CIVIL & GEOTECHNICAL
ENGINEERING PRODUCTS

www.stainless-uk.co.uk

Stainless UK

WELCOME TO **STAINLESS UK**

Stainless UK Ltd is an established manufacturer and stockholder of Stainless Steel products for Civil Engineering and Geotechnical Engineering.

For over 20 years from our Sheffield factory we have been supplying both standard and custom made products for a wide range of projects in both the UK and overseas. During this time, we have built an enviable reputation with our customers for engineering skills, innovation and service. Stainless UK is a BS ISO 9001 Quality Management System Certified company and operates a Management System in accordance with BS ISO 14001 and BS ISO 18001.

Stainless UK is also a CE certified fabricator to Execution Class 2 of BS EN 1090-2.

CONTENTS

Bespoke fabrication with extensive in-house production facilities.

Stainless UK manufacture a broad range of products for the construction industry. In-house production facilities including laser and plasma cutting, bending, punching, thread rolling, machining and welding.

Stainless UK is a CE certified fabricator to Execution Class 2 for fabricated products manufactured in accordance with BS EN 1090-2 Load Bearing and Structural Steel Components.

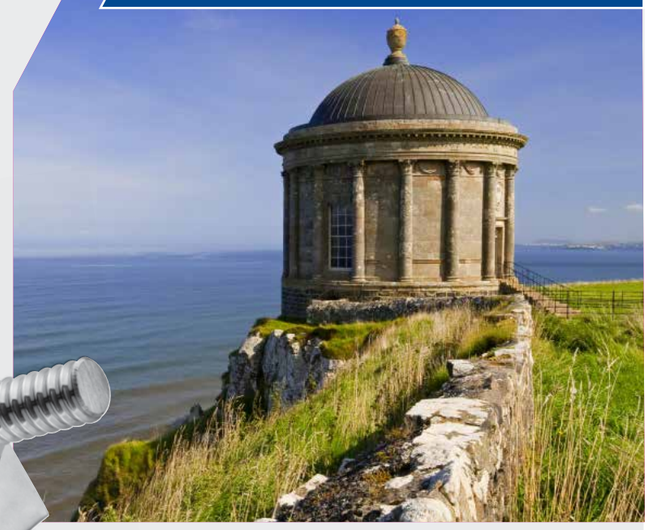
Stainless steel frames supplied for Manchester Piccadilly gardens water feature

- Windposts and Masonry Support
- Brackets and Angles
- Cast in Anchors
- Ladders and Walkways
- Special Fabrications

GRIP-BAR® ANCHOR SYSTEMS

Grip-Bar® is a unique high bond, high strength Stainless Steel threaded bar for Rock Anchors, Soil Nails, Masonry and Concrete Fixing.

Grip-Bar® installed for supporting cliff face



The Grip-Bar® Anchor System has been developed to service Civil Engineering and Geotechnical applications.

Tensile Strength

Grip-Bar® is manufactured with a proof strength of 650 N/mm² and a Ultimate Tensile Strength of 750 N/mm². Grip-Bar® with a Ultimate Tensile Strength of 800 N/mm² is available on request.

Reinforcement bar to BS 6744 has a proof strength of 500N/mm². To produce a thread on this bar requires reducing the bar section with a consequent reduction in strength.

Applications

- **Rock bolts**
- **Soil nails**
- **Docks and harbours**
- **Building and bridge cross ties**
- **Ground anchors**
- **Holding down bolts**
- **Coastal defence walls, slopes and slabs**

Technical Information

Ultimate Tensile Stress (minimum)	750 N/mm²
0.2% proof stress (minimum)	650 N/mm²
Minimum elongation	15%
Typical lengths	6 m
Straightness	2 in 1000
Standard bundle weight	1 tonne max.

Ref	Nom. Dia.	C.S.A	0.2% proof load	Ultimate tensile load	Weight per metre
	mm	mm²	kN	kN	Kg/m
GB10	10	62	40	46	0.49
GB12	12	91	54	64	0.73
GB16	16	167	108	124	1.3
GB20	20	261	170	196	2.1
GB22	22	322	203	235	2.6
GB24	24	378	246	283	2.9
GB27	27	492	320	368	3.9
GB30	30	596	388	446	4.7
GB33	33	737	480	552	5.75
GB36	36	873	568	653	7
GB39	39	1037	674	776	8.25
GB42	42	1197	778	896	9.5
GB45	45	1388	903	1038	10.9
GB48	48	1562	1016	1168	12.4

Fittings

All the fittings have been designed to provide a strength of anchorage equal to the theoretical minimum required by the threaded bar.

Fittings are made as small as possible to ensure that the strength of the Grip-Bar® can fully be utilised, by selecting the smallest cored hole for the application, saving on drilling time, reducing the size of drilling plant required, both resulting in the optimum cost solution.

Couplers, load nuts and lock nuts are stocked in grade 316 stainless steel only.

Bond

The development of the Grip-Bar® thread has over the years been supported by research, both by Stainless UK and at Sheffield University. Bond tests in accordance with BS 8110 - type 2 bond reinforcing bar have shown that the Grip-Bar® thread provides a bond well in excess of that required.

Further research has been completed to investigate the performance of Grip-Bar® in a rock bolting environment, with varying free and bonded lengths.

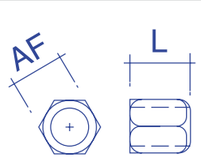
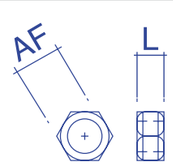
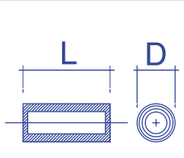
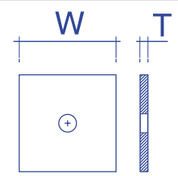
On each occasion the performance significantly out performed reinforcing bar comparators and both systems are in excess of the codes minimum recommendations.

Site Performance

Grip-Bar® is produced using a cold rolled thread which not only enhances the strength of the bar, but also provides a robust, self cleaning and user friendly thread which is easy to use on construction sites.

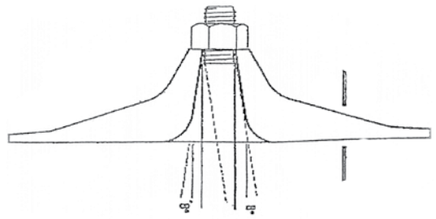
The coarse pitch thread is less susceptible to galling than the traditional metric thread; the large pitch significantly speeds up assembly.

The large flank angle on this bespoke thread design ensures that the crown of the thread is supported and will withstand significant site abuse and still remain serviceable.

	Load Nut - GBLN			Lock Nut - GBN			Coupler - GBCR			Plate Washer		
												
GB Dia	AF	Length	Weight	AF	Length	Weight	Dia.	Length	Weight	Width	Thickness	Weight
	mm	mm	Kg	mm	mm	Kg	mm	mm	Kg	mm	mm	Kg
GB10	17	18	0.02	17	9	0.01	19	41	0.06	100 x 100	8	0.62
GB12	19	20	0.03	19	10	0.02	19	51.5	0.07	100 x 100	8	0.62
GB16	24	26	0.06	24	13	0.03	25	64	0.14	100 x 100	8	0.62
GB20	30	32	0.12	30	16	0.06	30	76	0.23	125 x 125	10	1.22
GB22	36	35	0.23	36	17	0.12	33	85	0.32	150 x 150	10	1.74
GB24	36	38	0.21	36	19	0.11	36	91	0.41	150 x 150	10	1.74
GB27	42	44	0.35	42	23	0.18	41	104	0.69	150 x 150	10	1.74
GB30	46	48	0.45	46	24	0.22	45	107	0.79	200 x 200	12	3.75
GB33	50	60	0.65	50	27	0.29	50	115	1.07	210 x 210	15	5.20
GB36	56	66	0.93	56	29	0.41	55	122	1.34	225 x 225	20	7.99
GB39	60	68	1.08	60	32	0.51	59	130	1.67	250 x 250	20	9.87
GB42	65	70	1.32	65	34	0.64	64	137	2.04	250 x 250	20	9.87
GB45	70	72	1.58	70	36	0.79	68	145	2.48	300 x 300	30	21.42
GB48	75	76	1.93	75	38	0.96	73	152	2.95	300 x 300	30	21.42

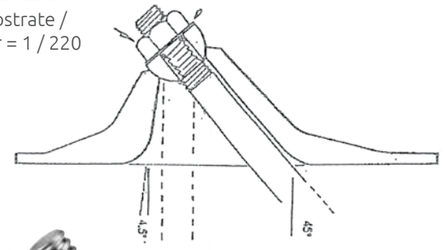
Ductile Iron Standard 8° Pattress Plates

- Maximum misalignment ± 8°
- Material ductile iron (SG)
- Finish: grey primer as standard
- Design stress ratio
- Stress in substrate / Stress in bar = 1 / 240



Ductile Iron Standard 45° Pattress Plates

- Maximum misalignment ± 45°
- Material ductile iron (SG)
- Finish: grey primer as standard
- Design stress ratio
- Stress in substrate / Stress in bar = 1 / 220



Benefits:

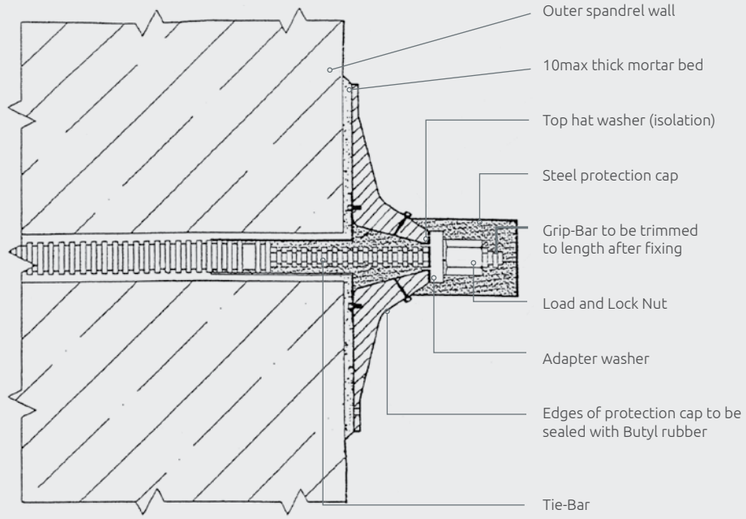
- Comprehensive range to suit all applications
- Optimised shape-high strength with low weight
- Aesthetically superior to fabricated plates
- Ductile (SG) iron, withstands high loads, corrosion properties superior to mild steel
- Ductile Iron (SG) (Spheroidal Graphite to ISO 1083 / JS / 450-10 / S)
- Readily available

Application:

- Buildings
- Retaining Walls
- Bridges
- Soft Stone
- Concrete
- Rock

Ref		Nominal Bar size	Max Design Load	Nominal Dimensions Approx.		Weight Approx.
8°	45°	mm	kN	Base Dia mm	Height mm	Kg
M16P	MS16P	16	78	225	50	4.2
M20P	MS20P	20	122	280	60	8.0
M24P	MS24P	24	176	335	80	12.3
M30P	MS30P	30	280	420	90	25.3
M39P	MS39P	39	490	545	120	57.0

Pattress Plate Details



Section through adapter washer

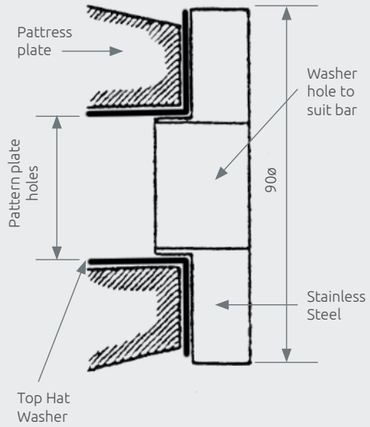


Plate Designs:

Plates are manufactured to customer specific requirements

System Accessories:

Pattress Plates can be supplied with a range of accessories, however plates and end connections can be manufactured to meet individual contract requirements.

Top Hat Washer

Grout Hole

Hemispherical Washer

Protection Cap

Reducer Washer

Stainless Steel rebar is generally used in construction where corrosion resistance is crucial. Typical applications include Roads, Bridges, Tunnels, Harbours, Piers, Jetties, Dams and Monuments.

Over the years many grades of stainless steel have been introduced to the British Standard. Most of these grades are not readily available, however the most common grades 304 (1.4301) and 316 (1.4436) are available ex stock from our Sheffield factory. Plain dowel bar is not readily available in grade 316 (1.4436) but is available in 316 (1.4401/4).

Rebar and Dowel Bar

REBAR AND DOWEL BAR

Rebar and Dowel Bar Sizes and Strengths

Rebar is generally supplied with a minimum 0.2% proof of 500N/mm², a UTS of 550 N/mm² and elongation of 14%. 650 N/mm² proof can be produced to order or see Grip Bar Data Sheet for equivalents.

Dowel bar is generally supplied with a 0.2% proof of 250 N/mm² and a UTS of 500N/mm². Higher proof strength of 500 N/mm² and 650 N/mm² are available.

Rebar 500 Proof 550 UTS							
Unthreaded					Threaded		
Ref	Kg/m	Cross Section Area [mm²]	Ultimate tensile load kN	Proof load 0.2% N/mm kN	Metric Threaded Size	Ultimate tensile load kN	Proof load 0.2% N/mm kN
RB 5	0.155	19.6	10	9			
RB 6	0.224	28.3	15	14	M6	12	11
RB 8	0.397	50.3	27	25	M8	21	17
RB 10	0.620	78.5	43	39	M10	34	31
RB 12	0.893	113.1	62	56	M12	50	45
RB 16	1.589	201.1	110	100	M16	91	82
RB 20	2.482	314.2	172	157	M20	143	130
RB 25	3.878	490.9	269	245	M24	207	188
RB 32	6.353	804.2	442	402	M30	327	296
RB 40	9.927	1256.6	691	628	M39	570	517
RB 50	15.512	1963.5	1079	981	M48	859	777

Dowel Bar 250 Proof - 500 UTS			
Unthreaded			
Ref	Kg/m	Ultimate tensile load kN	Proof load 0.2% N/mm kN
DB 5	0.154	9.5	4.7
DB 6	0.222	14	7
DB 8	0.395	25	12
DB 10	0.617	39	19
DB 12	0.888	56	28
DB 16	1.578	100	50
DB 20	2.466	157	78
DB 25	3.853	245	122
DB 32	6.313	402	201
DB 40	9.865	618	314
DB 50	15.41	981	490

Couplers, Nuts and End Threading to BS3643

Manufactured to meet the minimum strength of threaded ends.

Bar Dia mm	Bar		Coupler	
	Thread Size	Thread Length (mm)	Diameter (mm)	Length (mm)
12	M 12	17	18	37
16	M 16	21	25	45
20	M 20	25	30	53
24	M 24	30	33	63
32	M 30	37.5	42	81
40	M 39	50	60	107

System Accessories:

Bar is available with full strength couplers, load nuts, lock nuts, and standard plates, however plates and end connections can be manufactured to meet individual contract requirements.

Dowel Bar Sleeves

Expansion Dowel Cap

Safety End Caps

Tying Wire

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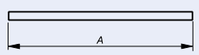

L=A

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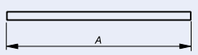
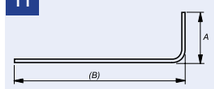


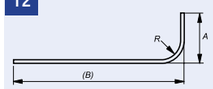
L=A

11



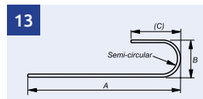
L=A + (B) – 0.5r – d

12



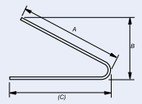
L=A + (B) – 0.43R – 1.2d

13



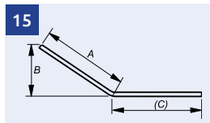
L=A + 0.57B + (C) – 1.6d

14



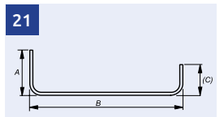
L=A + (C) - 4d

15



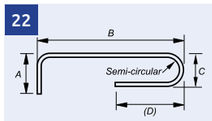
L=A + (C)

21



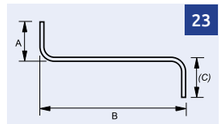
L=A + B + (C) – r – 2d

22



L=A + B + C + (D) – 1.5r – 3d

23



L=A + B + (C) – r – 2d

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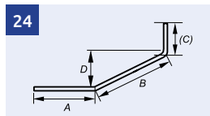
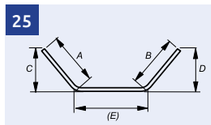


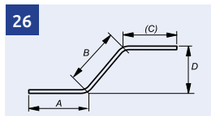
L=A + B + (C)

25



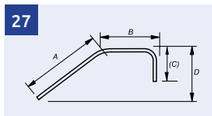
L=A + B + (E)

26



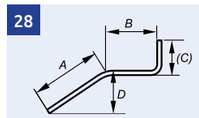
L=A + B + (C)

27



L=A + B + (C) – 0.5r – d

28



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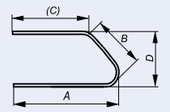

L=A + B + (C) – r – 2d

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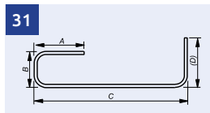

L=A + B + C + (D) – 1.5r – 3d

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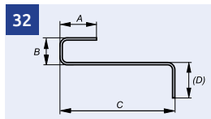
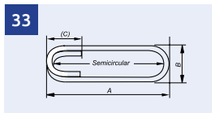


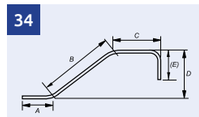
L=A + B + C + (D) – 1.5r – 3d

33



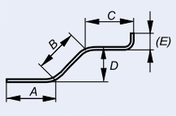
L=2A + 1.7B + 2(C) – 4d

34



L=A + B + C + (E) – 0.5r – d

35



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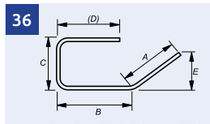
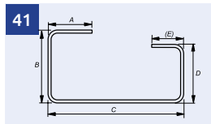


L=A + B + C + (D) – r – 2d

41



L=A + B + C + D + (E) – 2r – 4d

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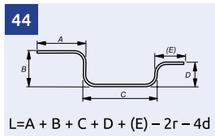
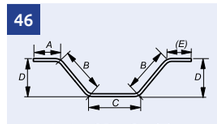


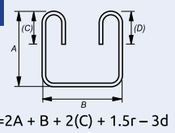
L=A + B + C + D + (E) – 2r – 4d

46



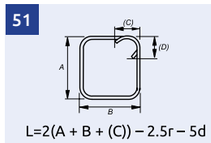
L=A + 2B + C + (E)

47



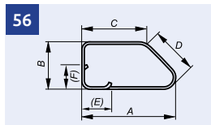
L=2A + B + 2(C) + 1.5r – 3d

51



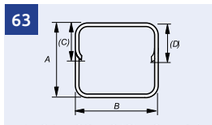
L=2(A + B + (C)) – 2.5r – 5d

56



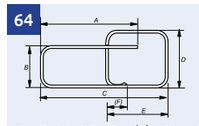
L=A + B + C + D + 2(E) - 2.5r - 5d

63



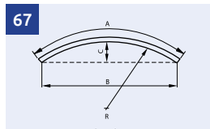
L=2A + 3B + 2(C) – 3r – 6d

64



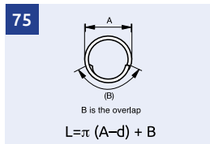
L=A+B+C+2D+E + (F) – 3r – 6d

67



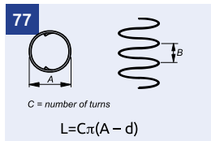
L=A

75



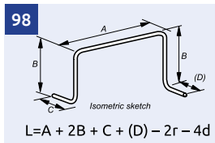
L=π (A–d) + B

77



L=Cπ(A – d)

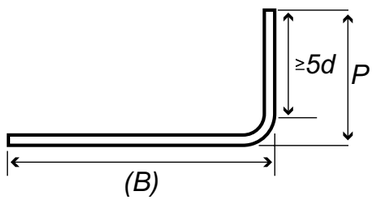
98



L=A + 2B + C + (D) – 2r – 4d

All other shape codes are Shape Code 99 and require fully dimensioned sketches.

Table of minimum dimensions



			Minimum End Projection	
Nominal Size	Minimum radius for scheduling	Minimum diameter for bending former	General (min. 5d straight)	Links where bend <150° (min. 10d straight)
6	12	24	110	110
8	16	32	115	115
10	20	40	120	130
12	24	48	125	160
16	32	64	130	210
20	70	140	190	290
25	87	175	240	365
32	112	224	305	465
40	140	280	380	580
50	175	350	475	725

Reinforcement Mesh Panels

Manufactured to BS4483 is typically used where the concrete cover to the steel is minimal, or where long life cycle is required.

Reinforcing Mesh Panels							
BS4483 Ref	Main Wires			Cross Wires			Mass per m²
	Pitch [mm]	Dia [mm]	CSA [mm²]	Pitch [mm]	Dia [mm]	CSA [mm²]	
A393	200	10	393	200	10	393	6.16
A252	200	8	252	200	8	252	3.95
A193	200	7	193	200	7	193	3.02
A142	200	6	142	200	6	142	2.22
A98	200	5	98	200	5	98	1.54
B1131	100	12	1131	200	8	252	10.90
B785	100	10	785	200	8	252	8.14
B503	100	8	503	200	8	252	5.93
B385	100	7	385	200	7	193	4.53
B283	100	6	283	200	7	193	3.73
B196	100	5	196	200	7	193	3.05

All studding is manufactured by thread rolling which increases the strength of the thread and improves thread performance whilst reducing galling.

Studding is manufactured according to BS 3506 in grades A2-70, A2-80, A4-70 and A4-80. Studding manufactured from austenitic stainless grades 310, 321 and Duplex grades are also available.

Standard 6m lengths from M16 to M39 are held in stock whilst a full range of diameters up to M52 are available to order. Metric studding can be supplied in cut lengths as required. Partially threaded bars are available to order. The smooth portion of the partially threaded bar can be supplied as either a rolled or polished finish. A full range of nuts, washers, couplers, turnbuckles and plates in both material grades and strength classes are available.

Thread	Weight per metre	Strength			
		Class 70		Class 80	
		0.2% proof	UTS	0.2% proof	UTS
	Kg/m	kN	kN	kN	kN
M12	0.72	41.0	64.0	54.0	73.0
M16	1.31	70.7	109.9	94.2	125.6
M20	2.05	110.3	171.5	147.0	196.0
M24	2.96	158.9	247.1	211.8	282.4
M27	3.83	206.6	321.3	275.4	367.2
M30	4.70	252.6	392.7	336.6	448.8
M33	5.78	312.3	485.8	416.4	555.2
M36	6.84	367.7	571.9	490.2	653.6
M39	8.14	439.2	683.2	585.6	780.8
M42	9.38	504.5	784.7	672.6	896.6
M45	10.90	587.7	914.2	783.6	1044.8
M48	12.32	662.9	1031.1	883.8	1178.4
M52	14.65	791.1	1230.6	1054.8	1406.4

Strength Class	Min. UTS N/mm²	Min. Yield N/mm²	Elongation at Failure
50	500	210	0.6D
70	700	450	0.4D
80	800	600	0.3D

Application:

- Bolting beam
- Stud bolts
- Rock bolts
- Soil nails
- Tie bars
- Bridge strengthening
- Building and bridge cross ties
- Ground anchors
- Holding down bolts
- Oil rigs
- Pipe Flanges

ASTM A193/A193M-11 specifies the mechanical properties of bolts, screws and nuts made from austenitic stainless steel for high temperature or high pressure service and other special purpose applications.

The four most common grades are B8 Class 2, B8 Class 2B, B8M Class 2 and B8M Class 2B. B8 material is an austenitic stainless steel Grade 304 and B8M material is an austenitic stainless steel Grade 316. Class 2 and Class 2B define the mechanical properties of the steel.

Stainless UK stock cold drawn stainless steel round bar for the manufacturer of fasteners in diameters up to 52mm and lengths up to 6m.

Grade	R25	C	MN	P	S	Si	CR	NI	MO
B8	Min	-	-	-	-	-	18.0	8.0	-
	Max	0.08	2.00	0.045	0.03	1.00	20.0	11.0	-
304	Min	-	-	0	-	-	18.0	8.0	-
	Max	0.08	2.0	0.045	0.03	0.75	20.0	10.5	-
B8M	Min	-	-	-	-	-	16.0	10.0	2.00
	Max	0.08	2.0	0.045	0.03	1.00	18.0	14.0	3.00
316	Min	-	-	-	-	0	16.0	10.0	2.00
	Max	0.08	2.0	0.045	0.03	0.75	18.0	14.0	3.00

Grade	Size	Size	Tensile Str (MPa) min	Yield Str 0.2% Proof (MPa) min	Elong (% in 4D min)	Red of Area (% min)	Hardness (HRC max)
	Dia (")	Dia (mm)					
B8M CL2	<= 3/4	<= 19.05	758	655	15	45	35
B8M CL2	> 3/4 <= 1	> 19.05 <= 25.4	690	550	20	45	35
B8M CL2	> 1 <= 1.1/4	> 25.4 <= 31.75	655	450	25	45	35
B8M CL2	> 1 .1/4 <= 1.1/2	> 31.75 <= 38.1	620	345	30	45	35
B8M CL2B	> 1 .1/2 <= 2	> 38.1 <= 50.8	655	515	25	40	35
B8M CL2B	> 2 <= 2.1/2	> 50.8 <= 63.5	620	450	30	40	35
B8M CL2B	> 2 .1/2 <= 3	> 63.5 <= 76.2	550	380	30	40	35
316	-	-	515	205	40	55	20
316L	-	-	485	170	40	55	20
316H	-	-	515	205	40	55	20

Civil engineering and geotechnical rock bolt or ground anchor

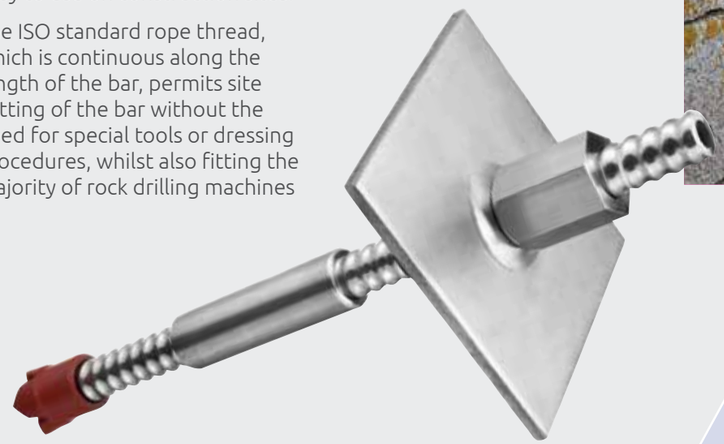
Site Performance

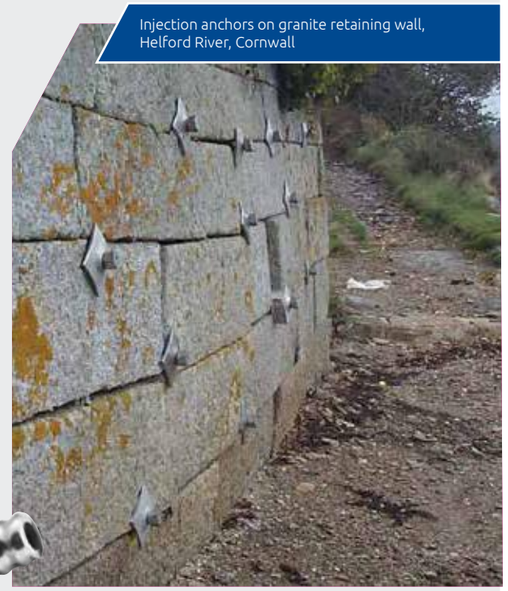
Injection anchors are produced using a cold rolled thread which not only enhances the strength of the bar, but also provides a self cleaning, robust thread which is easy to use on construction sites.

The ISO standard rope thread, which is continuous along the length of the bar, permits site cutting of the bar without the need for special tools or dressing procedures, whilst also fitting the majority of rock drilling machines

Bond

The bond of the injection anchor is in accordance with BS 8110 and BS 6744, the continuous thread provides a key for the grout.





Injection anchors on granite retaining wall, Helford River, Cornwall

Technical Information	
Grades Available	304 or 316 stainless
Ultimate Tensile Stress	650 N/mm²
Minimum elogation	20%
Typical lengths	3m-3.2m (6m-6.5m to order)
Straightness	2 in 1000
Standard bundle weight	1 tonne max
Thread (left hand)	ISO 10208

Bar Size	R25	R32	R38
Nominal Dia over threads (mm)	24.71	31.34	37.99
Nominal internal dia (mm)	13	18	24
Effective CSA (mm²)	307	472	586
Ultimate strength min (kN)	200	320	400
Nominal weight (kg/m)	2.45	3.8	4.75
Coupler dia x length (mm)	36 x 140	44 x 150	51 x 160
Load Nut a/f x length (mm)	40 x 60	50 x 70	60 x 80
Cross sectional area (mm²)	307	472	586

System Accessories:

Stainless steel injection anchors can be supplied with a range of accessories, which can be manufactured to meet individual contract requirements.

The selection of any drill bit is based on experience, but a trial anchor must be satisfactorily tested before the project is finally commenced.

Chemical Stud Anchor

Chemical Stud Anchor				
Product Code	Anchor Hole Dia	Anchor Length	Max Fixing Thickness	Minimum Hole Depth
GT08	10	110	18	80
GT10	12	130	25	90
GT12	14	160	34	110
GT16	18	190	45	125
GT20	25	260	55	170
GT24	28	300	60	210
GT30	36	350	70	280
GT36	42	420	75	320

Chemical Mortar Gun

Throughbolts

Shield Anchors

Sleeve Anchors

Anchor Bolts

Heavy Duty Anchors

Drop in Anchors

WIRE MESH

Wrapping Mesh

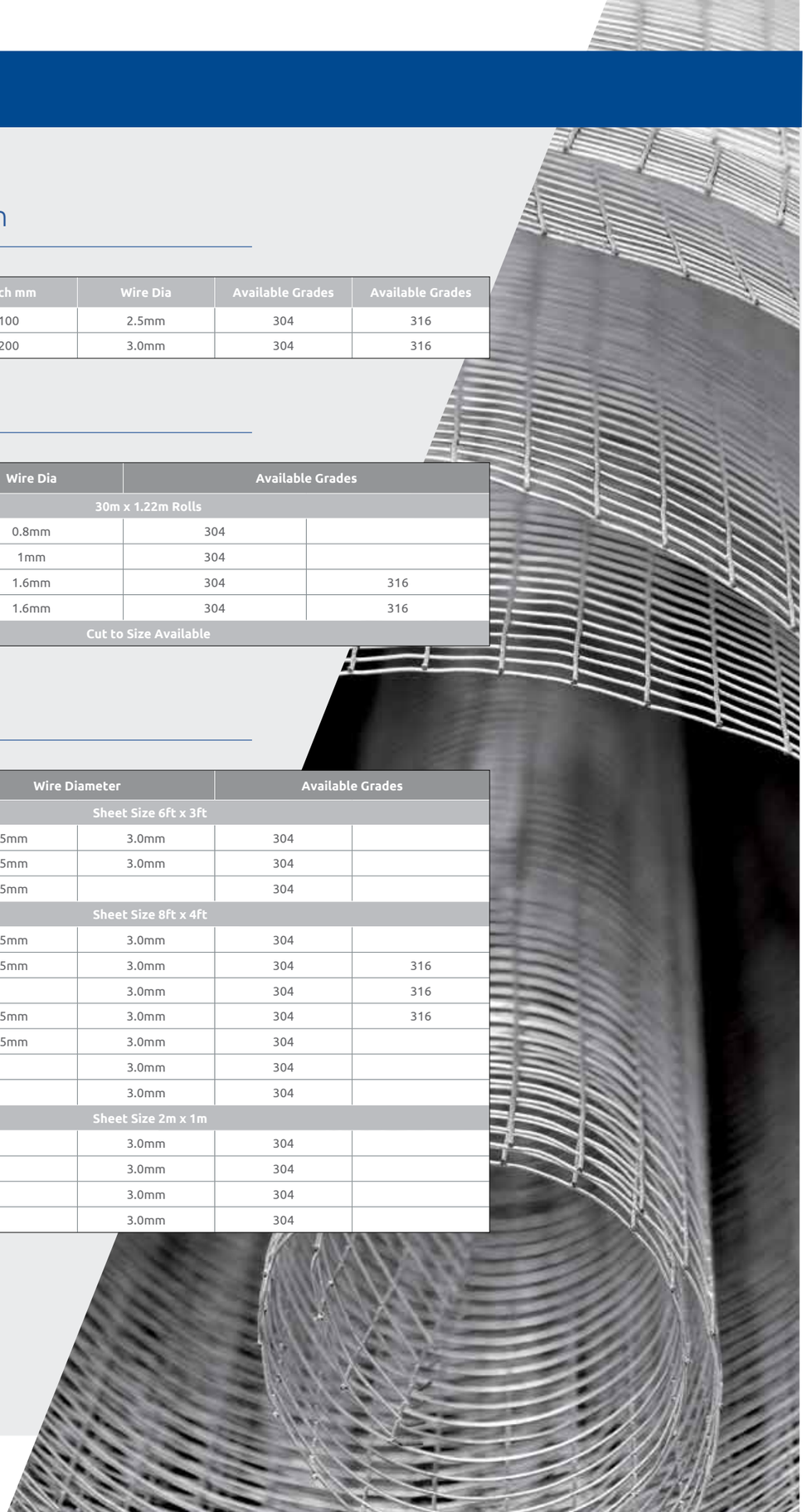
	Pitch mm	Wire Dia	Available Grades	Available Grades
D49	100	2.5mm	304	316
D98	200	3.0mm	304	316

Mesh on a Roll

Pitches	Wire Dia	Available Grades	
30m x 1.22m Rolls			
1/4" x 1/4"	0.8mm	304	
1/2" x 1/2"	1mm	304	
1/2" x 1/2"	1.6mm	304	316
1.0" x 1.0"	1.6mm	304	316
Cut to Size Available			

Mesh Sheets

Pitches	Wire Diameter		Available Grades	
Sheet Size 6ft x 3ft				
1.0" x 1.0"	2.5mm	3.0mm	304	
2.0" x 2.0"	2.5mm	3.0mm	304	
3.0" x 0.5"	2.5mm		304	
Sheet Size 8ft x 4ft				
0.5" x 0.5"	2.5mm	3.0mm	304	
1.0" x 1.0"	2.5mm	3.0mm	304	316
1.5" x 1.5"		3.0mm	304	316
2.0" x 2.0"	2.5mm	3.0mm	304	316
3.0" x 0.5"	2.5mm	3.0mm	304	
3.0" x 1.0"		3.0mm	304	
3.0" x 3.0"		3.0mm	304	
Sheet Size 2m x 1m				
33 x 33mm		3.0mm	304	
43 x 43mm		3.0mm	304	
53 x 53mm		3.0mm	304	
44 x 44mm		3.0mm	304	



Stainless UK

Notes:

Stainless UK
Newhall Road Works,
Newhall Road, Sheffield, S9 2QL

T: 0114 244 1333
F: 0114 244 1444
E: sales@stainless-uk.co.uk

www.stainless-uk.co.uk

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