- Chemical resistance
- Studs and other fixings
- Approved for Concrete & Masonry

Approvals

- ETA ETAG 001 Option 7 M8-M16
- ETA ETAG 029 for Masonry Size M10
- ITB approved AT-15-6900:2011 - ITB-978/W
- Association Socotec Approval CAZ 0834/1
- Tested according to LEED 2009 EQ c4.1, SCAQMD rule 1168 (2005).
- A+ Rating VOC content

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

Size (mm)	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic distances (mm)			Min Edge and Spacing (mm)	Nominal Embedment (mm)	Hole Diameter concrete (mm)	Hole Diameter fixture (mm)	Max Torque (Nm)
	Tension	Shear	Tension	Shear	Tension	Shear	Edge	Spacing	Edge					
8	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	$C_{cr,N}$	$S_{cr,N}$	$C_{cr,V}$	C_{min}, S_{min}	60			
	15.71		7.27		5.20						80	10	9	10
	19.00	9.00	12.70	7.20	9.07	5.14	80	160	80	40	160			
10	17.53		8.12		5.80						60			
	26.30	15.00	12.17	12.00	8.70	8.57	100	200	90	50	90	12	12	20
	30.20		20.10		14.36						200			
12	23.09		10.69		7.64						70			
	36.29	21.00	16.80	16.80	12.00	12.00	120	240	110	60	110	14	14	40
	43.80		29.20		20.86						240			
16	33.38		15.45		11.04						80			
	52.15	39.00	24.14	31.20	17.25	22.29	160	320	125	80	125	18	18	80
	81.60		54.40		38.86						320			
20	43.60		20.18		14.42						90			
	82.35	61.00	38.13	48.80	27.23	34.86	200	400	180	100	170	24	22	120
	127.40		84.90		60.64						400			
24	49.01		22.69		16.21						100			
	102.92	88.00	47.65	70.40	34.03	50.29	225	450	220	120	210	28	26	160
	183.60		122.40		87.43						480			
30	61.07		28.27		20.20						120			
	142.50	142.50	65.97	114.00	47.12	81.43	260	520	280	150	280	35	32	200
	292.00		194.50		138.93						600			

= steel failure

Partial safety factor = 1.5

Version 1 : 07/07/2014



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

5.8 Grade Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth hef (mm)																			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	7.3	8.5	9.7	10.9	12.1	12.7														105	12.7	
10	12	8.1	9.5	10.8	12.2	13.5	14.9	16.3	17.6	19.0	20.1										148	20.1	
12	14		10.8	12.4	13.9	15.5	17.0	18.6	20.1	21.6	24.7	29.2									189	29.2	
16	18			15.4	17.4	19.3	21.2	23.2	25.1	27.0	30.9	38.6	46.3	54.1	54.4						282	54.4	
20	24			17.9	20.2	22.4	24.7	26.9	29.2	31.4	35.9	44.9	53.8	62.8	71.8	84.9					379	84.9	
24	28				22.6	24.9	27.1	29.4	31.7	36.2	45.2	54.3	63.3	72.4	90.5	108.6					541	122.4	
27	32					26.1	28.5	30.9	33.3	38.0	47.5	57.0	66.5	76.0	95.0	114.0	128.3				670	159.1	
30	35						28.3	30.6	33.0	37.7	47.1	56.6	66.0	75.4	94.3	113.1	127.3	141.4			825	194.5	
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 hef (mm)																			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	7.3	8.5	9.7	10.9	12.1	13.3	14.5	15.8	17.0	19.5										161	19.5	
10	12	8.1	9.5	10.8	12.2	13.5	14.9	16.3	17.6	19.0	21.7	27.1									228	30.9	
12	14		10.8	12.4	13.9	15.5	17.0	18.6	20.1	21.6	24.7	30.9	37.1								291	45.0	
16	18			15.4	17.4	19.3	21.2	23.2	25.1	27.0	30.9	38.6	46.3	54.1	61.8						434	83.7	
20	24			17.9	20.2	22.4	24.7	26.9	29.2	31.4	35.9	44.9	53.8	62.8	71.8	89.7					582	130.7	
24	28				22.6	24.9	27.1	29.4	31.7	36.2	45.2	54.3	63.3	72.4	90.5	108.6					832	188.3	
27	32					26.1	28.5	30.9	33.3	38.0	47.5	57.0	66.5	76.0	95.0	114.0	128.3				1031	244.8	
30	35						28.3	30.6	33.0	37.7	47.1	56.6	66.0	75.4	94.3	113.1	127.3	141.4			1270	299.2	
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

cont.



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	7.3	8.5	9.7	10.9	12.1	13.3	14.5	15.8	17.0	19.4											224	27.2
10	12	8.1	9.5	10.8	12.2	13.5	14.9	16.3	17.6	19.0	21.7	27.1										318	43.1
12	14		10.8	12.4	13.9	15.5	17.0	18.6	20.1	21.6	24.7	30.9	37.1									405	62.6
16	18			15.4	17.4	19.3	21.2	23.2	25.1	27.0	30.9	38.6	46.3	54.1	61.8							604	116.6
20	24			17.9	20.2	22.4	24.7	26.9	29.2	31.4	35.9	44.9	53.8	62.8	71.8	89.7						811	182.0
24	28				22.6	24.9	27.1	29.4	31.7	36.2	45.2	54.3	63.3	72.4	90.5	108.6						1159	262.2
27	32					26.1	28.5	30.9	33.3	38.0	47.5	57.0	66.5	76.0	95.0	114.0	128.3					1435	341.0
30	35						28.3	30.6	33.0	37.7	47.1	56.6	66.0	75.4	94.3	113.1	127.3	141.4				1768	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 (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	7.3	8.5	9.7	10.9	12.1	13.3	13.7															113	13.7
10	12	8.1	9.5	10.8	12.2	13.5	14.9	16.3	17.6	19.0	21.7												160	21.7
12	14		10.8	12.4	13.9	15.5	17.0	18.6	20.1	21.6	24.7	30.9	31.6										204	31.6
16	18			15.4	17.4	19.3	21.2	23.2	25.1	27.0	30.9	38.6	46.3	54.1	58.8								304	58.8
20	24			17.9	20.2	22.4	24.7	26.9	29.2	31.4	35.9	44.9	53.8	62.8	71.8	89.7							409	91.7
24	28				22.6	24.9	27.1	29.4	31.7	36.2	45.2	54.3	63.3	72.4	90.5	108.6							584	132.1
27	32					26.1	28.5	30.9	33.3	38.0	47.5	57.0	66.5	76.0	80.2							1	338	80.2
30	35						28.3	30.6	33.0	37.7	47.1	56.6	66.0	75.4	94.3	98.1						1	416	98.1
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

cont.



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	7.3	8.5	9.7	10.9	12.1	13.3	14.5	15.7												129	15.7	
10	12		9.5	10.8	12.2	13.5	14.9	16.3	17.6	19.0	21.7	24.8									183	24.8	
12	14		10.8	12.4	13.9	15.5	17.0	18.6	20.1	21.6	24.7	30.9	36.1								233	36.1	
16	18			15.4	17.4	19.3	21.2	23.2	25.1	27.0	30.9	38.6	46.3	54.1	61.8						348	67.2	
20	24			17.9	20.2	22.4	24.7	26.9	29.2	31.4	35.9	44.9	53.8	62.8	71.8	89.7					467	104.8	
24	28				22.6	24.9	27.1	29.4	31.7	36.2	45.2	54.3	63.3	72.4	90.5	108.6					584	132.1	
27	32					26.1	28.5	30.9	33.3	38.0	47.5	57.0	66.5	76.0	80.2						2	338	80.2
30	35						28.3	30.6	33.0	37.7	47.1	56.6	66.0	75.4	94.3	98.1					2	416	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 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	6.3	7.4	8.4	9.5	10.6	11.6	12.7	13.7	14.8	16.9										207	21.9	
10	12	7.6	8.8	10.1	11.4	12.6	13.9	15.2	16.4	17.7	20.2	25.3									270	34.1	
12	15		9.4	10.8	12.1	13.5	14.8	16.2	17.5	18.9	21.6	27.0	32.4								364	49.2	
16	18			13.3	14.9	16.6	18.2	19.9	21.6	23.2	26.5	33.2	39.8	46.5	53.1						527	87.4	
20	25			14.1	15.8	17.6	19.4	21.1	22.9	24.6	28.2	35.2	42.2	49.3	56.3	70.4					776	136.6	
25	30				18.5	20.3	22.2	24.0	25.8	29.5	36.9	44.3	51.7	59.1	73.8	92.3					1065	196.5	
28	35					21.5	23.4	25.4	27.3	31.2	39.1	46.9	54.7	62.5	78.1	97.7	109.4				1371	267.8	
32	40							26.1	28.2	32.2	40.2	48.3	56.3	64.3	80.4	100.5	112.6	128.7			1739	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



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 Embed- ment (mm)
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		
	Tension N_{rk}	Shear V_{rk}	Tension N_{rd}	Shear V_{rd}	Tension N_{rec}	Shear V_{rec}	Tension N_{rk}	Shear V_{rk}	Tension N_{rd}	Shear V_{rd}	Tension N_{rec}	Shear V_{rec}	
8	15.71	9.00	7.27	7.20	5.20	5.14	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	20.95		9.70		6.93								80
	41.90		19.40		13.86								160
10	17.53	15.00	8.12	12.00	5.80	8.57	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	26.30		12.17		8.70								90
	58.43		27.05		19.32								200
12	23.09	21.00	10.69	16.80	7.64	12.00	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	70
	36.29		16.80		12.00								110
	79.17		36.65		26.18								240
16	33.38	39.00	15.45	31.20	11.04	22.29	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80
	52.15		24.14		17.25								125
	133.51		61.81		44.15								320
20	43.60	61.00	20.18	48.80	14.42	34.86	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	90
	82.35		38.13		27.23								170
	193.77		89.71		64.08								400
24	49.01	88.00	22.69	70.40	16.21	50.29	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	100
	102.92		47.65		34.03								210
	235.24		108.91		77.79								480
30	61.07	142.50	28.27	114.00	20.20	81.43	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	120
	142.50		65.97		47.12								280
	305.36		141.37		100.98								600

Table notes : see back page



Bond Strength Factors

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

Concrete Strength N/mm ²	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
Non-Cracked $f_c =$	0.97	1.00	1.02	1.04	1.07	1.10	1.12	1.15

Influence of environmental conditions in non cracked concrete

		M8	M10	M12	M16	M20	M24	M30
Temp I 40°C / 24°C	Dry and Wet	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Temp II 80°C / 50°C	Dry and Wet	0.90	0.88	0.87	0.86	0.85	0.84	0.82

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



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

Rebar Ø	Non Cracked Concrete						Cracked Concrete						Nominal Embedment (mm)																		
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)																				
	Tension N _{rk}	Shear V _{rk}	Tension N _{rd}	Shear V _{rd}	Tension N _{rec}	Shear V _{rec}	Tension N _{rk}	Shear V _{rk}	Tension N _{rd}	Shear V _{rd}	Tension N _{rec}	Shear V _{rec}																			
8	13.30	13.95	6.33	9.30	4.52	6.64	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60																		
	17.73		8.44		6.03								80																		
	35.47		16.89		12.06								160																		
10	15.91	21.45	7.58	14.30	5.41	10.21							Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60												
	23.86		11.36		8.12														90												
	53.03		25.25		18.04														200												
12	19.84	31.05	9.45	20.70	6.75	14.79													Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	70						
	31.18		14.85		10.61																				110						
	68.04		32.40		23.14																				240						
16	27.87	55.50	13.27	37.00	9.48	26.43																			Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80
	43.54		20.73		14.81																										125
	111.47		53.08		37.91																										320
20	32.23	86.55	15.35	57.70	10.96	41.21	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable																			90
	60.88		28.99		20.71																										170
	143.26		68.22		48.73																										400
25	38.80	135.00	18.48	90.00	13.20	64.29							Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable													100
	81.48		38.80		27.71																										210
	193.99		92.38		65.98																										500
28	46.30	168.75	22.05	112.50	15.75	80.36													Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable							112
	115.76		55.12		39.37																										280
	231.52		110.25		78.75																										560
32	54.05	220.95	25.74	147.30	18.38	105.22																			Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	128
	135.11		64.34		45.96																										320
	270.23		128.68		91.91																										640

Table notes : see back page



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
non cracked f_c =	0.97	1.00	1.02	1.04	1.07	1.10	1.12	1.15

Influence of environmental conditions in non cracked concrete

		Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Temp I 40°C / 24°C	Dry and Wet	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Temp II 80°C / 50°C	Dry and Wet	0.90	0.90	0.88	0.88	0.86	0.86	0.84	0.84

Table notes : see back page



Material Properties for grades of threaded rod

Stud Diameter (mm)	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
	$N_{rk,s}$ (kN)	$N_{rd,s}$ (kN)	$N_{rk,s}$ (kN)	$N_{rd,s}$ (kN)	$N_{rk,s}$ (kN)	$N_{rd,s}$ (kN)	$N_{rk,s}$ (kN)	$N_{rd,s}$ (kN)
M8	29.2	19.5	38.1	27.2	25.6	13.7	29.2	15.6
M10	46.4	30.9	60.3	43.1	40.6	21.7	46.4	24.8
M12	67.4	44.9	87.7	62.6	59.0	31.6	67.4	36.0
M16	125.6	83.7	163.0	116.4	109.9	58.8	125.7	67.2
M20	196.1	130.7	255.0	182.1	171.5	91.7	196.0	104.8
M24	282.5	188.3	367.0	262.1	247.1	132.1	293.0	132.1
M30	448.8	299.2	583.0	416.4	280.5	150.0	392.7	210.0

Stud Diameter (mm)	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
	$V_{rk,s}$ (kN)	$V_{rd,s}$ (kN)	$V_{rk,s}$ (kN)	$V_{rd,s}$ (kN)	$V_{rk,s}$ (kN)	$V_{rd,s}$ (kN)	$V_{rk,s}$ (kN)	$V_{rd,s}$ (kN)
M8	14.6	11.7	19.0	15.2	12.8	8.2	14.6	9.4
M10	23.2	18.6	30.2	24.1	20.3	13.0	23.2	14.9
M12	33.7	27.0	43.8	35.1	29.5	18.9	33.7	21.6
M16	62.8	50.2	81.6	65.3	55.0	35.2	62.8	40.3
M20	98.0	78.4	127.4	101.9	85.8	55.0	98.0	62.8
M24	141.2	113.0	183.6	146.8	123.6	79.2	141.2	90.5
M30	224.4	179.5	291.5	215.9	140.3	89.9	196.4	125.9

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	85.0	60.7	42.5	28.3
16	111.0	79.3	55.5	37.0
20	173.0	123.6	86.5	57.7
25	270.0	192.9	135.0	90.0
32	442	315.7	221	147.3



Effect of Anchor Spacing - Tension

Anchor Spacing (mm)	Stud / Rebar Diameter						
	8	10	12	16	20	24	30
40	0.64						
50	0.67	0.63					
60	0.70	0.65	0.63				
70	0.73	0.67	0.64				
80	0.76	0.69	0.66	0.63			
90	0.79	0.72	0.68	0.64			
100	0.82	0.74	0.70	0.65	0.63		
120	0.87	0.79	0.74	0.68	0.65	0.63	
150	0.96	0.86	0.80	0.73	0.68	0.65	0.63
160	1.00	0.88	0.82	0.74	0.70	0.66	0.64
175		0.92	0.85	0.76	0.71	0.68	0.65
200		1.00	0.90	0.80	0.74	0.71	0.68
225			0.95	0.84	0.77	0.74	0.70
240			1.00	0.86	0.79	0.76	0.72
250				0.87	0.80	0.77	0.73
275				0.91	0.83	0.80	0.75
280				0.92	0.84	0.80	0.76
300				0.95	0.86	0.82	0.78
320				1.00	0.88	0.85	0.80
350					0.92	0.88	0.83
400					1.00	0.94	0.88
425						0.97	0.90
450						1.00	0.93
480							0.96
520							1.00

Effect of Edge Distance - Tension

Edge Distance (mm)	Stud / Rebar Diameter						
	8	10	12	16	20	24	30
40	0.64						
50	0.73	0.63					
60	0.82	0.70	0.63				
70	0.90	0.77	0.68				
80	1.00	0.84	0.74	0.63			
90		0.91	0.80	0.67			
100		1.00	0.86	0.71	0.63		
110			0.92	0.76	0.66		
120			1.00	0.80	0.70	0.64	
140				0.89	0.77	0.68	0.63
160				1.00	0.84	0.76	0.66
180					0.91	0.84	0.72
200					1.00	0.92	0.78
225						1.00	0.86
250							0.94
260							1.00

Effect of Edge Distance - Shear

Edge Distance (mm)	Stud / Rebar Diameter						
	8	10	12	16	20	24	30
40	0.25						
50	0.44	0.30					
60	0.63	0.48	0.30				
70	0.81	0.65	0.44				
80	1.00	0.83	0.58	0.40			
90		1.00	0.72	0.53			
100			0.86	0.67	0.35		
110			1.00	0.80	0.44		
125				1.00	0.58	0.35	
140					0.72	0.45	0.30
160					0.91	0.58	0.36
180					1.00	0.71	0.47
200						0.84	0.59
225						1.00	0.74
250							0.88
280							1.00



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	+43°C	+60°C

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

Short term temperature: Temperatures within the service temperature range which vary over short intervals, e.g. day/night cycles and freeze/thaw cycles.

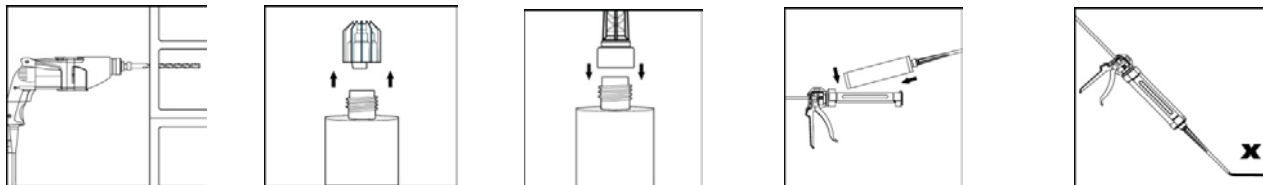
Long term temperature: Temperature, within the service temperature range, which will be approximately constant over significant periods of time.

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

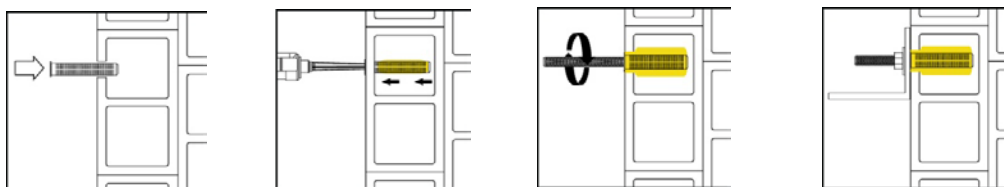
Physical Properties

	N/mm ²	Test Method
Compressive Strength	43.5	EN ISO 604 / ASTM 695
Flexural Strength	15.9	EN ISO 178 / ASTM 790
Flexural Modulus	2803	EN ISO 178 / ASTM 790
Tensile Strength	9.3	EN ISO 527 / ASTM 638
E Modulus	4874.5	EN ISO 527 / ASTM 638
VOC Content	A+ Rating	-

Installation parameters: drilling hole cleaning and installation HOLLOW WALL

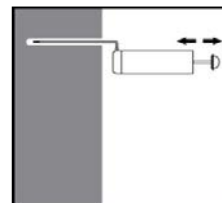
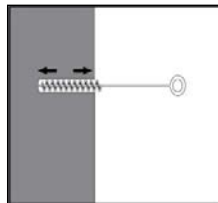
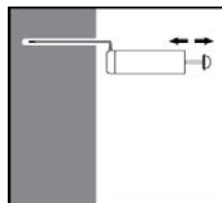
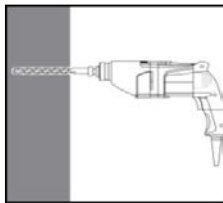


Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. Remove the threaded cap from the cartridge. Tightly attach the mixing nozzle. Do not modify the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



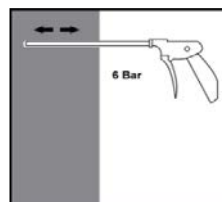
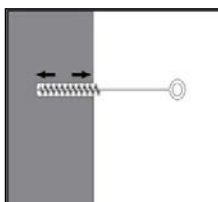
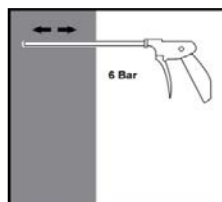
Introduce the sleeve of suitable dimensions. Insert the nozzle to the end of the sleeve and inject the resin so long till the sleeve will fill into 100%. Insert the anchor, slowly with a slight twisting motion into the sleeve. Remove excess resin and leave the fixing until minimum curing (loading) times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

Installation parameters: drilling hole cleaning and installation

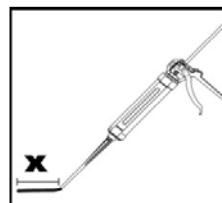
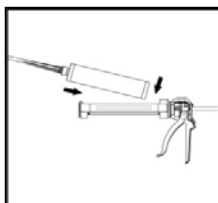
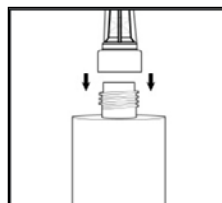
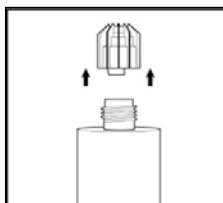


Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. The manual pump shall be used for blowing out bore holes up to diameters $d_o \leq 24\text{mm}$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

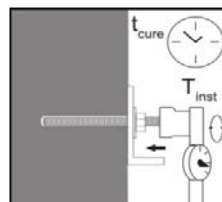
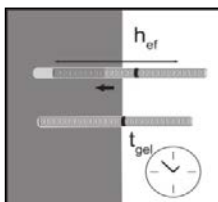
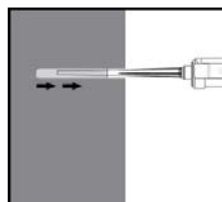
Compressed air cleaning (CAC) for all bore hole diameters d_o and all bore hole depths



Blow 2 times from the back of the hole (if needed with a nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at $6\text{ m}^3/\text{h}$). Brush 2 times with the specified brush size (see Table 6) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it.
X 2 Blow out again with compressed air at least 2 times.



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



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



Notes

PAGE 2 :

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

All data is based on correct installation - see instructions

No influence of edge and spacing

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

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

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

5.8 grade stud

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

PAGE 3 :

Design Resistance with various stud strengths, material and rebar.

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

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

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

PAGE 4 and 6 :

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

All data is based on correct installation - see instructions

No influence of edge and spacing

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

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

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

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

PAGE 5 & 7 :

Bond Strength Factors

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

PAGE 8 :

Material Properties for grades of other threaded rod and rebar

All grades shown for information

M30 studding is 8.8 grade instead of 5.8 grade

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

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

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

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

Partial Safety Factors for pages 2,3,4,5,6,7 :

1.8 for all sizes studs

1.8 for all sizes rebar