stainless steel

PRODUCT HANDBOOK

copper nickel

Stirlings AUSTRALIA

Global Metals Distributor




Contact Details

Stirlings Australia Global Metals Distributor
Being the registered trading name for
Stirling Holdings Pty Ltd as trustee for
Stirling Metals Unit Trust.
ACN 009 215 409

Postal Address
PO Box 1462
Canning Vale,
Western Australia 6155

Street Address
Cnr Baile Road & Modal Crescent
Canning Vale,
Western Australia 6155

Contacting Us

Telephone	+61 8 9366 6700
Facsimile	+61 8 9366 6710
Regional Freecall	1800 810 105
E-Mail	sales@stirlingsaus.com.au
Website	www.stirlingsaustralia.com.au

Tasmania Operations
21 Greenbanks Road
Bridgewater,
Hobart 7030

Contacting Us

Telephone	+61 3 6262 6300
Fax	+61 3 6263 6590

Disclaimer
Whilst great care was taken in preparation of the data contained in this handbook, Stirlings Australia accepts no liability for the accuracy of information supplied, and should only be used as a guide only.

Terms and Conditions of Sale
A full copy of Stirlings Australia Conditions of Sale document is available on request.

Product Warrant
Stirlings Australia warrant the quality of our products. Warranty liability extends to the value of the product supplied or the replacement of only, at Stirlings' option. Stirlings' do not accept any claim for consequential loss.

Date: March 2010

Stirlings AUSTRALIA

value • quality • service

Introduction

Stirlings Australia is pleased to present this edition of our stainless steel handbook for your reference. The products and information detailed in this handbook is a result of nearly four decades of experience; specialising in the distribution of stainless steel products and servicing a wide range of industries including mining, mineral processing, energy production, oil & gas, chemical processing, boat building, construction and food production.

Supported by an established and reliable network of international manufacturers and suppliers, Stirlings Australia is committed to ultimate customer satisfaction and continual improvement. As a leading Australian supplier of high-quality products, we pride ourselves in our vision to provide all customers with excellent value, top quality products and outstanding service.

All the products featured in this handbook adhere to strict quality policies and procedure and are specifically stocked to cater for our customers' needs. Like our company, our stock is continually growing and improving so please check our website for updated product information or call any of our friendly service staff to enquire.

Table of Contents

Copper Nickel

Technical Data

Our Brand

Stirlings
AUSTRALIA
value • quality • service

Our brand is built not on the products we sell, but the people we service and the relationships we have with them. It is built on trust, reliability and commitment and it believes that there is such a thing as friendships in business and profits aren't everything. Our mission is to continually improve in understanding and providing for the needs of the people we serve and to commit ourselves to achieving our vision. And that's our promise to you, that we'll do our best to always offer you Excellent Value, Top Quality Products and Outstanding Service.

Our Vision

Stirlings Australia is driven by continuous improvement & strong customer focus, aiming to be a world leader in providing our customers with excellent value, top quality products & outstanding service.

Our Mission

To achieve our vision, our mission is to actively seek to satisfy and exceed the needs of the market and our customers. We exist to provide for the needs of our customers who we define as; our business partners, our stakeholders, our friends and our employees. We grow by creating and increasing the success of our customers. Stirlings Australia is steered by a well-integrated system of people, technology, and innovative business approaches. We strive to make doing business with us easy for every customer, near or far, big or small, new or old.

Our Strategies

To achieve that, Stirlings Australia believes in employing these strategies:

- Enabling the promise then Making the promise then Delivering the promise.
- Continuous research into industry needs, trends, evolution and future direction; and to actively seek new avenues for our products and services.
- Supporting the stainless steel, copper nickel and nickel alloy commodity in Australia in our business strategies.
- Steering operating performance using a concerted integration of proven systems – TQM & CRM.
- Building, Maintaining and Strengthening relationships with customers through CRM.
- Strategically seek joint venture opportunities, business alliances and cooperative projects.

Our Values

At Stirlings Australia we value:

- Our Promises to Our Customers
- Quality in Everything We Do
- Continuous Improvement and Innovation
- Creating Successful Customers
- Honesty, Integrity and Trust
- Relationships NOT Transactions
- Professionalism and Ethical Conduct
- Our Employees and Their Growth and Development

Our Company

Stirlings Australia is a privately owneddistributor stockist of stainless steel long, flat and fluid products, copper nickel fluid products and facilitator of value-added services.

Established in 1973 as Stirling Metals & in 1994 as "Stirlings Stainless Steel", we're recognised as a leading stockist for high quality stainless steel and copper nickel products. We're committed to providing innovative product and supply solutions to cater to each of our customer's needs.

Stirlings Australia's success has been a result of years of building strong relationships and expert understanding within industries we service. The main industries we supply to are; Architecture & Building, Food & Beverage, Marine and Shipbuilding, Resource & Construction.

As a continually improving and customer focused company, Stirlings Australia is driven by a well-integrated team, technology, and innovative business approaches. We strive to make doing business with us smooth for every customer, near or far, big or small, new or old. We believe in employing strategies such as enabling, making and delivering on promises. Most of all, we believe in our vision, aiming to be a world leader in providing our customers with excellent value, top quality products & outstanding service.

Products are sourced directly from an established and reliable global network of manufacturers and suppliers. Stirlings Australia is committed to continually improving supply relationships to better assist our customers. Equipped with some of the latest technologies in logistics and processing, our warehousing facilities allows us to provide for an even greater range of product needs and processing requirements.

Services provided to customers are comprehensive offers customers a single supply source through products ex-stock, trading, project packaging, in-house and sub-contractor processing, documentation and logistics.

All our products and services adhere to strict quality procedures and are specifically stocked and provided to cater for our customers' needs. Our management systems are accredited to ISO 9001 and the company and its employees are committed to Continuous Improvement to systems, products and services to our customers.

Service Brief

Stirlings Australia is committed to customer satisfaction and we cater our services to suit the needs of our customers:

BEFORE YOU ORDER

Before you order, Stirlings can provide you with any information you might need. Our salespeople are available from 7:30am to 5:00pm weekdays for commercial quotations, technical advice, catalogued data and market details.

WHEN YOU ORDER

Our expert staff will ensure that your order is delivered exactly to your specification. The following services are available to help us to serve you better:

Availability

This catalogue shows the lines we normally stock and the quantity in stock can be confirmed immediately by our sales department. Should an item be outside our range or out of stock, we will make every effort to obtain the product for you.

Handling

Stirlings has invested in the latest materials handling equipment for a better quality of handling within our warehouse. We have commissioned the latest racking, shelving, gantries, multi-directional forklift and accessories to ensure that product is stored and moved without damage, contamination and accidents.

Product Cutting

To suit customer requirements, Stirlings cut much of the product range to size. We have commissioned a large capacity bandsaw, cutting up to 380mm diameter for bar and pipe cutting and an inert media blade friction cutter for tubing.

We provide one of the best plasma cutting services in Australia. The plasma cuts very accurately in thicknesses ranging from 3mm to 50mm without dross, minimising wastage and increasing cost efficiencies that are passed on to our customers.

Machining

Stirlings offer basic machining of your stainless steel order via a machining contractor.

Packaging

Stirlings offer a comprehensive standard and enhanced packaging service to suit an specification (see below).

Certification

Stirlings offer certification of our stainless steel products at three levels:

- Letter of conformity

Confirming product type and grade.

- Material Certificate

Stating basic chemical mechanical and physical properties transferred exactly from the original certificate by our authorised officer.

- Original Mill Certificate

Being a copy of the original, is available strictly on application only, at the discretion of our Quality Manager.

DELIVERY

Stirlings offers delivery to any destination worlwide accessible by regular shipping port or airport. We pack daily for metropolitan, intrastate, interstate and international deliveries.

AFTER SALES SERVICE

Stirlings fully warrant the products and services supplied on each and every order. We guarantee that immediate attention will be given to any order where a customer experiences a problem with our service.

Packaging

To ensure your order arrives as you ordered it, our service includes order packaging. Through decades of dedicated experience, we understand the importance of correct packaging which we can offer for all of our products.

Product		Metro Delivery & Collects	Country & Interstate	International
Bar		Loose/Taped	Skid	Optional
	Boat Shafts	Boxed	Boxed	Optional
Coil		Pallet	Pallet	Optional
Sheet	Small qty	Loose	Pallet	Optional
	Large & Heavy qty	Pallet	Pallet	Optional
Plate	Small	Loose/Taped	Boxed or Pallet	Optional
	Large/Heavy	Pallet	Boxed or Pallet	Optional
Tube		Loose/Taped	Skid/Crate	Optional
All Fittings		Bagged/Boxed	Bagged/Boxed	Optional
Flanges		Bagged/Boxed	Bagged/Boxed	Optional
Fasteners		Bagged/Boxed	Bagged/Boxed	Optional
Valves		Bagged/Boxed	Bagged/Boxed	Optional

Project Supply

Stirlings Australia is a well established Australian supplier of stainless steel and copper nickel products to the construction and oil and gas industry supplying high quality products to these industries for over 30 years.

Supported by an established network of international manufacturers, suppliers, stockists and logistics companies, we are confident of our abilities to assist you in Indent and Project supply of:

304/L, 316/L, 321/H, N08904 (904L), 310S/H, Duplex S31803 (2205), Super Duplex S32750 and S32760 (2507), Alloy Steels, Nickel Based Alloys, Titanium, Copper (Cupro) Nickel 90/10 & 70/30, Aluminium, Brass (A179) and Carbon Steel.

With more than 30 years of experience, we pride ourselves in our reliability, understanding and service in Indent and Project supply. We understand the need to be flexible and our experience allows us to foresee and prepare for any further requirements for projects. Our expert team of professionals is dedicated to servicing these industries and is committed to the success of the industries and the companies that serve them.

Some projects and companies Stirlings Australia has proudly project-supplied to are:

> *Austal Ships, BHP Billiton/ WMC Olympic Dam, Kalgoorlie Nickel Smelter, Kwinana Nickel Refinery, Hismelt, Minara Resources, Joe White Maltings, Downer Energy, Dampier Salt, Woodside, Worsley Alumina, DRI/HBI, BP Refinery, Raventhorpe Nickel, Dyno Noble, Alcan Gove, AN CSBP, Stanwell Power Station, Caltex, TiWest, Dalby Ethanol Plant and many more...*

We continue to strive for continual improvement in our Indent and Project supply and are constantly searching for ways to improve our service in this area. Stirlings Australia is a customer-focused company committed to providing our customers with Top Quality Products, Excellent Value and Outstanding Service.

Stirlings Australia also specialises in Heat Exchanger Project Requirements:

Welded & Seamless Tubes, Plates and U-Tubes* in Stainless Steel Grades:
304/304L
316/316L
321/H
904L (N08904)
310S/H
Duplex 2205 (S31803)
Super Duplex 2507(S32750 + S32760)
Plus: Alloy Steels, Nickel Based Alloys, Titanium, Copper (Cupro) Nickel 91/10 & 70/30, Aluminium Brass (A179) and Carbon Steel.

*U-Tubes can be supplied bent to required bending specification and schedule.

For more information, contact our Project Specialists:

Gavin Murray
Sales Manager - Indent & Project Packaging
Direct: +61 8 9366 6760
Email: gavinm@stirlingsaus.com.au

Nathan McCracken
Sales Officer - Indent & Project Packaging
Direct: +61 8 9366 6772
Email: nathanm@stirlingsaus.com.au

Stainless Steel Project Supply Capabilities

BAR
- . ANGLE
- . FLAT
- . ROUND
- . SQUARE

FLANGES
- . TABLE -D
- . TABLE -E
- . TABLE –F
- . DIN

ANSI FLANGES
- . CLASS 150
- . CLASS 300
- . CLASS 600
- . CLASS 900
- . CLASS 1500
- . CLASS 2500

PLATE
- . 2205 DUPLEX
- . 2507 DUPLEX
- . 304/L
- . 304/H
- . 316/L
- . 253MA
- . 310S
- . N08904 (904L)
- . Plasma cutting services

PIPE
- . WELDED
- . SEAMLESS

HEAT EXCHANGER TUBES
- . WELDED
- . SEAMLESS
- . U-TUBES

PRESSURE FITTINGS - SOCKET-WELD AND NPT
- . 3000#
- . 6000#
- . 9000#

BUTT-WELD FITTINGS
- . WELDED
- . SEAMLESS

Materials and Grades:
304/L, 316/L, 321/H, N08904 (904L), 310S/H, Duplex S31803 (2205), Super Duplex S32750 and S32760 (2507), Alloy Steels, Nickel Based Alloys, Titanium, Copper (Cupro) Nickel 90/10 & 70/30, Aluminium, Brass (A179) and Carbon Steel.

Our Promise

Stirlings Australia's commitment to your project's success means we will work closely with you to offer 'door-to-door' service on your projects, while understanding the importance of efficiency, flexibility and reliability - getting it right the first time. Our established support network of customs and logistics companies allows us to offer EXW, DDP, FIS, CFR, CIF via Sea Frieght LCL & FCL, Air Freight and any other requirements your project may have. Supplied goods are packed as per client packing specifications to ensure all materials are delivered in good condition and on time.

Stainless Steel Catalogue

Stirlings

Stirlings AUSTRALIA

value • quality • service

Angle Bar

Manufactured to ASTM A276/484.
Inventory in Equal Angles only.
Hot Rolled Annealed and Pickled finish.
Ranges in thicknesses from 3mm to 10mm.
Lengths are a standard 6.0 metres.

Unequal angles and cold formed angles upon request.

Size (mm)	304	316	kg/metre
3 x 20 x 20	○	●	0.90
25 x 25	●	●	1.15
30 x 30	○	○	1.40
40 x 40	●	●	1.85
50 x 50	○	●	2.45
4 x 25 x 25	○	○	1.48
30 x 30	○	○	1.80
40 x 40	○	○	2.45
5 x 25 x 25	○	●	1.80
30 x 30	○	○	2.20
40 x 40	○	●	3.00
50 x 50	●	●	3.80

Size (mm)	304	316	kg/metre
6 x 25 x 25	○	●	2.20
30 x 30	○	○	2.90
40 x 40	●	●	3.55
50 x 50	●	●	4.50
65 x 65	●	●	5.95
75 x 75	●	●	7.00
100 x 100	●	●	9.90
8 x 50 x 50	○	○	6.00
65 x 65	○	○	7.87
75 x 75	○	●	9.30
10 x 75 x75	○	●	11.20
100 x 100	○	●	16.20

Channel Section

Manufactured to ASTM A276/484.
Hot Rolled Annealed Pickled finish and Cold Formed.

Lengths are standard 6.0m

Non standard size/grade channels can be formed from plate. Please enquire.

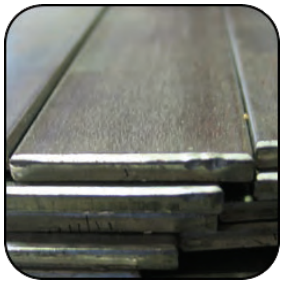
Thickness (T)	Web (W)	Leg (L)	316	kg/metre
3	40	20	○	1.61
3	50	25	○	2.09
5	80	40	●	5.53
6	100	50	●	8.34
6	130	65	○	11.19
6	150	75	○	13.08
10	200	100	○	28.44

● Stocked Item ○ Market Available

Flat Bar

Manufactured to ASTM A276/484.
Finished to a slit rolled edge.
HRAP market available.
Polished flat bar available in 240 grit finish.

Lengths
4 metres for flatbar 3mm to 5mm thick.
6 metres for flatbar 6mm to 12mm thick.
#240 grit architectural finish



Size (mm)	304/L	316/L	316 #240 Grit	kg/metre
3 x 12	○	●		0.28
3 x 20	○	●		0.47
3 x 25	●	●		0.59
3 x 30	○	●		0.70
3 x 40	○	●		0.94
3 x 50	●	●		1.18
5 x 20	●	○		0.78
5 x 25	●	●		0.98
5 x 30	○	●		1.18
5 x 40	●	●		1.57
5 x 50	●	●		1.97
5 x 65	●	○		2.56
5 x 75	●	●		2.95
5 x 100	○	●		4.15
6 x 12	○	○		0.56
6 x 20	○	○		0.94
6 x 25	●	●		1.18
6 x 30	○	●		1.41
6 x 40	●	●		1.89
6 x 50	●	●	●	2.36
6 x 65	○	●		3.07
6 x 75	●	●		3.54
6 x 100	●	●		4.73

Size (mm)	304/L	316/L	316 #240 Grit	kg/metre
8 x 50	○	●	●	3.15
8 x 65	○	○		4.10
8 x 75	○	●		4.73
8 x 100	○	○		6.31
10 x 20	○	○		1.57
10 x 25	●	●		1.97
10 x 30	○	○		2.36
10 x 40	○	●	●	3.15
10 x 50	●	●	●	3.94
10 x 65	○	●		5.12
10 x 75	●	●	●	5.91
10 x 100	●	●	●	7.88
12 x 25	○	○		2.36
12 x 40	○	○		3.78
12 x 50	○	●	●	4.73
12 x 65	○	○		6.15
12 x 75	○	●		7.09
12 x 100	○	●		9.46
20 x 100	○	○		15.70

● Stocked Item ○ Market Available

Round Bar

Manufactured to ASTM A276/484.
Available in the following:
3.18mm to 25.4mm - Cold drawn polished.
28.5mm to 34.9mm - Smooth turned and polished.
38.1mm to 101.6mm - Centreless ground.
101.6mm above - Peeled rough turned.
Lengths are a standard 6.0 metres.
Other grades available on request.

Size (mm)	304	316	630	253 MA	2205	kg/metre
3.18	○	●				0.06
3.97	○	○				0.09
4.76	●	●				0.14
5.00	○	○				0.15
5.54						0.19
6.00	○	●		●		0.22
6.35	●	●				0.25
7.94	●	●				0.39
8.00	●	○		●		0.39
9.52	●	●				0.56
10.00	○	●		●	●	0.61
11.11	○	○				0.76
12.00	●	●		●	○	0.89
12.70	○	●			●	0.99
14.29	○	○				1.26
15.88	●	●				1.56
16.00	○	●		●	●	1.58
19.05	○	●	○		○	2.24
20.00	●	●		●	●	2.47
22.00	○	○				2.99
22.22	○	●			○	3.05
24.00	○	●			○	3.56
25.00	○	○		●	○	3.86
25.40	●	●	○		●	3.99
28.58	○	○	○		○	5.05
30.00	○	●			○	5.57
31.75	○	●	○		●	6.23
34.93	○	●			○	7.55
35.00	○	○		○		7.58
38.10	○	●	○		○	8.98

Size (mm)	304	316	630	253 MA	2205	kg/metre
40.00	○	○		●	●	9.90
44.45	○	●			●	12.23
47.62		○				14.03
48.00						14.26
50.00	○	○		●	○	15.47
50.80	○	●	○		●	15.97
57.15	○	●	●		○	20.21
62.00						23.79
63.50	○	●	●		●	24.95
69.85	○	●	●		●	30.20
76.20	○	●	●		●	35.94
82.55	○	●	●		●	42.18
88.90	○	●	●		●	48.92
90.00						50.14
100.00						61.90
101.60	○	●	●		●	63.89
114.30	○	●				80.86
127.00	○	●			●	99.83
139.70					○	120.80
140.00					●	120.83
152.40	○	●			○	143.76
160.00					○	157.83
177.80		○				195.70
195.00					○	234.44
203.20		●			○	255.60
210.00					●	271.89
228.60		○				323.50
240.00					○	355.13
254.00		○			○	399.90

Boat Shaft Specialist

Stirlings Australia have a proven ability to source supply of boat shaft specific grades within the **Aqualoy** range. Boat shaft specialist : long length available, 316L, 2205,630.

Grades available include:
Aqualoy 17, 19, 22, and 22 High Strength.

● Stocked Item ○ Market Available

Square Bar

Manufactured to ASTM A276/484.
Cold drawn 6.0mm - 20mm.
Hot Rolled, Annealed and Pickled 20mm and above.
Lengths are available in 1m and 4m.

Size (mm)	316	kg/metre
6.00	○	0.25
6.35	●	0.31
9.52	●	0.71
10.00	○	0.78
12.00	○	1.13
12.70	●	1.27
15.88	●	1.98
16.00	○	2.01
19.05	●	2.85

Size (mm)	316	kg/metre
20.00	○	3.15
25.00	○	4.92
25.40	●	5.08
31.80	○	7.94
32.00	○	8.00
38.10	○	11.43
40.00	○	12.60
50.80	○	20.33

Hex Bar

Manufactured to ASTM A276/484.
Cold drawn 4.75 - 18.03mm (across the flat).
Hot Rolled, Annealed and Pickled 20.83mm and above (across the flat).
Lengths are 4 - 6 metre randoms

Market Available only. Price on application.

Size (mm)	316	kg/metre
4.75	○	0.15
6.35	○	0.27
8.23	○	0.46
11.18	○	0.85
13.34	○	1.21
15.27	○	1.59
18.03	○	2.21
20.83	○	2.96

Size (mm)	316	kg/metre
23.37	○	3.72
25.65	○	4.49
27.97	○	5.33
30.51	○	6.35
33.05	○	7.45
37.59	○	9.64
50.00	○	17.06
63.50	○	27.52

● Stocked Item ○ Market Available

Hollow Bar

Manufactured to ASTM A511.
Available in grade 316/316L only.
Cut to length.
Available in an improved machining grade.

Market available only, price on application.

O.D. (mm)	I.D. (mm)	Weight kg/metre
32	16	5.07
	20	4.20
36	16	6.78
	20	5.91
	25	4.55
40	20	7.83
	25	6.47
	28	5.49
45	20	10.5
	28	8.17
	32	6.7
50	25	12.1
	32	9.7
	36	8.01
56	28	15.2
	36	12.1
	40	10.2
63	32	19.0
	40	15.4
	50	9.9
71	36	24.1
	45	19.6
	56	12.9
80	40	30.9
	45	28.3
	50	25.3
	63	16.4
85	45	33.5
90	50	36.1
	63	27.1
	71	20.6
95	50	42.1
100	56	42.3
	71	32.7
	80	24.4

O.D. (mm)	I.D. (mm)	Weight kg/metre
106	56	52.1
	71	40.6
	80	32.3
112	63	55.3
	80	40.6
	90	30.2
118	63	64.2
	80	49.4
	90	39.0
125	71	68.5
	90	49.8
	100	38.3
132	71	79.7
	90	61.1
	106	42.0
140	80	85.2
	100	63.3
	112	47.8
150	80	101.0
	106	74.2
	125	47.4
160	112	85.8
	132	56.2
170	118	98.4
	140	63.8
180	125	110.0
	150	68.4
190	132	123.0
	160	73.0
200	140	134.0
	160	97.6
212	130	182.0
	170	109.0
224	140	199.0
	180	121.0

• Stocked Item ○ Market Available

Bar Product Technical Data

Angle Bar
Hot Finished to ASTM A276 / A484

Length of Leg	Length Tolerance
up to 150mm	± 3.0mm
over 150mm	± 5.0/-3.0mm

Flat Bar
Hot-finished (HRAP) to ASTM A276/484

Width (mm)	Thickness Tolerance (mm)			Width Tolerance (mm)
	3.2 to 13	over 13 to 25	over 25 to 50	
up to 25	± 0.20	± 0.25	-	± 0.40
over 25 to 50	± 0.30	± 0.40	± 0.80	± 0.80
over 50 to 100	± 0.40	± 0.50	± 0.80	+ 1.60 - 0.80
over 100 to 150	± 0.40	± 0.50	± 0.80	+ 2.40 - 1.60

Round Bar

		Typical Tolerance of Diameter (x)								
Nominal Diameter		6	7	8	9	10	11	12	13	14
Up to	3	0.006	0.010	0.014	0.025	0.040	0.060	0.100	0.140	0.250
Over	3 to 6	0.008	0.012	0.018	0.030	0.048	0.075	0.120	0.180	0.300
Over	6 to 10	0.009	0.015	0.022	0.036	0.058	0.090	0.150	0.220	0.360
Over	10 to 18	0.011	0.018	0.027	0.043	0.070	0.110	0.180	0.270	0.430
Over	18 to 30	0.013	0.021	0.033	0.052	0.084	0.130	0.210	0.330	0.520
Over	30 to 50	0.016	0.025	0.039	0.062	0.100	0.160	0.250	0.390	0.620
Over	50 to 80	0.019	0.030	0.046	0.074	0.120	0.190	0.300	0.460	0.740
Over	80 to 120	0.022	0.035	0.054	0.087	0.140	0.220	0.350	0.540	0.870
Over	120 to 180	0.025	0.040	0.063	0.100	0.160	0.250	0.400	0.630	1.000
Over	180 to 250	0.029	0.046	0.072	0.115	0.185	0.290	0.460	0.720	1.150
Over	250 to 315	0.032	0.052	0.081	0.130	0.210	0.320	0.520	0.810	1.300
Over	315 to 400	0.036	0.057	0.089	0.140	0.230	0.360	0.570	0.890	1.400
Over	400 to 500	0.040	0.063	0.097	0.155	0.250	0.400	0.630	0.970	1.550

h tolerance = (+0.0mm - x figure) ♦ j tolerance = (+ and -(x) figure) ♦ k tolerance = (+ x figure - 0.0mm)

e.g. Diameter tolerance is +0.0mm - 0.062mm for 38.1mm diameter round bar to h9 specification

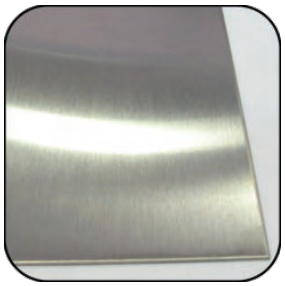
Square & Hexagonal Bar
Cold finished to ASTM A276 / A582 / A484

Specified Size (mm)	Size Tolerance (mm)
3.00 to less than 8.00	+ Nil, - 0.05
8.00 to less than 13.00	+ Nil, - 0.08
over 13.00 to 25.00	+ Nil, - 0.10
over 25.00 to 50.00	+ Nil, - 0.15
over 50.00 to 75.00	+ Nil, - 0.20
over 75.00	+ Nil, - 0.25

Sheet

Manufactured to ASTM A240/480.
Sheet finishes exclusive to Stirlings Australia
Matt Sheen - Cold rolled, smooth, dull grey sheen (2B).
Satin Polish - Linished belt polish to Stirlings' specification.
Ultra Polish (Mirror) - Mirror polished to Stirlings' specification.

Stirlings' sheets come protected with a PE (polyethylene) coating suitable for Laser cutting.



Thickness (mm)	Width (mm)	Length (mm)	304 Matt Sheen	304 Satin Polish	304 Bright Annealed	304 Ultra Polish	316 Matt Sheen	316 Satin Polish	2205 2B	Approx Weight (kg/ sheet)
0.45	900	1800	○							5.98
		2400	○	○						7.97
	1200/1219	1800	○				○			7.97
		2400	○	○			○			10.63
0.55	900	1800	○	○						7.30
		2400	○	○						9.75
	1200	1800	○	○			○			9.75
		2400	●	●			●	○		12.98
0.70	900	1800	○	○						9.30
		2400	○	○						12.39
	1200/1219	1800	○	○			○			12.39
		2400	●	●			●	○		16.53
		3000	○	○						16.70
0.80	1219	2438				●				19.49
0.90	750	2400								13.28
	900	1800		●			○	○		11.95
		2400	○	●						15.94
		3000	○	●						19.92
		3600	○	●						23.90
	1200/1219	1800	○	○			○			15.94
		2400	●	●	○		●	●		21.25
		3000	○	●			○			26.56
		3600	○	●						31.88
1.0	1219	2438				●				24.36
1.2	750	2400								17.71
		3000		●						22.14
	900	1800	●	●			○	○		15.94
		2400	○	●			○			21.25
		3000		●						26.56
		3600		●						31.88
	1200/1219	1800	○	○			○			21.59
		2400	●	●	○	●	●	●		28.78
		3000	●	●			●			35.98
		3600		●						43.18
	1500	2400		●						35.42
		3000	●	●			○			44.28
		3600		●						52.50

● Stocked Item ○ Market Available

Thickness (mm)	Width (mm)	Length (mm)	304 Matt Sheen	304 Satin Polish	304 Bright Annealed	304 Ultra Polish	316 Matt Sheen	316 Satin Polish	316 Ultra Polish	2205 2B	253MA	Approx Weight (kg/sheet)
1.50	900	1800	○	○								19.92
		2400	○	○								26.56
		3000		○								33.21
		3600	○	○								39.85
	1200/1219	2400	●	●	○	●						35.42
		3000	●	●								44.28
		3600		○								53.13
	1250	2500								○	○	38.43
	1500	2400	○	○								44.28
		3000	●	○								55.35
1.60	600	600	○				●					4.70
	900	1800					○					21.25
		2400					○					28.33
		3000										35.42
		3600										42.50
	1200	2400					●	●				37.78
		3000					●					47.23
		3600					○					56.67
	1500	2400					○					47.23
		3000					●	○				59.04
2.00	600	600	○				●					5.88
	900	1800	○	○			○					26.56
		2400	○	○			○					35.42
		3000	○									44.28
	1200	1800	○	○			○					35.42
		2400	●	●		●	●	●	○			47.23
		3000	●	●			●					59.04
	1250	2500								○	○	51.25
	1500	2400	○	○			○					59.04
		3000	●	○			●					73.80
	2000	3000									○	98.40
2.5	900	1800	○									29.22
		2400	○									44.28
	1200/1219	1800	○									44.28
		2400	●	○			●					59.04
		3000	○	○								73.80
	1500	3000	●	○			●					92.25
3.0	600	600	○				●					8.82
	900	1800	○				○					39.85
		2400	○				○					53.13
	1200/1219	1200	●	○			●					35.42
		1800	○	○			○					53.13
		2400	●	●			●	●				70.85
		2438							○			71.96
		3000	○				●					88.56
	1250	2500								○	○	76.87
	1500	3000	●	○			●			○		110.70
		6000	○				○			○	○	221.40
	2000	6000	●				●			○		295.20

Please refer to page 26 "Plate" for thicknesses 3.0mm to 50mm

● Stocked Item ○ Market Available

Sheet Finishes

Stirlings Australia offers a range of 'High Specification' sheet products, specifically developed for architectural, building, marine, food and hospitality industries.

Stirlings' sheet range provides finish options with all the benefits of stainless steel.

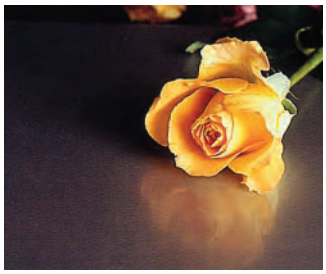
Pattern sheets also offer a great deal of benefits over normal sheet. Besides its high aesthetic appeal, it's increase in strength through the manufacturing process also means you can use thinner gauges (reducing weight) without sacrificing strength. It's also very resilient to damage, disguising scratches and dents as well as reducing maintenance costs. These feature make it great for use in:

- Bench tops
- Canopies
- Bar tops
- Splash backs
- Shop counters
- Food chutes
- Conveyors
- Lift doors
- Interior and exterior cladding

Ultra Polish stainless steel sheet has a highly reflective mirror finish. It makes a great substitute for glass mirror due to its lightweight, and inability to shatter. This makes it ideal for applications such as :

- Mirrors
- Lift Doors
- Interior and Exterior Cladding
- Displays
- Feature Panels

Call and have one of Stirlings' friendly sales teams show you the full range of our stainless steel sheets.



Matt Sheen

Satin Polish

Ultra Polish

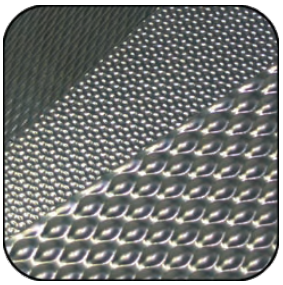
Pattern Sheet

Manufactured from ASTM A240/480 Sheet.
Number of finishes including:

Weave - Bright (Abrasive belt and bright finish).
- Satin (Smooth, moderately reflective finish).

Drops - Bright (Abrasive belt and bright finish).
- Satin (Smooth, moderately reflective finish).

Stirlings Australia can also source a wide range of patterned sheets and other finishes for your project (Etched, Acid Etched, Embossed, Mirror, Stained, Coloured, Glass bead etc)



Thickness (mm)	Size (mm)	Weight kg/m²	304 Bright Weave	304 Satin Weave	304 Bright Drops	304 Satin Drops
0.7	1200 x 3000	5.72	○	○	○	○
0.8	1219 x 2438	6.54				
0.9	1200 x 2400	7.36	○	○	○	○
	1200 x 3000	7.36	○	○		
	1200 x 3600	7.36	○			
1.2	1200 x 2400	9.81	○	○	○	
	1219 x 2438	9.81				
	1200 x 3000	9.81	○	○	○	○
	1219 x 3048	9.8				
	1200 x 1600	9.81	○	○	○	○
	1219 x 3658	9.81				
1.5/1.6	1200 x 2400	13.08	○	○	○	○
	1219 x 2438	13.08				
	1200 x 3000	13.08	○	○	○	○
2.0	1200 x 2400	16.35	○	○	○	○
	1200 x 3000	16.35	○	○	○	○
3.0	1219 x 2438	24.53				
4.0	1219 x 2438	32.71				
	1500 x 3000	32.71				
5.0	1500 x 3000	41.0				
6.0	1500 x 3000	49.2				

• Stocked Item ○ Market Available

Coil

Manufactured to ASTM A240/480.
Finished to No. 4 or 2B.
Coil weights approx 1250kg for grade 304 No. 4.
Available through our world wide range of suppliers and stockists.

Thickness		Width	Weight	304/304L	304/304L	316/316L	316/316L
Gauge	mm		kg/m²	2B	No.4 PVC	2B	No.4 PVC
24	0.55	900/915	4.44	○	○	○	
		1200/1219		●	○	○	
22	0.70	900/915	5.65	○	○	○	
		1200/1219		○	○		
20	0.90	900/915	7.26	○	●	○	
		1200/1219		○	●	○	
18	1.2	750			●		
		900/915	9.68	○	●	○	
		1200/1219		○	●	○	○
		1500/1524		○	●	○	
16	1.5/1.6	900/915	12.91	○	●	○	
		1200/1219		●	●	●	○
		1500/1524		○	○	●	
14	2.0	1200/1219	16.14	●	○	●	
		1500/1524		○	○	●	
12	2.5	1200/1219	20.18	●	○	○	
		1500/1524		○	○	○	
10	3.0	1200/1219	24.21	●	○	○	
		1500/1524		○		○	

● Stocked Item ○ Market Available

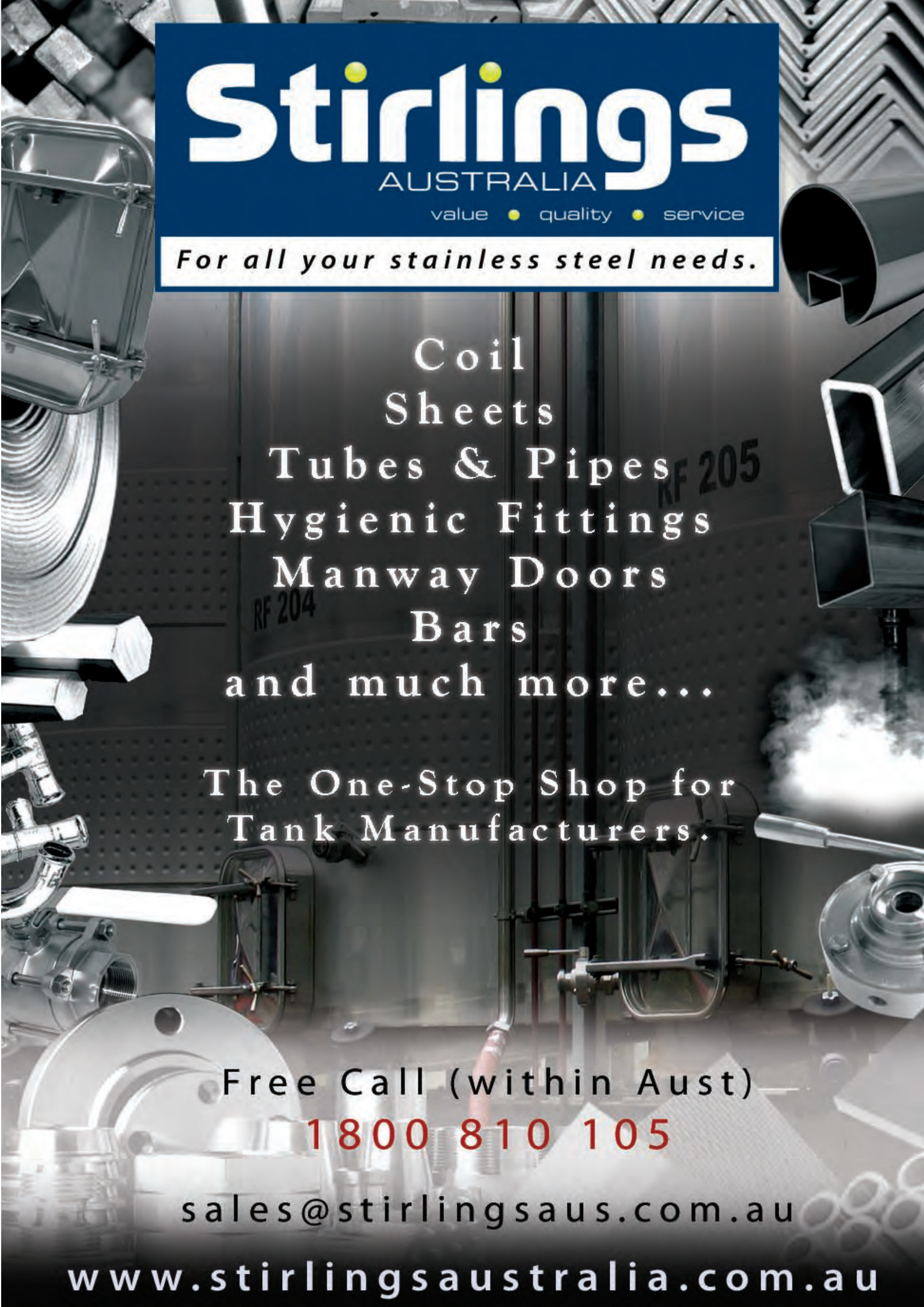

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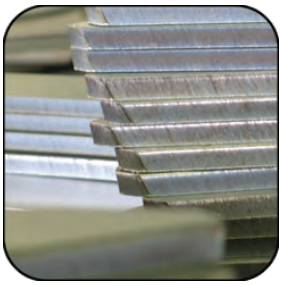
Plate

Manufactured to ASTM A240/480.
Finished No.1, Hot Rolled Annealed and Pickled (HRAP).
Finished 2B in some sizes.
Cut to size and shape as required.
Alternative sizes and grades available upon request.



Thickness	Width	Length	Weight kg/m²	Kg Per Plate	304/ 304L	304/ 304H	316/ 316L	253MA	Duplex 2205	Super Duplex 2507	904L
3.0	1500	3000	24.60	110.70	●		●				
	1500	6000	24.60	221.40	●	○	○			●	
	2000	6000	24.60	295.20	●	○	●	●	●		●
4.0	1500	3000	32.80	147.60	●		●				
	1500	6000	32.80	295.20	●	○	●				
	2000	6000	32.80	393.60	●	○	●				
5.0	1500	3000	41.00	184.50	●		●				
	1500	6000	41.00	369.00	●	○	●	●	●	●	
	2000	6000	41.00	492.00	●	○	●				
6.0	1500	3000	49.20	221.40	●		●				
	1500	6000	49.20	442.80	●	○	●	●	●	●	
	2000	6000	49.20	590.40	●	○	●				
8.0	1500	3000	65.60	295.20	●		●				
	1500	6000	65.60	590.40	●	○	●				
	2000	6000	65.60	787.20	●	○	●	●	●	●	
10.0	1500	3000	82.00	369.00	●		●				
	1500	6000	82.00	738.00	●	○	●				
	2000	6000	82.00	984.00	●	○	●	●	●	●	
12.0	1500	6000	98.40	885.60	○	○	○				
	2000	6000	98.40	1180.80	●	○	●	●	●	●	
13.0	1500	6000	106.60	959.40	○	○	○				
	2000	6000	106.60	1279.20	○	○	●				
16.0	1500	6000	131.20	1180.80	○	○	○				
	2000	6000	131.20	1574.40	●	○	●	●	●	●	
20.0	1500	6000	164.00	1476.00	○	○	○				
	2000	6000	164.00	1968.00	●	○	●	●	●	●	
25.0	1500	6000	205.00	1845.00	○	○	○				
	2000	6000	205.00	2460.00	●	○	●	●	●	●	
32.0	2000	4000	264.40	2115.20	○		○		●	●	
	2000	6000	264.40	3148.80	●	○	●				
40.0	2000	4000	328.00	2624.00					●		
	2000	6000	328.00	3936.00	○	○	●				
50.0	2000	4000	408.50	3268.00					●		
	2000	6000	408.50	4902.00			●				

● Stocked Item ○ Market Available

plate processing

Services

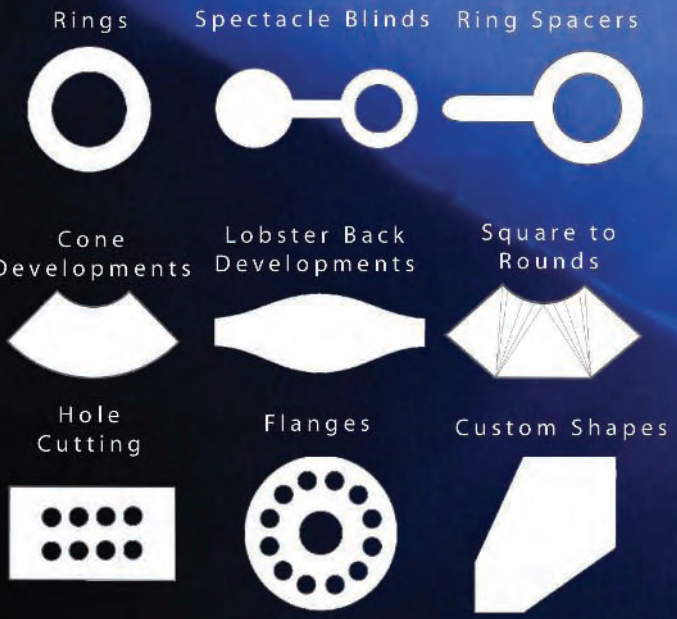
High Definition Plasma cutting service for plate 3mm to 50mm:

- Quality in-house facility
- Design Development
- Nesting
- Estimating
- DXF file communication
- Quality edge and part finish
- Prompt and reliable service

Other Services:

Stirlings Australia can also arrange water cutting, laser cutting, and guillotine plate processing, as well as pressing, machining and drilling as part of our service.

Example of plasma cut shapes



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Pipe - Seamless & Welded

Manufactured to ASTM A312/530
Welded pipe: Annealed, pickled and descaled.
Seamless pipe: 40nb and smaller is cold finished.
Seamless pipe: 50nb and larger is hot finished.
Lengths 6.0 metres.

Duplex (2205) pipe manufactured to ASTM A790
Welded S31803

Schedule - Nominal bore			Size			Welded			Seamless		Weight
	Imp	mm	O.D.	wt	I.D	304/L	316/L	2205	316/L	2205	kg/m
10 S	¼	8	13.72	1.65	10.42		○		○		0.48
	⅜	10	17.15	1.65	13.85		○		○		0.64
	½	15	21.34	2.11	17.12	●	●	○	○		1.01
	¾	20	26.70	2.11	22.48	●	●	○	○		1.30
	1	25	33.40	2.77	27.86	●	●	○	●	○	2.12
	1¼	32	42.16	2.77	36.62	●	●	○	●		2.73
	1½	40	48.26	2.77	42.72	●	●	○	●	○	3.15
	2	50	60.33	2.77	54.79	●	●	●	●	○	3.98
	2½	65	73.03	3.05	66.93	●	●	○	○		5.34
	3	80	88.90	3.05	82.80	●	●	●	●	○	6.54
	3½	90	101.60	3.05	95.50	○	○	○	○		7.52
	4	100	114.30	3.05	108.20	●	●	●	●	○	8.48
	5	125	141.30	3.40	134.50	●	●	●	○		11.74
	6	150	168.30	3.40	161.50	●	●	●	○		14.04
	8	200	219.08	3.76	211.56	●	●	●			20.25
	10	250	273.05	4.19	264.67	●	●	●			28.20
	12	300	323.85	4.57	314.71	●	●	●			36.53
	14	350	355.60	4.78	346.44	○	●	○			41.92
	16	400	406.40	4.78	396.84	○	●	○			47.99
	18	450	457.20	4.78	447.64	○	●	○			54.06
	20	500	508.00	5.53	496.94	○	●				69.62
	22	550	558.80	5.53	547.74	○	○				76.66
	24	600	609.60	6.35	596.90	○	●				95.86
40 S	¼	8	13.72	2.24	9.24	○	●		○		0.64
	⅜	10	17.15	2.31	12.53	○	●		○		0.86
	½	15	21.34	2.77	15.80	●	●	○	●	○	1.29
	¾	20	26.70	2.87	20.96	●	●	○	●	○	1.71
	1	25	33.40	3.38	26.64	●	●	○	●	○	2.54
	1¼	32	42.16	3.56	35.04	○	●	○	●		3.43
	1½	40	48.26	3.68	40.90	●	●	○	●	○	4.11
	2	50	60.33	3.91	52.51	●	●	○	●	○	5.52
	2½	65	73.03	5.16	62.71	●	●	○	●		8.76
	3	80	88.90	5.49	77.92	●	●	○	●	○	11.45
	3½	90	101.60	5.74	90.12	○	●	○			13.77
	4	100	114.30	6.02	102.26	●	●	○	●		16.31
	5	125	141.30	6.55	128.20	○	●	○	○		22.10
	6	150	168.30	7.11	154.08	●	●	○	○		28.68
	8	200	219.08	8.18	202.72	●	●	○	○		43.16
	10	250	273.05	9.27	254.51	●	●	○	○		61.20
	12	300	323.85	9.53	304.79	○	●	○	○		74.92
	14	350	355.60	9.53	336.54	○	○	○	○		81.33
	16	400	406.40	9.53	387.34	○	○	○			93.27
	18	450	457.20	9.53	438.14	○	●	○			105.16
	20	500	508.00	9.53	488.94	○	●				117.15
	22	550	558.80	9.53	539.74	○	○				129.13
	24	600	609.60	9.53	590.54	○	●				141.13

● Stocked Item ○ Market Available

Pipe - Seamless & Welded

Manufactured to ASTM A312/530
Welded pipe: Annealed, pickled and descaled.
Seamless pipe: 40nb and smaller is cold finished.
Seamless pipe: 50nb and larger is hot finished.
Lengths 6.0 metres.

Duplex (2205) pipe manufactured to ASTM A790
Welded S31803

Schedule - Nominal bore			Size			Welded			Seamless		Weight
	Imp	mm	O.D.	wt	I.D	304/L	316/L	2205	316/L	2205	kg/m
80 S	¼	8	13.72	3.02	7.68				○		0.81
	⅜	10	17.15	3.20	10.75				○		1.12
	½	15	21.34	3.73	13.88				●		1.64
	¾	20	26.70	3.91	18.88				●		2.23
	1	25	33.40	4.55	24.30				●		3.28
	1¼	32	42.16	4.85	32.46				●		4.53
	1½	40	48.26	5.08	38.10				●		5.49
	2	50	60.33	5.54	49.25				●		7.59
	2½	65	73.03	7.01	59.01				●		11.58
	3	80	88.90	7.62	73.66				●		15.50
	3½	90	101.60	8.08	85.44				○		18.90
	4	100	114.30	8.56	97.18				●		22.65
	5	125	141.30	9.52	122.26				●		31.41
	6	150	168.30	10.97	146.36				●		43.19
	8	200	219.08	12.70	193.68				●		65.59
	10	250	273.05	12.70	247.65						81.55
	12	300	323.85	12.70	298.45						97.46
	14	350	355.60	12.70	330.20						107.39
	16	400	406.40	12.70	381.00						123.30
	18	450	457.20	12.70	431.80						139.15
	20	500	508.00	12.70	482.60						155.12
	22	550	558.80	12.70	533.40						171.09
	24	600	609.60	12.70	584.20						187.06
160	½	15	21.34	4.78	11.78				●		1.98
	¾	20	26.70	5.56	15.58				●		2.94
	1	25	33.40	6.35	20.70				●		4.30
	1¼	32	42.16	6.35	29.46				○		5.69
	1½	40	48.26	7.14	33.98				●		7.34
	2	50	60.33	8.74	42.85				●		11.28
	2½	65	73.03	9.53	53.97				○		15.14
	3	80	88.90	11.13	66.64				○		21.65
	4	100	114.30	13.49	87.32				○		34.02
	5	125	141.30	15.88	109.54						49.83
	6	150	168.30	18.26	131.78						68.56
	8	200	219.08	23.01	173.06						112.90
	10	250	273.05	28.58	215.89						174.82
	12	300	323.85	33.32	257.21						242.28
	14	350	355.60	35.71	284.18						285.88
	16	400	406.40	40.49	325.42						370.73
	18	450	457.20	45.24	366.72						466.35
	20	500	508.00	50.01	407.98						573.18
	22	550	558.80	53.98	450.02						681.82
	24	600	609.60	59.54	490.52						819.55

● Stocked Item ○ Market Available

Pipe Technical Data - Seamless & Welded

Barlows Formula:

Bursting Pressures: $P = \frac{2 \times S \times t}{D}$

P = Pressure Rating (MPa)
S = Minimum tensile strength (MPa) (S = 517MPa)
t = Wall Thickness (mm)
D = Outside Diameter of Pipe (mm)

Nominal Working Pressures: Figures Shown in tables are nominal working pressures for seamless pipe under constant operating conditions. Where pressures or temperature fluctuations occur, increased safety factors should be adopted. Listed are factors of safety recommended for varying pressure conditions.

Apply
- 5 to bursting pressure for no pressure fluctuations.
- 8 to bursting pressure for small/regular pressure fluctuations.
- 12 to bursting pressure for small/regular fluctuations.

Note: The figures given for nominal working pressures and factor of safety are for quick reference purposes only. Detailed design calculations should be in accordance with the applicable design standard.

Stainless Steel Pipe
Nominal Working Pressure Chart - General Austenitic Grades
(This chart based on a nominal safety factor of 4 and applies to seamless pipe only)

Nominal Bore Size		Schedule 10S								Schedule 40S								Schedule 80S							
		Temperature °C																							
mm	In	50	100	150	200	250	300	350	400	50	100	150	200	250	300	350	400	50	100	150	200	250	300	350	400
6	⅛	30.1	26.8	23.4	21.7	20.2	19.2	18.5	17.9	42.1	37.3	32.6	30.3	28.2	26.7	25.9	25.0	58.6	52.0	45.5	42.2	39.3	37.3	36.0	34.8
8	¼	30.1	26.8	23.4	21.7	20.2	19.2	18.5	17.9	40.9	36.3	31.8	29.5	27.5	26.0	25.2	24.3	55.2	49.0	42.8	39.7	37.0	35.1	33.9	32.8
10	⅜	24.1	21.4	18.7	17.4	16.2	15.4	14.9	14.4	33.8	30.0	26.2	24.3	22.7	21.5	20.8	20.1	46.8	41.6	36.4	33.7	31.4	29.8	28.8	27.8
15	½	24.8	22.0	19.2	17.9	16.6	15.8	15.3	14.7	32.5	28.9	25.3	23.4	21.8	20.7	20.0	19.3	43.8	38.9	34.0	31.6	29.4	27.9	27.0	26.0
20	¾	19.8	17.6	15.4	14.2	13.3	12.6	12.2	11.8	26.9	23.9	20.9	19.4	18.1	17.1	16.6	16.0	36.6	32.5	28.4	26.4	24.6	23.3	22.6	21.8
25	1	20.8	18.4	16.1	14.9	13.9	13.2	12.8	12.3	25.3	22.5	19.7	18.2	17.0	16.1	15.6	15.1	34.1	30.3	26.5	24.6	22.9	21.7	21.0	20.3
32	1¼	16.4	14.6	12.8	11.8	11.0	10.5	10.1	9.8	21.1	18.7	16.4	15.2	14.2	13.4	13.0	12.5	28.8	25.5	22.3	20.7	19.3	18.3	17.7	17.1
40	1½	14.4	12.7	11.1	10.3	9.6	9.1	8.8	8.5	19.1	16.9	14.8	13.7	12.8	12.1	11.7	11.3	26.3	23.4	20.4	19.0	17.7	16.7	16.2	15.6
50	2	11.5	10.2	8.9	8.3	7.7	7.3	7.1	6.8	16.2	14.4	12.6	11.7	10.9	10.3	10.0	9.6	23.0	20.4	17.8	16.6	15.4	14.6	14.1	13.7
65	2½	10.5	9.3	8.1	7.5	7.0	6.7	6.4	6.2	17.7	15.7	13.7	12.7	11.9	11.3	10.9	10.5	24.0	21.3	18.7	17.3	16.1	15.3	14.8	14.3
80	3	8.6	7.6	6.7	6.2	5.8	5.5	5.3	5.1	15.5	13.7	12.0	11.1	10.4	9.8	9.5	9.2	21.5	19.1	16.7	15.5	14.4	13.7	13.2	12.8
90	3½	7.5	6.7	5.8	5.4	5.0	4.8	4.6	4.5	14.1	12.6	11.0	10.2	9.5	9.0	8.7	8.4	19.9	17.7	15.4	14.3	13.4	12.7	12.2	11.8
100	4	6.7	5.9	5.2	4.8	4.5	4.2	4.1	4.0	13.2	11.7	10.2	9.5	8.8	8.4	8.1	7.8	18.7	16.6	14.5	13.5	12.6	11.9	11.5	11.1
125	5	6.0	5.3	4.7	4.3	4.0	3.8	3.7	3.6	11.6	10.3	9.0	8.4	7.8	7.4	7.1	6.9	16.9	15.0	13.1	12.2	11.3	10.7	10.4	10.0
150	6	5.1	4.5	3.9	3.6	3.4	3.2	3.1	3.0	10.6	9.4	8.2	7.6	7.1	6.7	6.5	6.3	16.3	14.5	12.7	11.7	11.0	10.4	10.0	9.7
200	8	4.3	3.8	3.3	3.1	2.9	2.7	2.6	2.6	9.3	8.3	7.3	6.7	6.3	5.9	5.7	5.6	14.5	12.9	11.3	10.4	9.7	9.2	8.9	8.6
250	10	3.8	3.4	3.0	2.8	2.6	2.4	2.4	2.3	8.5	7.5	6.6	6.1	5.7	5.4	5.2	5.0	11.6	10.3	9.0	8.4	7.8	7.4	7.2	6.9
300	12	3.5	3.1	2.7	2.5	2.4	2.2	2.2	2.1	7.4	6.5	5.7	5.3	4.9	4.7	4.5	4.4	9.8	8.7	7.6	7.1	6.6	6.2	6.0	5.8

Note: Nominal working pressures are shown in MPa
Nominal working pressures for welded pipe can be calculated by multiplying the figure in the tables by 0.85 (weld joint efficiency factor).

Buttweld Pipe Fittings

Manufactured to ASTM A403 WP-W ANSI B16.9
Welded construction
Finished pickled

Duplex (2205) Buttweld Fittings manufactured to A815
Seamless and Welded S31803

* Seamless now available from stock, ASTM A403 WP-S.





Schedule - Nominal Bore			90º Elbows - L.Radius			S. Radius	45º Elbows		Equal Tee		Stub End-B		Cap
	Imp	mm	304L	316L	2205	316	304L	316L	304L	316L	304L	316L	316L
10S	½	15	○	●			○	○	○	●	○	○	○
	¾	20	○	●			○	○	○	●	○	○	○
	1	25	○	● *			○	●	○	● *	○	●	●
	1¼	32	○	●			○	●	○	●	○	○	●
	1½	40	●	● *			○	●	○	● *	○	●	●
	2	50	●	● *	● *	●	○	●	○	● *	○	●	●
	2½	65	○	● *			○	●	○	● *	○	●	○
	3	80	●	● *	● *	●	○	●	○	● *	○	●	●
	4	100	●	● *	● *	●	○	●	○	● *	○	●	●
	5	125	○	●	●		○	○	○	●	○	●	○
	6	150	●	●	●	●	○	●	○	●	○	●	●
	8	200	○	●	●	●	○	●	○	●	○	●	○
	10	250	○	●	●		○	○	○	●	○	○	○
	12	300	○	●	●		○	○	○	○	○	○	○
	14	350	○	○			○	○	○	○	○	○	○
40S	½	15	○	● *			○	○	○	● *	○	○	○
	¾	20	○	● *			○	○	○	● *	○	○	○
	1	25	●	● *			○	●	○	● *	○	○	●
	1¼	32	●	●			○	●	○	●	○	○	●
	1½	40	●	● *			○	●	○	● *	○	○	●
	2	50	●	● *		●	○	●	○	● *	○	○	●
	2½	65	○	● *			○	●	○	● *	○	○	●
	3	80	●	● *		●	○	●	○	● *	○	○	●
	4	100	○	● *		●	○	●	○	● *	○	○	○
	5	125	○	●			○	○	○	●	○	○	○
	6	150	○	●		●	○	●	○	●	○	○	○
	8	200	○	●			○	○	○	○	○	○	○
	10	250	○	○			○	○	○	○	○	○	○
	12	300	○	○			○	○	○	○	○	○	○
	14	350	○	○			○	○	○	○	○	○	○
80S Smls	½	15	○	● *			○	○	○	● *	○	○	○
	¾	20	○	● *			○	○	○	● *	○	○	○
	1	25	○	● *			○	○	○	● *	○	○	○
	1¼	32	○	○			○	○	○	○	○	○	○
	1½	40	○	● *			○	○	○	● *	○	○	○
	2	50	○	● *			○	○	○	● *	○	○	○
	2½	65	○	● *			○	○	○	● *	○	○	○
	3	80	○	● *			○	○	○	● *	○	○	○
	4	100	○	● *			○	○	○	○	○	○	○
	5	125	○	○			○	○	○	○	○	○	○
	6	150	○	○			○	○	○	○	○	○	○
	8	200	○	○			○	○	○	○	○	○	○
	10	250	○	○			○	○	○	○	○	○	○
	12	300	○	○			○	○	○	○	○	○	○
	14	350	○	○			○	○	○	○	○	○	○

● Stocked Item ○ Market Available

Reducing Buttweld Pipe Fittings

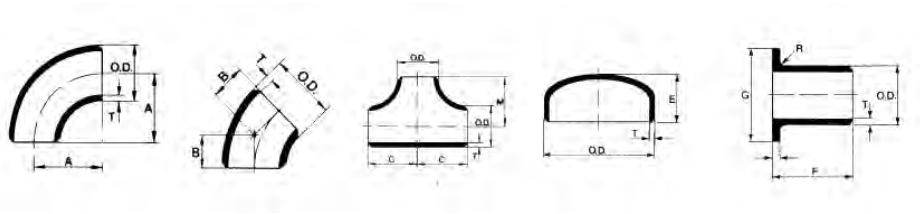
Manufactured to ASTM A403 WP-W ANSI B16.9
Welded construction
Finished pickled

* Seamless now available from stock, ASTM A403 WP-S.

ReSize - Nominal Bore				Concentric Reducer			Eccentric Reducer		Reducing Tee	
Imp	mm	304L Sch 10	304L Sch 40	316L Sch 10	316L Sch 40	316L Sch 80 Smls	316L Sch 10	316L Sch 40	316L Sch 10	316L Sch 40
¾ x ½	20 x 15	○	○	●						
1 x ½	25 x 15	○	○	●	●		○	○	○	○
1 x ¾	25 x 20	○	○	●	●		○	○	○	○
1¼ x 1	32 x 25	○	○	●	●					
1½ x 1	40 x 25	○	○	● *	● *	● *	○	○	●	●
1½ x 1¼	40 x 32	○	○	●	●					
2 x 1	50 x 25	○	○	● *	● *	● *	○	○	●	●
2 x 1½	50 x 40	○	○	● *	● *	● *	○	○	●	●
2½ x 1½	65 x 40	○	○	● *	● *	● *				
2½ x 2	65 x 50	○	○	● *	● *	● *	○	○	○	○
3 x 1½	80 x 40	○	○	● *	○ *	● *	○	○	●	●
3 x 2	80 x 50	○	○	● *	● *	● *	○	○	●	●
3 x 2½	80 x 65	○	○	● *	● *	● *				
4 x 2	100 x 50	○	○	● *	● *	● *	○	○	●	●
4 x 2½	100 x 65	○	○	●	○		○	○	○	○
4 x 3	100 x 80	○	○	● *	● *	● *	○	○	●	●
5 x 4	125 x 100	○	○	●	○					
6 x 3	150 x 80	○	○	●	●		○	○	●	○
6 x 4	150 x 100	○	○	●	●		○	○	●	○
6 x 5	150 x 125	○	○	●	●					
8 x 4	200 x 100	○	○	●	○				●	
8 x 6	200 x 150	○	○	●	○		○	○	●	○
10 x 4	250 x 100	○	○	○	○					
10 x 6	250 x 150	○	○	●	○		○	○	○	○
10 x 8	250 x 200	○	○	●	○					
12 x 8	300 x 200	○	○	●	○		○	○	○	○
12 x 10	300 x 250	○	○	○	○					

● Stocked Item ○ Market Available

Buttweld Pipe Fittings Technical Data



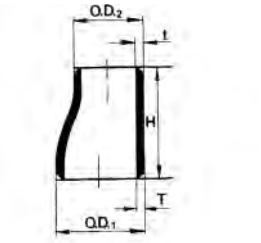
Size	N.B.				90° Elbow		45° Elbow		Equal Tee		Cap		Stub End		
Imp	mm	Sch	O.D.	Wt	A	Wgt	B	Wgt	C/M	Wgt	E	Wgt	F	G	Wgt
½	15	10 S	21.3	2.11	38.1	0.06	15.9	0.03	25.4	0.09	25.4	0.03	50.8	34.9	0.07
		40 S	21.3	2.77	38.1	0.08	15.9	0.04	25.4	0.16	25.4	0.04	50.8	34.9	0.09
		80 S	21.3	3.73	38.1	0.10	15.9	0.05	25.4	0.25	25.4	0.05	50.8	34.9	-
¾	20	10 S	26.7	2.77	28.6	0.07	11.1	0.035	28.6	0.11	25.4	0.05	50.8	42.9	0.10
		40 S	26.7	2.87	28.6	0.09	11.1	0.045	28.6	0.23	25.4	0.06	50.8	42.9	0.12
		80 S	26.7	3.91	28.6	0.11	11.1	0.055	28.6	0.38	25.4	0.09	50.8	42.9	-
1	25	10 S	33.4	2.77	38.1	0.14	22.2	0.07	38.1	0.27	38.1	0.09	50.8	50.8	0.16
		40 S	33.4	3.38	38.1	0.16	22.2	0.08	38.1	0.35	38.1	0.10	50.8	50.8	0.17
		80 S	33.4	4.55	38.1	0.20	22.2	0.10	38.1	0.50	38.1	0.13	50.8	50.8	-
1¼	32	10 S	42.2	2.77	47.6	0.23	25.4	0.12	47.6	0.45	38.1	0.13	50.8	63.5	0.22
		40 S	42.2	3.56	47.6	0.25	25.4	0.13	47.6	0.65	38.1	0.17	50.8	63.5	0.25
		80 S	42.2	4.85	47.6	0.35	25.4	0.175	47.6	0.90	38.1	0.19	50.8	63.5	-
1½	40	10 S	48.3	2.77	57.2	0.31	28.6	0.15	57.2	0.65	38.1	0.14	50.8	73.0	0.25
		40 S	48.3	3.68	57.2	0.40	28.6	0.20	57.2	0.88	38.1	0.20	50.8	73.0	0.31
		80 S	48.3	5.08	57.2	0.55	28.6	0.275	57.2	1.50	38.1	0.23	50.8	73.0	-
2	50	10 S	60.3	3.05	76.2	0.51	34.9	0.25	63.5	0.90	38.1	0.17	63.5	92.1	0.43
		40 S	60.3	3.91	76.2	0.71	34.9	0.35	63.5	1.10	38.1	0.27	63.5	92.1	0.61
		80 S	60.3	5.54	76.2	0.95	34.9	0.475	63.5	2.15	38.1	0.30	63.5	92.1	-
2½	65	10 S	73.0	3.05	95.3	0.85	44.5	0.43	76.2	1.10	38.1	0.25	63.5	104.8	0.57
		40 S	73.0	5.16	95.3	1.36	44.5	0.70	76.2	1.70	38.1	0.35	63.5	104.8	0.80
		80 S	73.0	7.01	95.3	1.50	44.5	0.75	76.2	3.00	38.1	0.45	63.5	104.8	-
3	80	10 S	88.9	3.05	114.3	1.22	50.8	0.63	85.7	1.40	50.8	0.40	63.5	127.0	0.73
		40 S	88.9	5.49	114.3	2.18	50.8	1.25	85.7	1.90	50.8	0.71	63.5	127.0	1.13
		80 S	88.9	7.62	114.3	2.90	50.8	1.45	85.7	3.80	50.8	0.85	63.5	127.0	-
4	100	10 S	114.3	3.05	152.4	2.15	63.5	1.10	104.8	2.15	63.5	0.65	76.2	157.2	1.09
		40 S	114.3	6.02	152.4	4.17	63.5	2.00	104.8	4.15	63.5	1.22	76.2	157.2	1.87
		80 S	114.3	8.56	152.4	6.00	63.5	3.00	104.8	7.65	63.5	1.60	76.2	157.2	-
5	125	10 S	141.3	3.40	190.5	3.63	79.2	1.53	123.8	3.50	76.2	1.02	76.2	185.7	1.47
		40 S	141.3	6.55	190.5	6.86	79.2	3.40	123.8	6.60	76.2	2.00	76.2	185.7	2.28
		80 S	141.3	9.52	190.5	9.30	79.2	4.65	123.8	13.50	76.2	2.70	76.2	185.7	-
6	150	10 S	168.3	3.40	228.6	5.44	95.3	2.72	142.9	4.80	88.9	1.36	88.9	215.9	2.15
		40 S	168.3	7.11	228.6	11.00	95.3	5.50	142.9	9.80	88.9	3.23	88.9	215.9	3.57
		80 S	168.3	10.97	228.6	16.80	95.3	8.40	142.9	19.30	88.9	4.40	88.9	215.9	-
8	200	10 S	219.1	3.76	304.8	10.77	127.0	5.15	177.8	8.60	101.6	2.49	101.6	269.9	3.22
		40 S	219.1	8.18	304.8	21.55	127.0	11.00	177.8	18.00	101.6	5.67	101.6	269.9	6.07
		80 S	219.1	12.70	304.8	34.80	127.0	17.40	177.8	33.00	101.6	8.35	101.6	269.9	-
10	250	10 S	273.1	4.19	381.0	19.50	159.0	9.75	215.9	14.50	127.0	4.90	127.0	323.9	5.13
		40 S	273.1	9.27	381.0	38.56	159.0	20.50	215.9	31.00	127.0	9.21	127.0	323.9	13.95
		80 S	273.1	12.70	381.0	53.90	159.0	26.95	215.9	60.00	127.00	13.60	127.0	323.9	-
12	300	10 S	323.9	4.57	457.2	27.22	190.5	13.63	254.0	22.00	152.4	6.53	152.4	381.0	8.16
		40 S	323.9	9.53	457.2	59.42	190.5	30.00	254.0	44.50	152.4	15.00	152.4	381.0	20.00
		80 S	323.9	12.70	457.2	80.00	190.5	40.00	254.0	78.00	152.4	22.50	152.4	381.0	-
14	350	10 S	355.6	4.78	533.4	36.30	222.2	19.50	279.4	49.00	165.1	8.20	152.4	412.8	10.89
		40 S	355.6	9.53	533.4	70.00	222.2	35.00	279.4	102.00	165.1	16.00	152.4	412.8	-
		80 S	355.6	12.70	533.4	94.00	222.2	47.00	279.4	115.00	165.1	27.00	152.4	412.8	-

Note: Weights and dimensions listed above are a guide only. All dimensions given in mm. All weights given in kg.

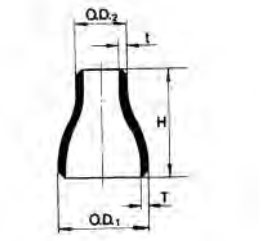
Please contact our Sales department for any additional data.

Reducing Buttweld Pipe Fittings Technical Data

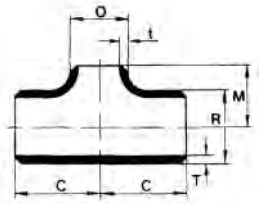
			Conc. & Ecc. Reducers				Reducing Tee		
Imperial	Metric	SCH	O.D. 1	O.D. 2	H	Wgt	C	M	Wgt
¾ x ½	20 x 15	10 S	26.7	21.3	39.3	0.03	29	29	0.11
		40 S	26.7	21.3	39.3	0.07	29	29	0.15
		80 S	26.7	21.3	39.3	0.10	29	29	-
1 x ½	25 x 15	10 S	33.4	21.3	50.8	0.07	38	38	0.19
		40 S	33.4	21.3	50.8	0.13	38	38	0.22
		80 S	33.4	21.3	50.8	0.16	38	38	-
1 x ¾	25 x 20	10 S	33.4	26.7	50.8	0.07	38	38	0.19
		40 S	33.4	26.7	50.8	0.13	38	38	0.23
		80 S	33.4	26.7	50.8	0.16	38	38	-
1¼ x 1	32 x 25	10 S	42.2	33.4	50.8	0.09	49	49	0.45
		40 S	42.2	33.4	50.8	0.18	49	49	0.65
		80 S	42.2	33.4	50.8	0.22	49	49	-
1½ x 1	40 x 25	10 S	48.3	33.4	63.5	0.14	57	57	0.42
		40 S	48.3	33.4	63.5	0.26	57	57	0.55
		80 S	48.3	33.4	63.5	0.35	57	57	-
1½ x 1¼	40 x 32	10 S	48.3	42.2	63.5	0.14	57	57	0.65
		40 S	48.3	42.2	63.5	0.26	57	57	1.35
		80 S	48.3	42.2	63.5	0.35	57	57	-
2 x 1	50 x 25	10 S	60.3	33.4	76.2	0.23	64	51	0.54
		40 S	60.3	33.4	76.2	0.41	64	51	0.74
		80 S	60.3	33.4	76.2	0.57	64	51	-
2 x 1½	50 x 40	10 S	60.3	48.3	76.2	0.23	64	60	0.59
		40 S	60.3	48.3	76.2	0.41	64	60	0.83
		80 S	60.3	48.3	76.2	0.57	64	60	-
2½ x 1½	65 x 40	10 S	73.0	48.3	88.9	0.41	76	67	0.90
		40 S	73.0	48.3	88.9	0.77	76	67	1.49
		80 S	73.0	48.3	88.9	1.01	76	67	-
2½ x 2	65 x 50	10 S	73.0	60.3	88.9	0.41	76	70	0.94
		40 S	73.0	60.3	88.9	0.77	76	70	1.53
		80 S	73.0	60.3	88.9	1.01	76	70	-
3 x 1½	80 x 40	10 S	88.9	48.3	88.9	0.5	86	73	1.19
		40 S	88.9	48.3	88.9	1.00	86	73	2.05
		80 S	88.9	48.3	88.9	1.35	86	73	-
3 x 2	80 x 50	10 S	88.9	60.3	88.9	0.50	86	76	1.23
		40 S	88.9	60.3	88.9	1.00	86	76	2.16
		80 S	88.9	60.3	88.9	1.35	86	76	-
3 x 2½	80 x 65	10 S	88.9	73.0	88.9	0.50	86	83	1.31
		40 S	88.9	73.0	88.9	1.00	86	83	2.29
		80 S	88.9	73.0	88.9	1.35	86	83	-
4 x 2	100 x 50	10 S	114.3	60.3	101.6	0.82	105	89	2.35
		40 S	114.3	60.3	101.6	1.60	105	89	4.50
		80 S	114.3	60.3	101.6	2.27	105	89	-
4 x 2½	100 x 65	10 S	114.3	73.0	101.6	0.82	105	95	2.45
		40 S	114.3	73.0	101.6	1.60	105	95	4.70
		80 S	114.3	73.0	101.6	2.27	105	95	-
4 x 3	100 x 80	10 S	114.3	88.9	101.6	0.82	105	98	2.50
		40 S	114.3	88.9	101.6	1.60	105	98	4.80
		80 S	114.3	88.9	101.6	2.27	105	98	-
5 x 4	125 x 100	10 S	141.3	114.3	127.0	1.35	124	117	7.40
		40 S	141.3	114.3	127.0	2.75	124	117	10.0
		80 S	141.3	114.3	127.0	3.92	124	117	-
6 x 3	150 x 80	10 S	168.3	88.9	139.7	2.00	143	124	4.90
		40 S	168.3	88.9	139.7	3.95	143	124	9.80
		80 S	168.3	88.9	139.7	5.94	143	124	-
6 x 4	150 x 100	10 S	168.3	114.3	139.7	2.00	143	130	5.10
		40 S	168.3	114.3	139.7	3.95	143	130	10.0
		80 S	168.3	114.3	139.7	5.94	143	130	-
8 x 4	200 x 100	10 S	219.1	114.3	152.4	3.27	178	156	8.00
		40 S	219.1	114.3	152.4	6.50	178	156	17.5
		80 S	219.1	114.3	152.4	9.86	178	156	-
8 x 6	200 x 150	10 S	219.1	168.3	152.4	3.27	178	168	8.40
		40 S	219.1	168.3	152.4	6.50	178	168	18.1
		80 S	219.1	168.3	152.4	9.86	178	168	-
10 x 6	250 x 150	10 S	273.1	168.3	177.8	5.45	216	194	14.0
		40 S	273.1	168.3	177.8	10.70	216	194	30.0
		80 S	273.1	168.3	177.8	14.48	216	194	-
10 x 8	250 x 200	10 S	273.1	219.1	177.8	5.45	216	203	14.5
		40 S	273.1	219.1	177.8	10.70	216	203	31.0
		80 S	273.1	219.1	177.8	14.48	216	203	-
12 x 8	300 x 200	10 S	323.9	219.1	203.2	7.70	254	229	24.0
		40 S	323.9	219.1	203.2	15.00	254	229	-
		80 S	323.9	219.1	203.2	19.79	254	229	-
12 x 10	300 x 250	10 S	323.9	273.1	203.2	7.70	254	241	25.0
		40 S	323.9	273.1	203.2	15.00	254	241	-
		80 S	323.9	273.1	203.2	19.79	254	241	-



Eccentric



Concentric



Reducing Tee

BSP Fittings

Manufactured to ASTM A351 (Castings)
Manufactured from ASTM A312 pipe (buttweld)
Threads conform with BS 21
Rated up to 150lb and are only available in 316/316L

Size - Nominal Imp	mm	Socket Round	Nipple Hex	Nipple TBE	Nipple TOE	Union 3 pce	Elbow 45º Fem	Elbow 90º Fem	3000LB BSP Coupling
⅛	6	●	●	○	○	○	●	●	
¼	8	●	●	●	●	●	●	●	●
⅜	10	●	●	●	●	●	●	●	●
½	15	●	●	●	●	●	●	●	●
¾	20	●	●	●	●	●	●	●	●
1	25	●	●	●	●	●	●	●	●
1¼	32	●	●	●	●	●	●	●	●
1½	40	●	●	●	●	●	●	●	●
2	50	●	●	●	●	●	●	●	●
2½	65	●	●	●	●	●	○	●	
3	80	●	●	●	●	●	○	●	
4	100	●	●	●	●	○	○	●	

Size - Nominal Imp	mm	Elbow M/F	Tee Fem	Hex Cap	Hex Plug	Locknut Fem	Half Sockets	Hose Tail
⅛	6	○	○	○	●			○
¼	8	●	●	●	●			●
⅜	10	●	●	●	●			●
½	15	●	●	●	●	○	●	●
¾	20	●	●	●	●	○	●	●
1	25	●	●	●	●	○	●	●
1¼	32	●	●	●	●	○	○	●
1½	40	●	●	●	●	○	●	●
2	50	●	●	●	●	○	●	●
2½	65	●	●	●	●			●
3	80	○	●	●	●			●
4	100	○	●	●	●			●

TBE - Threaded both ends.
TOE - Threaded one end.
M/F - Male/female.

Size - Nominal		Hex Reducing Bush	Hex Reducing Nipple	Round Reducing Socket
¼ x ⅛	8 x 6	●	●	○
⅜ x ⅛	10 x 6	●	●	○
⅜ x ¼	10 x 8	●	●	○
½ x ⅛	15 x 6	●	●	
½ x ¼	15 x 8	●	●	○
½ x ⅜	15 x 10	●	●	○
¾ x ¼	20 x 8	●	●	
¾ x ⅛	20 x 10	●	●	○
¾ x ½	20 x 15	●	●	●
1 x ½	25 x 15	●	●	○
1 x ¾	25 x 20	●	●	●
1¼ x ¾	32 x 20	●	●	
1¼ x 1	32 x 25	●	●	●
1½ x ¾	40 x 20	●	●	
1½ x 1	40 x 25	●	●	
1½ x 1¼	40 x 32	●	●	●
2 x 1	50 x 25	●	●	○
2 x 1¼	50 x 32	●	●	
2 x 1½	50 x 40	●	●	●
2½ x 2	65 x 50	●	●	●
3 x 2	80 x 50	●		
3 x 2½	80 x 65	●	●	
4 x 3	100 x 80	●		

● Stocked Item ○ Market Available

BSP Screwed Fittings Technical Data

Elbows

90º

45º

Tee

Male/Female Elbow

Hex Cap

Socket

Hex Head Plug

Union

Hex Red. Bush

Hex Nipple

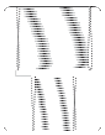
Barrel Nipple

Toe Nipple

Hex Red. Nipple

Hosetail

Reducing Socket



Locknut

Size mm	6nb		8nb		10nb		15nb		20nb		25nb		32nb		40nb		50nb		65nb		80nb		100nb	
TYPE	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W
90º Elbow	26	0.03	30	0.04	36	0.06	44	0.10	48	0.14	55	0.27	66	0.38	72	0.51	84	0.75	100	1.70	115	2.33	144	3.43
45º Elbow	32	0.04	34	0.04	38	0.05	42	0.18	48	0.17	56	0.26	66	0.32	72	0.43	84	0.70	98	1.56	108	2.02	130	2.97
Tee	36	0.05	39	0.05	46	0.09	58	0.14	65	0.21	74	0.36	89	0.50	96	0.70	113	1.01	136	2.41	157	3.32	194	4.81
M/F Elbow	29	0.02	32	0.04	41	0.06	48	0.11	57	0.16	66	0.26	80	0.40	89	0.50	105	0.82	134	1.69	150	2.06	179	3.45
Hex Cap	16	0.02	18	0.03	20	0.03	26	0.07	32	0.10	39	0.17	49	0.24	55	0.38	66	0.47	85	0.85	100	1.24	125	2.09
Socket	20	0.02	25	0.04	26	0.05	34	0.10	36	0.14	43	0.22	48	0.31	48	0.36	56	0.57	65	1.36	71	1.77	83	2.96
Hex Plug	14	0.02	17	0.03	21	0.04	26	0.05	32	0.09	38	0.12	46	0.19	52	0.27	65	0.40	80	0.76	95	1.03	120	1.66
Union	37	0.13	37	0.11	39	0.18	41	0.22	42	0.33	51	0.50	52	0.70	56	0.87	60	1.39	75	2.07	89	2.98	99	4.82
Hex Nipple	31	0.02	33	0.03	33	0.05	41	0.80	44	0.11	49	0.17	52	0.25	52	0.37	58	0.53	63	1.14	69	1.37	80	1.90
TBE Nipple	40	0.02	40	0.03	40	0.04	60	0.08	60	0.11	60	0.16	80	0.29	80	0.35	100	0.58	100	0.92	120	1.45	120	2.07
TOE Nipple	30	0.13	30	0.02	30	0.03	35	0.05	40	0.08	40	0.11	50	0.19	50	0.23	50	0.30	60	0.57	70	0.86	80	1.38
Hose Tail	-	-	47	0.04	52	0.05	63	0.10	73	0.17	82	0.24	80	0.32	93	0.46	110	0.78	136	1.28	147	1.80	158	3.40
Locknut	19	0.02	22	0.02	27	0.03	32	0.04	36	0.05	46	0.10	55	0.14	60	0.15	75	0.25	90	0.51	100	0.55	130	0.92

L = Length (mm) W = Approx Weight (kg)

NPT Fittings

Manufactured to ASTM A182 ANSI B16.11
NPT Thread, 3000lb rating.
316/316L grade only.

Size - Nominal Imp	mm	Round Coupling	Union 3 Pce	90º Elbow Female	45º Elbow Female	Tee Female	Cap Female	Hex Nipple	Hex Plug
⅛	6	○	○	○	○	○	○	○	○
¼	8	●	○	○	○	○	○	●	○
⅜	10	●	○	●	○	○	○	●	○
½	15	●	●	●	○	●	○	●	●
¾	20	●	●	●	○	●	○	●	●
1	25	●	●	●	○	●	○	●	●
1¼	32	●	○	●	○	○	○	●	○
1½	40	●	○	●	○	●	○	●	●
2	50	●	○	●	○	●	○	●	●

Size Nominal Imp	mm	Hex Red Bush	Hex Red Nipple
¼ x ⅛	8 x 6	○	○
⅜ x ⅛	10 x 6	○	○
⅜ x ¼	10 x 8	○	○
½ x ¼	15 x 8	○	○
½ x ⅜	15 x 10	●	●
¾ x ¼	20 x 8	○	○
¾ x ⅜	20 x 10	○	○
¾ x ⅜	20 x 15	●	○
1 x ¼	25 x 10	●	○

Size - Nominal Imp	mm	Hex Red Bush	Hex Red Nipple
1 x ½	25 x 15	●	○
1 x ¾	25 x 20	●	●
1¼ x ¾	32 x 20	○	○
1¼ x 1	32 x 25	○	○
1½ x ¾	40 x 20	○	○
1½ x 1	40 x 25	●	○
2 x ¾	50 x 20	○	○
2 x 1	50 x 25	●	○
2 x 1½	50 x 40	●	○

● Stocked Item ○ Market Available

NPT Screwed Fittings Technical Data

Hex Nipples

Hex Red. Bush

Unions

Hex Red. Nipples

Elbow 90º

Tees

Coupling

Hex Plug

Cap

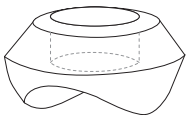
Reducing coupling

Size mm	8		10		15		20		25		32		40		50	
TYPE	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W
Coupling	35	.06	38	.07	45	.14	52	.21	60	.44	67	.72	80	1.07	88	1.42
Union	42	.21	49	.27	48	.34	56	.48	61	.76	71	1.55	78	1.61	88	2.30
90º Elbow	48	.14	51	.27	62	.67	68	.81	73	1.09	83	1.34	99	2.33	103	2.68
45º Elbow	43	.13	53	.25	57	.35	62	.50	75	.87	80	1.02	95	1.70	100	2.35
Tee	53	.20	60	.31	68	.54	77	.88	90	1.36	88	1.61	119	2.92	228	3.18
Cap	18	.05	25	.06	33	.11	36	.18	42	.37	43	.60	48	.73	42	1.10
Hex Nipple	37	.03	37	.06	48	.09	48	.12	60	.24	60	.29	65	.51	68	.87
Hex Plug	20	.03	24	.05	25	.07	27	.12	31	.21	35	.41	40	.57	42	.99

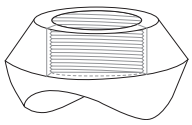
All lengths are given in mm.
All weights are given in kg.

Outlet Fittings

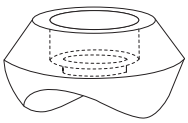
Manufactured to ASTM A182 ANSI B.16.11
Socketweld/NPT connection, 3000lb rating
316 grade only.



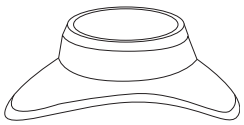
Weldolet



Threadolet

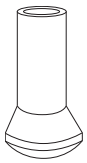


Sockolet

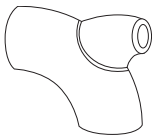


Swept Outlet

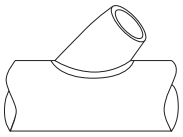
NPT Nipolet



Nipolet



Elbowlet



Laterolet

Size - Nominal Imp	mm	Weldolet	NPT Threadolet	Sockolet	Swept Outlet	Nipolet	NPT Nipolet	Elbowlet	Laterolet
⅛	6	○	○	○	○	○	○	○	○
¼	8	○	○	○	○	○	○	○	○
⅜	10	○	○	○	○	○	○	○	○
½	15	○	●	●	○	○	○	○	○
¾	20	○	●	●	○	○	○	○	○
1	25	○	●	●	○	○	○	○	○
1¼	32	○	○	○	○	○	○	○	○
1½	40	○	○	○	○	○	○	○	○
2	50	○	○	○	○	○	○	○	○

Socket Weld Fittings

Manufactured to ASTM A182 ANSI B.16.11
Socketweld connection, 3000lb rating
316 grade only.

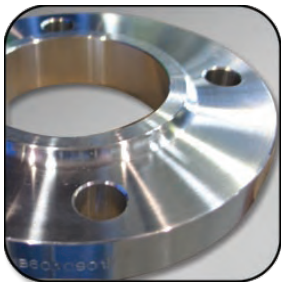
Imp	mm	Full Coupling	Union	90° Elbow	45° Elbow	Tee	Union	Cap
½	15	●	●	●	●	●	●	○
¾	20	●	●	●	●	●	●	○
1	25	●	●	●	●	●	●	○
1¼	32	○	○	○	○	○	○	○
1½	40	●	●	●	●	●	●	○
2	50	●	●	●	●	●	●	○

Imp	mm	Reducing Socket
¾ x ½	20x15	●
1 x ½	25x15	○
1 x ¾	25x20	●
1½ x 1	40x25	●
2 x 1	50x25	●
2 x 1½	50x40	●

● Stocked Item ○ Market Available

ANSI Flanges

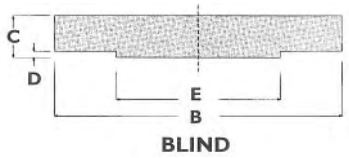
Manufactured to ASTM A182 ANSI B.16.5
Available in 150lb, 300lb and 600lb classes.
Three types available:
SORF - Slip on raised face.
WNRF - Weld neck raised face.
BRF - Blind raised face.



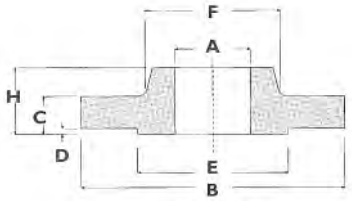
		Slip On Raised Face						Weld Neck Raised Face							Blind Raised Face				
	Size							Sch10	Sch40										
Grade	N.B	150lb	Wgt	300lb	Wgt	600lb	Wgt	150lb	150lb	Wgt	300lb	Wgt	600lb	Wgt	150lb	Wgt	300lb	Wgt	600lb	Wgt
304L	15	○	0.5	○	0.7	○	0.9	○	○	0.9	○	0.9	○	1.4	○	0.9	○	0.9	○	0.9
	20	○	0.7	○	1.1	○	1.4	○	○	0.9	○	1.4	○	1.6	○	0.9	○	1.4	○	1.4
	25	○	0.9	○	1.4	○	1.6	○	○	1.4	○	1.8	○	1.8	○	0.9	○	1.8	○	1.8
	32	○	1.1	○	2.1	○	2.1	○	○	1.4	○	2.3	○	2.5	○	1.4	○	2.7	○	2.7
	40	○	1.4	○	3.0	○	3.2	○	○	1.8	○	3.2	○	3.6	●	1.8	○	3.2	○	3.6
	50	○	2.3	○	3.2	○	3.6	○	○	2.7	○	3.6	○	4.6	●	2.3	○	3.6	○	4.6
	65	○	3.2	○	4.6	○	5.5	○	○	4.6	○	5.5	○	6.4	●	3.2	○	5.5	○	6.8
	80	○	3.6	○	5.9	○	6.8	○	○	5.2	○	6.9	○	8.2	●	4.1	○	7.3	○	9.1
	100	○	5.9	○	10.5	○	15	○	○	7.8	○	12.1	○	16.8	●	7.7	○	12.7	○	18.6
	150	○	8.0	○	16.3	○	36.4	○	○	12.5	○	16.4	○	33.2	●	12.0	○	21.8	○	39.1
	200	○	12.8	○	25.0	○	44.1	○	○	19.9	○	21.1	○	51.0	●	21.4	○	35.9	○	63.0
	250	○	18.0	○	35.0	○	80.0	○	○	24.6	○	31.4	○	86.0	○	30.5	○	55.0	○	105
316L	15	●	0.5	●	0.7	○	0.9	○	●	0.9	○	0.9	○	1.4	●	0.9	○	0.9	○	0.9
	20	●	0.7	○	1.1	○	1.4	○	○	0.9	○	1.4	○	1.6	●	0.9	○	1.4	○	1.4
	25	●	0.9	●	1.4	○	1.6	●	●	1.4	●	1.8	○	1.8	●	0.9	●	1.8	○	1.8
	32	○	1.1	○	2.1	○	2.1	○	○	1.4	○	2.3	○	2.5	●	1.4	○	2.7	○	2.7
	40	●	1.4	○	3.0	○	3.2	●	●	1.8	○	3.2	○	3.6	●	1.8	●	3.2	○	3.6
	50	●	2.3	●	3.2	○	3.6	●	●	2.7	○	3.6	○	4.6	●	2.3	●	3.6	○	4.6
	65	●	3.2	○	4.6	○	5.5	●	●	4.6	●	5.5	○	6.4	○	3.2	○	5.5	○	6.8
	80	●	3.6	●	5.9	○	6.8	●	●	5.2	●	6.9	○	8.2	●	4.1	●	7.3	○	9.1
	100	●	5.9	●	10.5	○	15	●	●	7.8	○	12.1	○	16.8	●	7.7	○	12.7	○	18.6
	150	●	8.0	○	16.3	○	36.4	●	●	12.5	○	21.1	○	33.2	●	12.0	○	21.8	○	39.1
	200	●	12.8	○	25.0	○	44.1	○	●	19.9	○	31.4	○	51.0	●	21.4	○	35.9	○	63.0
	250	●	18.0	○	35.0	○	80.0	○	●	24.6	○	44.0	○	86.0	●	30.5	○	55.0	○	105
	300	●	27.7	○	51.0	○	98.0	○	○	40.0	○	65.0	○	103	●	50.0	○	83.0	○	134
	350	●	37.7	○	72.0	○	118	○	○	52.0	○	94.0	○	125	○	63.0	○	110	○	172
	400	●	48.2	○	95.0	○	166	○	○	65.0	○	113	○	200	○	85.0	○	143	○	240
	450	●	59.0	○	115	○	216	○	○	76.0	○	139	○	252	○	99.0	○	188	○	302
	500	○	67.0	○	140	○	278	○	○	90.0	○	168	○	314	○	129	○	234	○	389
	550	○	72.0	○	197	○	292	○	○	102	○	195	○	323	○	151	○	270	○	437
	600	●	96.0	○	223	○	398	○	○	123	○	236	○	444	●	190	○	364	○	534
2205	15	○	0.5	○	0.7	○	0.9	○	○	0.9	○	0.9	○	1.4	○	0.9	○	0.9	○	0.9
	20	○	0.7	○	1.1	○	1.4	○	○	0.9	○	1.4	○	1.6	○	0.9	○	1.4	○	1.4
	25	○	0.9	○	1.4	○	1.6	○	○	1.4	○	1.8	○	1.8	○	0.9	○	1.8	○	1.8
	32	○	1.1	○	2.1	○	2.1	○	○	1.4	○	2.3	○	2.5	○	1.4	○	2.7	○	2.7
	40	○	1.4	○	3.0	○	3.2	○	○	1.8	○	3.2	○	3.6	○	1.8	○	3.2	○	3.6
	50	○	2.3	○	3.2	○	3.6	○	○	2.7	○	3.6	○	4.6	○	2.3	○	3.6	○	4.6
	65	○	3.2	○	4.6	○	5.5	○	○	4.6	○	5.5	○	6.4	○	3.2	○	5.5	○	6.8
	80	○	3.6	○	5.9	○	6.8	○	○	5.2	○	6.9	○	8.2	○	4.1	○	7.3	○	9.1
	100	○	5.9	○	10.5	○	15	○	○	7.8	○	12.1	○	16.8	○	7.7	○	12.7	○	18.6
	150	○	8.0	○	16.3	○	36.4	○	○	12.5	○	16.4	○	33.2	○	12.0	○	21.8	○	39.1
	200	○	12.8	○	25.0	○	44.1	○	○	19.9	○	21.1	○	51.0	○	21.4	○	35.9	○	63.0
	250	○	18.0	○	35.0	○	80.0	○	○	24.6	○	31.4	○	86.0	○	30.5	○	55.0	○	105

● Stocked Item ○ Market Available

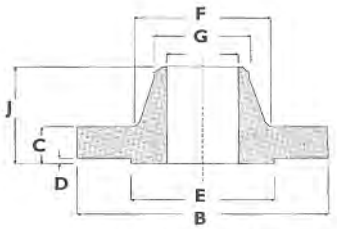
ANSI Flange Dimensions



BLIND



SLIP-ON



WELDING NECK

Size		Slipon Bore	O.D. of Flange	Thickness of Flange	Raised Face Thickness	Raised Face Diameter	Hub diameter	Hub Diam. of Chamfer W. Neck	Length/Hub Slip-On	Length/Hub Weld Neck	Bolt Circle Diameter	Bolt Hole Diameter	Number of Bolt Holes
		A	B	C	D	E	F	G	H	J	K	L	M
150	15	22.3	89.0	11.1	1.6	35	30.2	21.4	15.9	47.7	60.3	15.8	4
	20	27.6	98.5	12.8	1.6	42.9	38.2	26.7	15.9	52.4	69.8	15.8	4
	25	34.5	108.0	14.3	1.6	50.9	49.2	33.6	17.5	55.6	79.3	15.8	4
	32	43.1	117.5	15.9	1.6	63.6	58.8	42.2	20.7	57.2	88.9	15.8	4
	40	49.5	127.1	17.5	1.6	73.1	65.1	48.3	22.3	61.9	98.4	15.8	4
	50	61.9	152.5	19.1	1.6	92.0	77.8	60.5	25.5	63.6	120.6	19.0	4
	65	74.6	177.9	22.3	1.6	104.8	90.5	73.2	28.6	69.9	139.7	19.0	4
	80	90.6	190.6	23.8	1.6	127.1	108.0	89.0	30.2	69.9	152.4	19.0	4
	90	103.3	216.0	23.8	1.6	139.8	122.3	101.7	31.8	71.5	177.8	19.0	8
	100	116.0	228.7	23.8	1.6	157.2	135.0	114.4	33.4	76.3	190.5	19.0	8
	125	143.7	254.1	23.8	1.6	185.8	163.5	141.3	36.5	89.0	215.9	22.2	8
	150	170.6	279.5	25.5	1.6	216.0	192.1	168.5	39.7	89.0	241.3	22.2	8
	200	221.4	343.0	28.6	1.6	269.9	246.1	219.3	44.5	101.7	298.4	22.2	8
	250	276.3	406.5	30.2	1.6	323.9	304.9	273.1	49.2	101.7	361.9	25.4	12
	300	327.1	482.7	31.8	1.6	381.1	365.2	323.9	55.6	114.4	431.8	25.4	12
	350	359.1	533.5	35.0	1.6	412.8	400.1	355.7	57.2	127.1	476.2	28.5	12
	400	410.4	597.0	36.5	1.6	470.0	457.3	406.5	63.6	127.1	539.7	28.5	16
	450	461.7	635.1	39.7	1.6	533.5	504.9	457.3	68.3	139.8	577.8	31.7	16
	500	513.0	698.6	42.9	1.6	584.3	558.9	508.1	73.1	144.5	635.0	31.7	20
	600	615.9	812.9	47.7	1.6	692.2	663.6	609.7	82.6	152.5	749.3	34.9	20
300	15	22.3	95.3	14.3	1.6	35.0	38.2	21.4	22.3	52.4	66.6	15.8	4
	20	27.6	117.5	15.9	1.6	42.9	47.7	26.7	25.5	57.2	82.5	19.0	4
	25	34.5	123.9	17.5	1.6	50.9	54.0	33.6	27.0	61.9	88.9	19.0	4
	32	43.1	133.4	19.1	1.6	63.6	63.6	42.2	27.0	65.1	98.4	19.0	4
	40	49.5	155.6	20.7	1.6	73.1	69.9	48.3	30.2	68.3	114.3	22.2	4
	50	61.9	165.2	22.3	1.6	92.1	84.2	60.5	33.4	69.9	127.0	19.0	8
	65	74.6	190.6	25.5	1.6	104.8	100.0	73.2	38.2	76.3	149.2	22.2	8
	80	90.6	209.6	28.6	1.6	127.1	117.5	89.0	42.9	79.4	168.2	22.2	8
	90	103.3	228.7	30.2	1.6	139.8	133.4	101.7	44.5	81.0	184.1	22.2	8
	100	116.0	254.1	31.8	1.6	157.2	146.1	114.4	47.7	85.8	200.0	22.2	8
	125	143.7	279.5	35.0	1.6	185.8	177.9	141.3	50.9	98.5	234.9	22.2	8
	150	170.6	317.6	36.5	1.6	216.0	206.4	168.5	52.4	98.5	269.8	22.2	12
	200	221.4	381.1	41.3	1.6	269.9	260.4	219.3	61.9	111.2	330.2	25.4	12
	250	276.3	444.6	47.7	1.6	323.9	320.7	273.1	66.7	117.5	387.3	28.5	16
	300	327.1	520.8	50.9	1.6	381.1	374.7	323.9	73.1	130.2	450.8	31.7	16
	350	359.1	584.3	54.0	1.6	412.8	425.5	355.7	76.3	142.9	514.3	31.7	20
	400	410.4	647.8	57.2	1.6	470.0	482.7	406.5	82.6	146.1	571.5	34.9	20
	450	461.7	711.3	60.4	1.6	533.5	533.5	457.3	89.0	158.8	628.6	34.9	24
	500	513.0	774.8	63.6	1.6	584.3	587.4	508.1	95.3	162.0	685.8	34.9	24
	600	615.9	914.5	69.9	1.6	692.2	701.7	609.7	106.4	168.3	812.8	41.2	24
600	15	22.3	95.3	14.3	6.4	35.0	38.2	21.4	22.3	52.4	66.6	15.8	4
	20	27.6	117.5	15.9	6.4	42.9	47.7	26.7	25.5	57.2	82.5	19.0	4
	25	34.5	123.9	17.5	6.4	50.9	34.5	33.6	27.0	61.9	88.9	19.0	4
	23	43.1	133.4	20.7	6.4	63.6	63.6	42.2	28.6	66.7	98.4	19.0	4
	40	49.5	155.6	22.3	6.4	73.1	69.9	48.3	31.8	69.9	114.3	22.2	4
	50	61.9	165.2	25.5	6.4	92.1	84.2	60.5	36.5	73.1	127.0	19.0	8
	65	74.6	190.6	28.6	6.4	104.8	100.0	73.2	41.3	79.4	149.3	22.2	8
	80	90.6	209.6	31.8	6.4	127.1	117.5	89.0	46.1	82.6	168.2	22.2	8
	90	103.3	228.7	35.0	6.4	139.8	133.4	101.7	49.2	85.8	184.1	25.4	8
	100	116.0	273.1	38.2	6.4	157.2	152.5	114.4	54.0	101.7	215.9	25.4	8
	125	143.7	330.3	44..5	6.4	185.8	188.9	141.3	60.4	114.4	266.7	28.5	8
	150	170.6	355.7	47.7	6.4	216.0	222.3	168.5	66.7	117.5	292.1	28.5	12
	200	221.4	419.2	55.6	6.4	269.9	273.10	219.3	76.3	133.4	349.2	31.7	12
	250	276.3	508.1	63.6	6.4	323.9	343.0	273.1	85.8	152.5	431.8	34.9	16
	300	327.1	558.9	66.7	6.4	381.1	400.1	323.9	92.1	155.6	488.9	34.9	20
	350	359.1	603.3	69.9	6.4	412.8	431.9	355.7	93.7	165.2	527.0	38.1	20
	400	410.4	685.9	76.3	6.4	470.0	495.4	406.5	106.4	177.9	603.2	41.2	20
	450	461.7	743.0	82.6	6.4	533.5	546.2	457.3	117.5	184.2	654.0	44.4	20
	500	513.0	812.9	89.0	6.4	584.3	609.70	508.1	127.1	190.6	723.9	44.4	24
	600	615.9	939.9	101.7	6.4	692.2	717.6	609.7	139.8	203.3	838.2	50.8	24

Table Flanges

Manufactured to AS 2129 from ASTM A182 Forgings or ASTM A240 Plate
Available in Table D and Table E.
Table F and H available upon request.
Gramaphone finish on one side.
Available bored for pipe or tube, or Blinds and screwed BSP

Grade	Size Pipe NB / Tube mm	Table 'D' Slip On BFP	Slip On BFT	Slip On Wgt	Blind	Blind Wgt	Table 'E' Slip On BFP	Slip On BFT	Slip On Wgt	Blind	Blind Wgt	Screwed	Screwed Wgt
304L	15 / 12.70	○	○	0.3	○	0.3	○	○	0.3	○	0.4	○	0.3
	20 / 19.05	○	○	0.3	○	0.4	○	○	0.4	○	0.4	○	0.4
	25 / 25.40	○	○	0.4	○	0.5	○	○	0.6	○	0.7	○	0.6
	32 / 31.75	○	○	0.5	○	0.6	○	○	0.7	○	0.8	○	0.7
	40 / 38.10	○	○	0.6	○	0.7	○	○	1.0	○	1.2	○	1.0
	50 / 50.80	○	○	1.0	○	1.2	○	○	1.1	○	1.5	○	1.1
	65 / 63.5	○	○	1.1	○	1.4	○	○	1.2	○	1.8	○	1.2
	80 / 76.2	○	○	1.5	○	2.2	○	○	1.9	○	2.8	○	1.9
	100 / 101.6	○	○	2.0	○	3.0	○	○	2.6	○	3.6	○	2.6
	125 / 127.0	○	○	3.1	○	4.3	○	○	4.3	○	5.5	○	4.3
	150 / 152.4	○	○	3.6	○	6.6	○	○	5.2	○	8.1	○	5.2
	200 / 203.2	○	○	5.4	○	9.4	○	○	8.3	○	14.5	○	8.3
	250	○	○	8.8	○	16.9	○	○	11.6	○	21.2	○	11.6
	300	○	○	13.3	○	26.7	○	○	16.6	○	33.4	○	16.6
316L	15 / 12.70	○	●	0.3	○	0.3	●	○	0.3	○	0.4	○	0.3
	20 / 19.05	●	●	0.3	○	0.4	●	○	0.4	○	0.4	○	0.4
	25 / 25.40	●	●	0.4	●	0.5	●	●	0.6	●	0.7	○	0.6
	32 / 31.75	●	●	0.5	●	0.6	●	●	0.7	●	0.8	○	0.7
	40 / 38.10	●	●	0.6	●	0.7	●	●	1.0	●	1.2	●	1.0
	50 / 50.80	●	●	1.0	●	1.2	●	●	1.1	●	1.5	●	1.1
	65 / 63.5	●	●	1.1	●	1.4	●	●	1.2	●	1.8	○	1.2
	80 / 76.2	●	●	1.5	●	2.2	●	●	1.9	●	2.8	●	1.9
	100 / 101.6	●	●	2.0	●	3.0	●	●	2.6	●	3.6	●	2.6
	125 / 127.0	●	●	3.1	●	4.3	●	●	4.3	●	5.5	○	4.3
	150 / 152.4	●	●	3.6	●	6.6	●	●	5.2	●	8.1	○	5.2
	200 / 203.2	●	○	5.4	●	9.4	●	●	8.3	●	14.5	○	8.3
	250	●	○	8.8	●	16.9	●	○	11.6	●	21.2	○	11.6
	300	●	○	13.3	○	26.7	●	●	16.6	●	33.4	○	16.6
2205	15 / 12.70	○	○	0.3	○	0.3	○	○	0.3	○	0.4	○	0.3
	20 / 19.05	○	○	0.3	○	0.4	○	○	0.4	○	0.4	○	0.4
	25 / 25.40	○	○	0.4	○	0.5	○	○	0.6	○	0.7	○	0.6
	32 / 31.75	○	○	0.5	○	0.6	○	○	0.7	○	0.8	○	0.7
	40 / 38.10	○	○	0.6	○	0.7	○	○	1.0	○	1.2	○	1.0
	50 / 50.80	○	○	1.0	○	1.2	○	○	1.1	○	1.5	○	1.1
	65 / 63.5	○	○	1.1	○	1.4	○	○	1.2	○	1.8	○	1.2
	80 / 76.2	○	○	1.5	○	2.2	○	○	1.9	○	2.8	○	1.9
	100 / 101.6	○	○	2.0	○	3.0	○	○	2.6	○	3.6	○	2.6
	125 / 127.0	○	○	3.1	○	4.3	○	○	4.3	○	5.5	○	4.3
	150 / 152.4	○	○	3.6	○	6.6	○	○	5.2	○	8.1	○	5.2
	200 / 203.2	○	○	5.4	○	9.4	○	○	8.3	○	14.5	○	8.3
	250	○	○	8.8	○	16.9	○	○	11.6	○	21.2	○	11.6
	300	○	○	13.3	○	26.7	○	○	16.6	○	33.4	○	16.6

● Stocked Item ○ Market Available

Table Flange Dimensions

Table D

Nominal Pipe Size mm	Slip on Bore	Outside diameter of Flange	Thickness	Bolt Circle Diameter	Number of Holes	Diameter of Holes
15	22.3	95.0	5	67.0	4	14.0
20	27.6	100.0	5	73.0	4	14.0
25	34.5	115.0	5	83.0	4	14.0
32	43.1	120.0	6	87.0	4	14.0
40	49.5	135.0	6	98.0	4	14.0
50	61.9	150.0	8	114.0	4	18.0
65	74.6	165.0	8	127.0	4	18.0
80	90.6	185.0	10	146.0	4	18.0
90	103.3	205.0	10	165.0	4	18.0
100	116.0	215.0	10	178.0	4	18.0
125	143.7	255.0	13	210.0	8	18.0
150	170.6	280.0	13	235.0	8	18.0
200	221.4	335.0	13	292.0	8	18.0
250	276.3	405.0	16	356.0	8	22.0
300	327.1	455.0	19	406.0	12	22.0
350	359.1	525.0	22	470.0	12	26.0
375	410.4	550.0	22	495.0	12	26.0
400	410.4	580.0	25	521.0	12	26.0
450	461.7	640.0	25	584.0	12	26.0
500	513.0	705.0	29	641.0	16	26.0
550	564.3	760.0	29	699.0	16	30.0
600	615.9	825.0	32	756.0	16	30.0
700	717.5	910.0	35	845.0	20	30.0
750	768.3	995.0	41	927.0	20	33.0
800	819.1	1060.0	41	984.0	20	36.0
850	869.9	1090.0	44	1016.0	20	36.0
900	920.7	1175.0	48	1092.0	24	36.0

Table E

Nominal Pipe Size mm	Slip on Bore	Outside diameter of Flange	Thickness	Bolt Circle Diameter	Number of Holes	Diameter of Holes
15	22.3	95.0	6	67.0	4	14.0
20	27.6	100.0	6	73.0	4	14.0
25	34.5	115.0	7	83.0	4	14.0
32	43.1	120.0	8	87.0	4	14.0
40	49.5	135.0	9	98.0	4	14.0
50	61.9	150.0	10	114.0	4	18.0
65	74.6	165.0	10	127.0	4	18.0
80	90.6	185.0	11	146.0	4	18.0
90	103.3	205.0	12	165.0	8	18.0
100	116.0	215.0	13	178.0	8	18.0
125	143.7	255.0	13	210.0	8	18.0
150	170.6	280.0	17	235.0	8	22.0
200	221.4	335.0	19	292.0	8	22.0
250	276.3	405.0	22	356.0	12	22.0
300	327.1	455.0	25	406.0	12	26.0
350	359.1	525.0	29	470.0	12	26.0
375	410.4	550.0	32	495.0	12	26.0
400	410.4	580.0	32	521.0	12	26.0
450	461.7	640.0	35	584.0	16	26.0
500	513.0	705.0	38	641.0	16	26.0
550	564.3	760.0	44	699.0	16	30.0
600	615.9	825.0	48	756.0	16	33.0
700	717.5	910.0	51	845.0	20	33.0
750	768.3	995.0	54	927.0	20	36.0
800	819.1	1060.0	54	984.0	20	36.0
850	869.9	1090.0	57	1016.0	20	36.0
900	920.7	1175.0	64	1092.0	24	36.0

Table F

Nominal Pipe Size mm	Slip on Bore	Outside diameter of Flange	Thickness	Bolt Circle Diameter	Number of Holes	Diameter of Holes
15	22.3	95.0	10	67.0	4	14.0
20	27.6	100.0	10	73.0	4	14.0
25	34.5	120.0	10	87.0	4	18.0
32	43.1	135.0	13	98.0	4	18.0
40	49.5	140.0	13	105.0	4	18.0
50	61.9	165.0	16	127.0	4	18.0
65	74.6	185.0	16	146.0	8	18.0
80	90.6	205.0	16	165.0	8	18.0
90	103.3	215.0	20	178.0	8	18.0
100	116.0	230.0	20	191.0	8	18.0
125	143.7	280.0	20	235.0	8	22.0
150	170.6	305.0	20	260.0	12	22.0
200	221.4	370.0	25	324.0	12	22.0
250	276.3	430.0	30	381.0	12	26.0
300	327.1	490.0	32	438.0	16	26.0
350	359.1	550.0	32	495.0	16	30.0
375	410.4	580.0	38	521.0	16	30.0
400	410.4	610.0	38	552..0	20	30.0
450	461.7	675.0	38	610.0	20	33.0
500	513.0	735.0	50	673.0	24	33.0
550	564.3	785.0	50	724.0	24	33.0
600	615.9	850.0	57	781.0	24	36.0
700	717.5	935.0	60	857.0	24	36.0
750	768.3	1015.0	67	940.0	28	36.0
800	819.1	1060.0	68	984.0	28	36.0
850	869.9	1090.0	70	1016.0	32	36.0
900	920.7	1185.0	76	1105.0	32	39.0

Table H

Nominal Pipe Size mm	Slip on Bore	Outside diameter of Flange	Thickness	Bolt Circle Diameter	Number of Holes	Diameter of Holes
15	22.3	115.0	13	83.0	4	18.0
20	27.6	115.0	13	83.0	4	18.0
25	34.5	120.0	13	87.0	4	18.0
32	43.1	135.0	16	98.0	4	18.0
40	49.5	140.0	16	105.0	4	18.0
50	61.9	165.0	20	127.0	4	18.0
65	74.6	185.0	20	146.0	8	18.0
80	90.6	205.0	20	165.0	8	18.0
90	103.3	215.0	20	178.0	8	18.0
100	116.0	230.0	25	191.0	8	18.0
125	143.7	280.0	30	235.0	8	22.0
150	170.6	305.0	30	260.0	12	22.0
200	221.4	370.0	32	324.0	12	22.0
250	276.3	430.0	38	381.0	12	26.0
300	327.1	490.0	38	438.0	16	26.0
350	359.1	550.0	50	495.0	16	30.0
375	410.4	580.0	50	521.0	16	30.0
400	410.4	610.0	54	552.0	20	30.0
450	461.7	675.0	60	610.0	20	33.0
500	513.0	735.0	67	673.0	24	33.0
550	564.3	785.0	70	724.0	24	33.0
600	615.9	850.0	76	781.0	24	36.0

Metric Flanges

Manufactured from plate to BS EN 1092 (BS4505)
Larger sizes available on request
all dimensions in mm

All can be supplied with full face if required (non standard)

Rating DN 6

Nominal Pipe Size	Slip On Bore	Outside Diameter of Flange	Height of RF	Diameter of RF	Thickness			Overall Height Bossed	Overall Height Weld Neck	Diameter at Large End of Neck	Diameter at Small End of Neck	Diameter at Root of Boss	Bolt Circle Diameter	Number of Holes	Diameter of Holes
mm	**SB**	**0**	**RH**	**R**	**QB**	**QA**	**Q**	**YF**	**YW**	**X**	**AW**	**AB**	**P**	**N**	**HD**
15	22.3	80.0	2.0	40.0	12.0	12.0	12.0	20.0	30.0	30.0	21.3	30.0	55.0	4	11.0
20	27.6	90.0	2.0	50.0	14.0	14.0	14.0	24.0	32.0	38.0	26.9	40.0	65.0	4	11.0
25	34.5	100.0	2.0	60.0	14.0	14.0	14.0	24.0	35.0	42.0	33.7	50.0	75.0	4	11.0
32	43.1	120.0	2.0	70.0	14.0	14.0	16.0	26.0	35.0	55.0	42.4	60.0	90.0	4	14.0
40	49.5	130.0	2.0	80.0	14.0	14.0	16.0	26.0	38.0	62.0	48.3	70.0	100.0	4	14.0
50	61.9	140.0	2.0	90.0	14.0	14.0	16.0	28.0	38.0	74.0	60.3	80.0	110.0	4	14.0
65	74.6	160.0	2.0	110.0	14.0	14.0	16.0	32.0	38.0	88.0	76.1	100.0	130.0	4	14.0
80	90.6	190.0	2.0	128.0	16.0	16.0	18.0	34.0	42.0	102.0	88.9	110.0	150.0	4	18.0
100	116.0	210.0	2.0	148.0	16.0	16.0	18.0	40.0	45.0	130.0	114.3	130.0	170.0	4	18.0
125	141.3	240.0	2.0	178.0	18.0	18.0	20.0	44.0	48.0	155.0	139.7	160.0	200.0	8	18.0
150	170.6	265.0	2.0	202.0	18.0	18.0	20.0	44.0	48.0	184.0	168.3	185.0	225.0	8	18.0
200	221.1	320.0	2.0	258.0	20.0	20.0	22.0	44.0	55.0	236.0	219.1	240.0	280.0	8	18.0
250	276.3	375.0	2.0	312.0	22.0	22.0	24.0	44.0	60.0	290.0	273.0	295.0	335.0	12	18.0
300	327.1	440.0	2.0	365.0	22.0	22.0	24.0	44.0	62.0	342.0	323.9	355.0	395.0	12	22.0
350	358.6	490.0	2.0	415.0	22.0	22.0	26.0		62.0	385.0	355.6		445.0	12	22.0
400	409.4	540.0	2.0	465.0	22.0	22.0	28.0		65.0	438.0	406.4		495.0	16	22.0
450	460.0	595.0	2.0	520.0	24.0	22.0	30.0		65.0	492.0	457.0		550.0	16	22.0
500	511.0	645.0	2.0	570.0	24.0	24.0	30.0		68.0	538.0	508.0		600.0	20	22.0
600	613.0	755.0	2.0	670.0	30.0	30.0	32.0		70.0	640.0	610.0		705.0	20	26.0
700	715.0	860.0	2.0	775.0	40.0	24.0	40.0		70.0	740.0	711.0		810.0	24	26.0
800	816.0	975.0	2.0	880.0	44.0	24.0	44.0		70.0	842.0	813.0		920.0	24	30.0
900	918.0	1075.0	2.0	980.0	48.0	26.0	48.0		70.0	942.0	914.0		1020.0	24	30.0
1000	1020.0	1175.0	2.0	1080.0	52.0	26.0	52.0		70.0	1045.0	1016.0		1120.0	28	30.0
1200	1224.0	1405.0	2.0	1295.0	60.0	28.0	60.0		90.0	1248.0	1220.0		1340.0	32	33.0

• Stocked Item ○ Market Available

Metric Flanges

Rating DN 10

Nominal Pipe Size	Slip On Bore	Outside Diameter of Flange	Height of RF	Diameter of RF	Thickness			Overall Height Bossed	Overall Height Weld Neck	Diameter at Large End of Neck	Diameter at Small End of Neck	Diameter at Root of Boss	Bolt Circle Diameter	Number of Holes	Diameter of Holes
mm	**SB**	**0**	**RH**	**R**	**QB**	**QA**	**Q**	**YF**	**YW**	**X**	**AW**	**AB**	**P**	**N**	**HD**
15	22.3	95.0	2.0	45.0	16.0	16.0	14.0	22.0	38.0	32.0	21.3	35.0	65.0	4	14.0
20	27.6	105.0	2.0	58.0	18.0	18.0	16.0	26.0	40.0	39.0	26.9	45.0	75.0	4	14.0
25	34.5	115.0	2.0	68.0	18.0	18.0	16.0	28.0	40.0	46.0	33.7	52.0	85.0	4	14.0
32	43.1	140.0	2.0	78.0	18.0	18.0	18.0	30.0	42.0	56.0	42.4	60.0	100.0	4	18.0
40	49.5	150.0	2.0	88.0	18.0	18.0	18.0	32.0	45.0	64.0	48.3	70.0	110.0	4	18.0
50	61.9	165.0	2.0	102.0	18.0	18.0	19.0	28.0	45.0	74.0	60.3	84.0	125.0	4	18.0
65	74.6	185.0	2.0	122.0	18.0	18.0	20.0	32.0	45.0	92.0	76.1	104.0	145.0	4	18.0
80	90.6	200.0	2.0	138.0	20.0	20.0	20.0	34.0	50.0	110.0	88.9	118.0	160.0	8	18.0
100	116.0	220.0	2.0	158.0	20.0	20.0	22.0	40.0	52.0	130.0	114.3	140.0	180.0	8	18.0
125	141.3	250.0	2.0	188.0	22.0	22.0	22.0	44.0	55.0	158.0	139.7	168.0	210.0	8	18.0
150	170.6	285.0	2.0	212.0	22.0	22.0	24.0	44.0	55.0	184.0	168.3	195.0	240.0	8	22.0
200	221.1	340.0	2.0	268.0	24.0	24.0	24.0	44.0	62.0	234.0	219.1	246.0	295.0	8	22.0
250	276.3	395.0	2.0	320.0	26.0	26.0	26.0	46.0	68.0	288.0	273.0	298.0	350.0	12	22.0
300	327.1	445.0	2.0	370.0	26.0	26.0	26.0	46.0	68.0	342.0	323.9	350.0	400.0	12	22.0
350	358.6	505.0	2.0	430.0	26.0	26.0	28.0	53.0	68.0	390.0	355.6	400.0	460.0	16	22.0
400	409.4	565.0	2.0	482.0	26.0	26.0	32.0	57.0	72.0	440.0	406.4	456.0	515.0	16	26.0
450	460.0	615.0	2.0	532.0	28.0	28.0	36.0	63.0	72.0	488.0	457.0	502.0	565.0	20	26.0
500	511.0	670.0	2.0	585.0	28.0	28.0	38.0	67.0	75.0	540.0	508.0	559.0	620.0	20	26.0
600	613.0	780.0	2.0	685.0	34.0	28.0	42.0	75.0	80.0	640.0	610.0	658.0	725.0	20	30.0
700	715.0	895.0	2.0	800.0	38.0	30.0			80.0	746.0	711.0		840.0	24	30.0
800	816.0	1015.0	2.0	905.0	42.0	32.0			90.0	848.0	813.0		950.0	24	33.0
900	918.0	1115.0	2.0	1005.0	46.0	34.0			95.0	948.0	914.0		1050.0	28	33.0
1000	1020.0	1230.0	2.0	1110.0	52.0	34.0			95.0	1050.0	1016.0		1160.0	28	36.0
1200	1224.0	1455.0	2.0	1330.0	60.0	38.0			115.0	1256.0	1220.0		1380.0	32	39.0

Rating DN 16

Nominal Pipe Size	Slip On Bore	Outside Diameter of Flange	Height of RF	Diameter of RF	Thickness			Overall Height Bossed	Overall Height Weld Neck	Diameter at Large End of Neck	Diameter at Small End of Neck	Diameter at Root of Boss	Bolt Circle Diameter	Number of Holes	Diameter of Holes
mm	**SB**	**0**	**RH**	**R**	**QB**	**QA**	**Q**	**YF**	**YW**	**X**	**AW**	**AB**	**P**	**N**	**HD**
15	22.3	95.0	2.0	45.0	16.0	16.0	14.0	22.0	38.0	32.0	21.3	35.0	65.0	4	14.0
20	27.6	105.0	2.0	58.0	18.0	18.0	16.0	26.0	40.0	39.0	26.9	45.0	75.0	4	14.0
25	34.5	115.0	2.0	68.0	18.0	18.0	16.0	28.0	40.0	46.0	33.7	52.0	85.0	4	14.0
32	43.1	140.0	2.0	78.0	18.0	18.0	18.0	30.0	42.0	56.0	42.4	60.0	100.0	4	18.0
40	49.5	150.0	2.0	88.0	18.0	18.0	18.0	32.0	45.0	64.0	48.3	70.0	110.0	4	18.0
50	61.9	165.0	2.0	102.0	18.0	18.0	19.0	28.0	45.0	74.0	60.3	84.0	125.0	4	18.0
65	74.6	185.0	2.0	122.0	18.0	18.0	20.0	32.0	45.0	92.0	76.1	104.0	145.0	4	18.0
76	77.7	185.0	2.0	122.0	18.0	18.0	20.0	32.0	45.0	92.0	76.1	104.0	145.0	4	18.0
80	90.6	200.0	2.0	138.0	20.0	20.0	20.0	34.0	50.0	110.0	88.9	118.0	160.0	8	18.0
100	116.0	220.0	2.0	158.0	20.0	20.0	22.0	40.0	52.0	130.0	114.3	140.0	180.0	8	18.0
125	141.3	250.0	2.0	188.0	22.0	22.0	22.0	44.0	55.0	158.0	139.7	168.0	210.0	8	18.0
150	170.6	285.0	2.0	212.0	22.0	22.0	24.0	44.0	55.0	184.0	168.3	195.0	240.0	8	22.0
165	167.6	285.0	2.0	212.0	22.0	22.0	24.0	44.0	55.0	184.0	168.3	195.0	240.0	8	22.0
200	221.1	340.0	2.0	268.0	24.0	24.0	26.0	44.0	62.0	234.0	219.1	246.0	295.0	12	22.0
250	276.3	405.0	2.0	320.0	26.0	26.0	29.0	46.0	70.0	288.0	273.0	298.0	355.0	12	26.0
300	327.1	460.0	2.0	378.0	28.0	28.0	32.0	46.0	78.0	342.0	323.9	350.0	410.0	12	26.0
350	358.6	520.0	2.0	438.0	30.0	30.0	35.0	57.0	82.0	390.0	355.6	400.0	470.0	16	26.0
400	409.4	580.0	2.0	490.0	32.0	32.0	38.0	63.0	85.0	444.0	406.4	456.0	525.0	16	30.0
450	460.0	640.0	2.0	550.0	40.0	40.0	42.0	68.0	87.0	490.0	457.0	502.0	585.0	20	30.0
500	511.0	715.0	2.0	610.0	44.0	44.0	46.0	73.0	90.0	546.0	508.0	559.0	650.0	20	33.0
600	613.0	840.0	2.0	725.0	54.0	54.0	52.0	83.0	95.0	650.0	610.0	658.0	770.0	20	36.0
700	715.0	910.0	2.0	795.0	48.0	36.0		83.0	100.0	750.0	711.0	760.0	840.0	24	36.0
800	816.0	1025.0	2.0	900.0	52.0	38.0		90.0	105.0	848.0	813.0	864.0	950.0	24	39.0
900	918.0	1125.0	2.0	1000.0	58.0	40.0		94.0	110.0	948.0	914.0	968.0	1050.0	28	39.0
1000	1020.0	1255.0	2.0	1115.0	64.0	42.0		100.0	120.0	1056.0	1016.0	1072.0	1170.0	28	42.0
1200	1224.0	1485.0	2.0	1330.0	76.0	48.0			130.0	1260.0	1220.0		1390.0	32	48.0

Rating DN 25

Nominal Pipe Size	Slip On Bore	Outside Diameter of Flange	Height of RF	Diameter of RF	Thickness			Overall Height Bossed	Overall Height Weld Neck	Diameter at Large End of Neck	Diameter at Small End of Neck	Diameter at Root of Boss	Bolt Circle Diameter	Number of Holes	Diameter of Holes
mm	**SB**	**0**	**RH**	**R**	**QB**	**QA**	**Q**	**YF**	**YW**	**X**	**AW**	**AB**	**P**	**N**	**HD**
15	22.3	95.0	2.0	45.0	16.0	16.0	14.0	22.0	38.0	32.0	21.3	35.0	65.0	4	14.0
20	27.6	105.0	2.0	58.0	18.0	18.0	16.0	26.0	40.0	40.0	26.9	45.0	75.0	4	14.0
25	34.5	115.0	2.0	68.0	18.0	18.0	16.0	28.0	40.0	46.0	33.7	52.0	85.0	4	14.0
32	43.1	140.0	2.0	78.0	18.0	18.0	18.0	30.0	42.0	56.0	42.4	60.0	100.0	4	18.0
40	49.5	150.0	2.0	88.0	18.0	18.0	18.0	32.0	45.0	64.0	48.3	70.0	110.0	4	18.0
50	61.9	165.0	2.0	102.0	20.0	20.0	20.0	34.0	48.0	74.0	60.3	84.0	125.0	4	18.0
65	74.6	185.0	2.0	122.0	22.0	22.0	22.0	38.0	52.0	92.0	76.1	104.0	145.0	8	18.0
80	90.6	200.0	2.0	138.0	24.0	24.0	24.0	40.0	58.0	110.0	88.9	118.0	160.0	8	18.0
100	116.0	235.0	2.0	162.0	24.0	24.0	26.0	44.0	65.0	134.0	114.3	145.0	190.0	8	22.0
125	141.3	270.0	2.0	188.0	26.0	26.0	28.0	48.0	68.0	162.0	139.7	170.0	220.0	8	26.0
150	170.6	300.0	2.0	218.0	28.0	28.0	30.0	52.0	75.0	190.0	168.3	200.0	250.0	8	26.0
200	221.1	360.0	2.0	278.0	30.0	30.0	32.0	52.0	80.0	244.0	219.1	256.0	310.0	12	26.0
250	276.3	425.0	2.0	335.0	32.0	32.0	35.0	60.0	88.0	296.0	273.0	310.0	370.0	12	30.0
300	327.1	485.0	2.0	395.0	34.0	34.0	38.0	67.0	92.0	350.0	323.9	364.0	430.0	16	30.0
350	358.6	555.0	2.0	450.0	38.0	38.0	42.0	72.0	100.0	398.0	355.6	418.0	490.0	16	33.0
400	409.4	620.0	2.0	505.0	40.0	40.0	46.0	78.0	110.0	452.0	406.4	472.0	550.0	16	36.0
450	460.0	670.0	2.0	555.0	46.0	46.0	50.0	84.0	110.0	500.0	457.0	520.0	600.0	20	36.0
500	511.0	730.0	2.0	615.0	48.0	48.0	56.0	90.0	125.0	558.0	508.0	580.0	660.0	20	36.0
600	613.0	845.0	2.0	720.0	58.0	58.0	68.0	100.0	125.0	660.0	610.0	684.0	770.0	20	39.0

Rating DN 40

Nominal Pipe Size	Slip On Bore	Outside Diameter of Flange	Height of RF	Diameter of RF	Thickness			Overall Height Bossed	Overall Height Weld Neck	Diameter at Large End of Neck	Diameter at Small End of Neck	Diameter at Root of Boss	Bolt Circle Diameter	Number of Holes	Diameter of Holes
mm	**SB**	**0**	**RH**	**R**	**QB**	**QA**	**Q**	**YF**	**YW**	**X**	**AW**	**AB**	**P**	**N**	**HD**
15	22.3	95.0	2.0	45.0	16.0	16.0	14.0	22.0	38.0	32.0	21.3	35.0	65.0	4	14.0
20	27.6	105.0	2.0	58.0	18.0	18.0	16.0	26.0	40.0	40.0	26.9	45.0	75.0	4	14.0
25	34.5	115.0	2.0	68.0	18.0	18.0	16.0	28.0	40.0	46.0	33.7	52.0	85.0	4	14.0
32	43.1	140.0	2.0	78.0	18.0	18.0	18.0	30.0	42.0	56.0	42.4	60.0	100.0	4	18.0
40	49.5	150.0	2.0	88.0	18.0	18.0	18.0	32.0	45.0	64.0	48.3	70.0	110.0	4	18.0
50	61.9	165.0	2.0	102.0	20.0	20.0	20.0	34.0	48.0	74.0	60.3	84.0	125.0	4	18.0
65	74.6	185.0	2.0	122.0	22.0	22.0	22.0	38.0	52.0	92.0	76.1	104.0	145.0	8	18.0
80	90.6	200.0	2.0	138.0	24.0	24.0	24.0	40.0	58.0	110.0	88.9	118.0	160.0	8	18.0
100	116.0	235.0	2.0	162.0	24.0	24.0	26.0	44.0	65.0	134.0	114.3	145.0	190.0	8	22.0
125	141.3	270.0	2.0	188.0	26.0	26.0	28.0	48.0	68.0	162.0	139.7	170.0	220.0	8	26.0
150	170.6	300.0	2.0	218.0	28.0	28.0	30.0	52.0	75.0	190.0	168.3	200.0	250.0	8	26.0
200	221.1	375.0	2.0	285.0	36.0	34.0	36.0	52.0	88.0	244.0	219.1	260.0	320.0	12	30.0
250	276.3	450.0	2.0	345.0	38.0	38.0	42.0	60.0	105.0	306.0	273.0	312.0	385.0	12	33.0
300	327.1	515.0	2.0	410.0	42.0	42.0	48.0	67.0	115.0	362.0	323.9	380.0	450.0	16	33.0
350	358.6	580.0	2.0	465.0	46.0	46.0	54.0	72.0	125.0	408.0	355.6	424.0	510.0	16	36.0
400	409.4	660.0	2.0	535.0	50.0	50.0	60.0	78.0	135.0	462.0	406.4	478.0	585.0	16	39.0
450	460.0	685.0	2.0	560.0	57.0	57.0	66.0	84.0	135.0	500.0	457.0	522.0	610.0	20	39.0
500	511.0	755.0	2.0	615.0	57.0	57.0	72.0	90.0	140.0	562.0	508.0	576.0	670.0	20	42.0
600	613.0	890.0	2.0	735.0	72.0	72.0	84.0	100.0	150.0	666.0	610.0	686.0	795.0	20	48.0

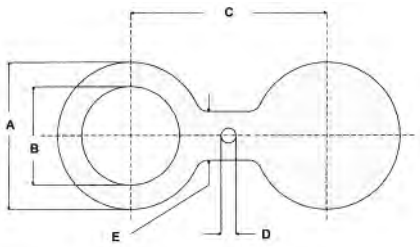
Rating DN 63

Nominal Pipe Size	Slip On Bore	Outside Diameter of Flange	Height of RF	Diameter of RF	Thickness			Overall Height Bossed	Overall Height Weld Neck	Diameter at Large End of Neck	Diameter at Small End of Neck	Diameter at Root of Boss	Bolt Circle Diameter	Number of Holes	Diameter of Holes
mm	**SB**	**0**	**RH**	**R**	**QB**	**QA**	**Q**	**YF**	**YW**	**X**	**AW**	**AB**	**P**	**N**	**HD**
15	22.3	105.0	2.0	45.0	20.0	20.0	20.0	28.0	45.0	34.0	21.3	43.0	75.0	4	14.0
20	27.6	130.0	2.0	58.0	22.0	22.0	22.0	30.0	48.0	42.0	26.9	52.0	90.0	4	18.0
25	34.5	140.0	2.0	68.0	24.0	24.0	24.0	32.0	58.0	52.0	33.7	60.0	100.0	4	18.0
32	43.1	155.0	2.0	78.0	24.0	24.0	24.0	32.0	60.0	62.0	42.4	68.0	110.0	4	22.0
40	49.5	170.0	2.0	88.0	26.0	26.0	26.0	34.0	62.0	70.0	48.3	80.0	125.0	4	22.0
50	61.9	180.0	2.0	102.0	26.0	26.0	26.0	36.0	62.0	82.0	60.3	90.0	135.0	4	22.0
65	74.6	205.0	2.0	122.0	26.0	26.0	26.0	40.0	68.0	98.0	76.1	112.0	160.0	8	22.0
80	90.6	215.0	2.0	138.0	28.0	28.0	30.0	44.0	72.0	112.0	88.9	125.0	170.0	8	22.0
100	116.0	250.0	2.0	162.0	30.0	30.0	32.0	52.0	78.0	138.0	114.3	152.0	200.0	8	26.0
125	141.3	295.0	2.0	188.0	34.0	34.0	34.0	56.0	88.0	168.0	139.7	185.0	240.0	8	30.0
150	170.6	345.0	2.0	218.0	36.0	36.0	36.0	60.0	95.0	202.0	168.3	215.0	280.0	8	33.0
200	221.1	415.0	2.0	285.0	42.0	42.0	46.0		110.0	256.0	219.1		345.0	12	36.0
250	276.3	470.0	2.0	345.0	46.0	46.0	54.0		125.0	316.0	273.0		400.0	12	36.0
300	327.1	530.0	2.0	410.0	52.0	52.0	62.0		140.0	372.0	323.9		460.0	16	36.0
350	358.6	600.0	2.0	465.0	56.0	56.0	72.0		150.0	420.0	355.6		525.0	16	39.0
400	409.4	670.0	2.0	535.0	60.0	60.0	78.0		160.0	475.0	406.4		585.0	16	42.0

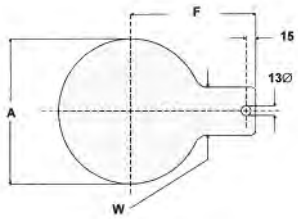
Rating DN 100

Nominal Pipe Size	Slip On Bore	Outside Diameter of Flange	Height of RF	Diameter of RF	Thickness			Overall Height Bossed	Overall Height Weld Neck	Diameter at Large End of Neck	Diameter at Small End of Neck	Diameter at Root of Boss	Bolt Circle Diameter	Number of Holes	Diameter of Holes
mm	**SB**	**0**	**RH**	**R**	**QB**	**QA**	**Q**	**YF**	**YW**	**X**	**AW**	**AB**	**P**	**N**	**HD**
15	22.3	105.0	2.0	45.0	20.0	20.0	20.0	28.0	45.0	34.0	21.3	43.0	75.0	4	14.0
20	27.6	130.0	2.0	58.0	22.0	22.0	22.0	30.0	48.0	42.0	26.9	52.0	90.0	4	18.0
25	34.5	140.0	2.0	68.0	24.0	24.0	24.0	32.0	58.0	52.0	33.7	60.0	100.0	4	18.0
32	43.1	155.0	2.0	78.0	24.0	24.0	24.0	32.0	60.0	62.0	42.4	68.0	110.0	4	22.0
40	49.5	170.0	2.0	88.0	26.0	26.0	26.0	34.0	62.0	70.0	48.3	80.0	125.0	4	22.0
50	61.9	195.0	2.0	102.0	28.0	28.0	28.0	36.0	68.0	90.0	60.3	95.0	145.0	4	26.0
65	74.6	220.0	2.0	122.0	30.0	30.0	30.0	40.0	76.0	108.0	76.1	118.0	170.0	8	26.0
80	90.6	230.0	2.0	138.0	32.0	32.0	34.0	44.0	78.0	120.0	88.9	130.0	180.0	8	26.0
100	116.0	265.0	2.0	162.0	36.0	36.0	36.0	52.0	90.0	150.0	114.3	158.0	210.0	8	30.0
125	141.3	315.0	2.0	188.0	40.0	40.0	42.0	56.0	105.0	180.0	139.7	188.0	250.0	8	33.0
150	170.6	355.0	2.0	218.0	44.0	44.0	48.0	60.0	115.0	210.0	168.3	225.0	290.0	12	33.0
200	221.1	430.0	2.0	285.0	52.0	52.0	60.0		130.0	278.0	219.1		360.0	12	36.0
250	276.3	505.0	2.0	345.0	60.0	60.0	72.0		157.0	340.0	273.0		430.0	12	39.0
300	327.1	585.0	2.0	410.0	68.0	68.0	84.0		170.0	400.0	323.9		500.0	16	42.0
350	358.6	655.0	2.0	465.0	74.0	74.0	95.0		189.0	460.0	355.6		560.0	16	48.0
400	409.4	715.0	2.0	535.0			106.0				406.4		620.0	16	48.0
500	511.0	870.0	2.0	615.0			128.0				508.0		760.0	20	56.0

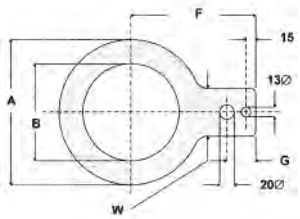
Flange Blinds



SPECTACLE BLIND



PADDLE BLIND



RING SPACER

NB Size	ANSI 150									ANSI 300								
	A	B	C	D	E	W	F	G	T	A	B	C	D	E	W	F	G	T
25	63.0	29.0	79.0	16.0	42.0	32.0	145.0	40.0	6.0	70.0	29.0	89.0	16.0	45.0	32.0	150.0	40.0	6.0
40	82.0	42.0	98.0	16.0	50.0	32.0	155.0	40.0	6.0	92.0	42.0	114.0	22.0	50.0	32.0	170.0	40.0	6.0
50	101.0	54.0	121.0	19.0	60.0	32.0	165.0	40.0	6.0	108.0	54.0	127.0	19.0	60.0	25.0	173.0	40.0	10.0
80	132.0	80.0	152.0	19.0	60.0	32.0	175.0	40.0	6.0	146.0	80.0	168.0	22.0	60.0	32.0	195.0	40.0	10.0
100	171.0	104.0	191.0	19.0	70.0	32.0	205.0	40.0	10.0	177.0	104.0	200.0	22.0	65.0	32.0	215.0	40.0	12.0
150	218.0	156.0	241.0	22.0	80.0	32.0	230.0	40.0	10.0	247.0	156.0	270.0	22.0	80.0	32.0	250.0	40.0	20.0
200	276.0	204.0	298.0	22.0	90.0	40.0	260.0	45.0	16.0	304.0	204.0	330.0	25.0	90.0	40.0	280.0	45.0	22.0
250	336.0	256.0	362.0	25.0	100.0	40.0	295.0	45.0	16.0	358.0	256.0	387.0	29.0	100.0	40.0	312.0	45.0	25.0
300	406.0	306.0	432.0	25.0	110.0	50.0	330.0	45.0	20.0	419.0	306.0				50.0	350.0	45.0	30.0
350	447.0	338.0	476.0	29.0	120.0	50.0	360.0	45.0	22.0	482.0	338.0				40.0	383.0	45.0	32.0
400	510.0	389.0				50.0	390.0	45.0	25.0	535.0	384.0				50.0	415.0	45.0	36.0
450	545.0	440.0				50.0	410.0	45.0	25.0	592.0	434.0				40.0	445.0	45.0	42.0
500	600.0	491.0				60.0	440.0	45.0	30.0	650.0	485.0				45.0	447.0	45.0	46.0
600	715.0	593.0				60.0	500.0	50.0	36.0	770.0	578.0				60.0	477.0	45.0	46.0

* Refer to note

NB Size	ANSI 600									ANSI 900								
	A	B	C	D	E	W	F	G	T	A	B	C	D	E	W	F	G	T
25	70.0	29.0	89.0	16.0	52.0	32.0	150.0	40.0	6.0	76.0	29.0	102.0	25.0	60.0	32.0	164.0	40.0	10.0
40	92.0	42.0	114.0	22.0	65.0	32.0	170.0	40.0	10.0	95.0	42.0	124.0	29.0	65.0	32.0	179.0	40.0	40.0
50	108.0	52.0	127.0	19.0	65.0	25.0	173.0	40.0	10.0	139.0	52.0	165.0	25.0	70.0	32.0	198.0	40.0	12.0
80	146.0	76.0	168.0	22.0	65.0	32.0	195.0	40.0	16.0	164.0	76.0	191.0	25.0	75.0	32.0	210.0	40.0	16.0
100	190.0	100.0	216.0	25.0	75.0	32.0	225.0	40.0	16.0	202.0	100.0	235.0	32.0	90.0	32.0	235.0	40.0	10.0
150	263.0	149.0	292.0	29.0	85.0	32.0	267.0	40.0	25.0	284.0	149.0	316.0	32.0	100.0	32.0	280.0	40.0	30.0
200	317.0	196.0	349.0	32.0	95.0	40.0	300.0	45.0	30.0	354.0	196.0	394.0	39.0	110.0	40.0	325.0	45.0	36.0
250	397.0	246.0				40.0	345.0	45.0	36.0	430.0	246.0				40.0	363.0	45.0	42.0
300	454.0	292.0				38.0	370.0	45.0	42.0	493.0	292.0				40.0	395.0	45.0	50.0
350	488.0	320.0				40.0	393.0	45.0	46.0	515.0	320.0				40.0	410.0	45.0	55.0
400	561.0	366.0				50.0	432.0	45.0	50.0	570.0	366.0				50.0	443.0	45.0	65.0
450	610.0	412.0				50.0	463.0	45.0	60.0	635.0	412.0				50.0	485.0	45.0	70.0
500	680.0	460.0				45.0	500.0	45.0	65.0	695.0	460.0				60.0	520.0	45.0	80.0
600	786.0	552.0				50.0	560.0	50.0	80.0	835.0	552.0				60.0	615.0	50.0	95.0

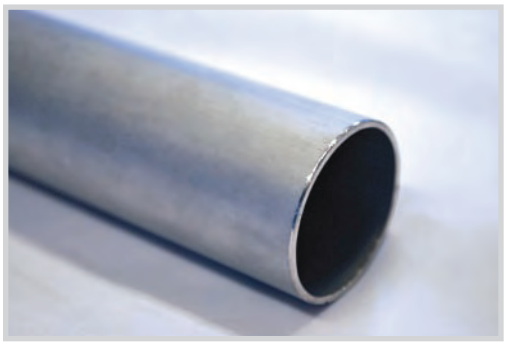
* Refer to note

* Use paddle blinds and ring spacers where no dimensions are shown for spectacle blind.
Dimensions based on sizes designed to suit ANSI B.16.5 flanges. All dimensions given in mm.
T = Thickness

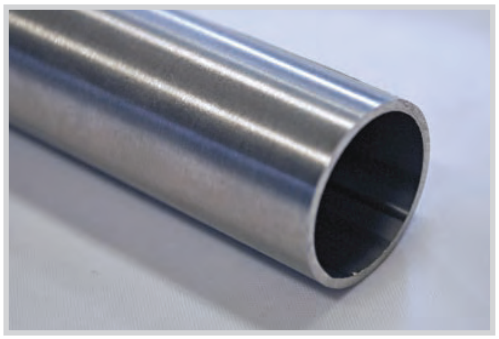
Tube Finishes

Stirlings Australia offers a range of "High Specification" tube products, specially developed for architectural, building, marine, food and hospitality industries. Tube Finishes:

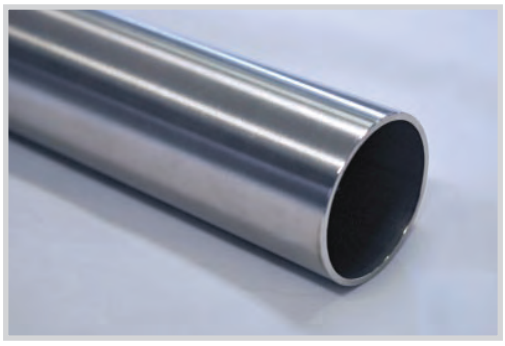
- HiMill - Smooth, dull finish.
- HiThree - Smooth, hairline grain polish #300 grit polish.
- HiBev - Smooth, hairline grain polish externally, internally smooth (AS1528).
- HiSix - Smooth, light grain bright polish #600 grit polish.
- HiSix Annealed - Smooth, light grain polish, annealed 600#.
- HiPol - Mirror lustre, highest polished tube available.



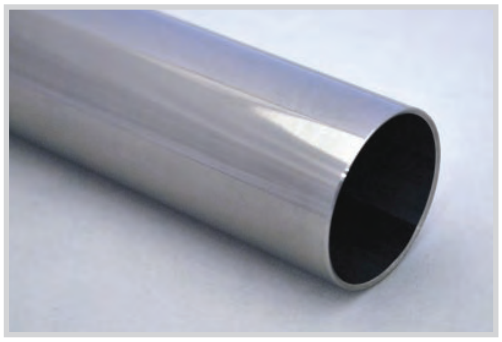
HiMill



HiThree



HiBev



HiSix

HiPol

Welded Tube

Manufactured to
ASTM A554: HiMill, HiThree, HiSix & HiPol
ASTM A269: HiMill annealed, HiSix annealed
ASTM A789: 2205 HiMill annealed
ASTM A249: available from production
ASTM 1528: HiBev

Length: 6 mtrs or 6.1 mtrs (2205)
Please refer to "Tube Finish Details" page for more information.

Size W.T.	Size O.D.	304 HiMill	304 HiSix	304 HiSix Ann	316 HiMill	316 HiMill Ann	316 HiThree	316 HiBev	316 HiSix	316 HiPol	2205 HiMill Ann	Apprx. Wgt. (kg/m)
1.2	9.52	○	○		○							0.25
	12.70	○	●		○				○			0.34
	15.88	○	●		○							0.44
	19.05	○	●	○	○				●			0.53
	22.22	○	●	○	○				○			0.63
	25.40	○	●	●	○				○			0.73
	31.75	○	●	○								0.92
	38.10	○	○	○	○							1.11
	50.80	○	○									1.49
1.6	9.52	○			○				○			0.31
	12.70	○	●	○	○		○		●			0.44
	15.88	○	●		○		○		●			0.57
	19.05	○	●	○	○		○		●		●	0.70
	22.22	○	●	○	○		○		●			0.83
	25.40	○	●	○	○	●	○	●	●	●	●	0.95
	31.75	○	●	○	○		○		○	●		1.21
	38.10	○	●	●	○	●	●	●	●	●	●	1.46
	50.80	○	●	●	○	●	●	●	●	●	●	1.98
	63.50	○	●	○	●	●	●	●	●	●		2.49
	76.20	○	●	○	●		○	●	●	●		3.00
	101.6	○	●	○	●		○	●	●			4.02
	127.0	○			●		●		○			5.03
	152.4				●		●		○			6.05
2.0	50.8				●							2.82
	63.5					●					●	3.08
	76.20					●					●	3.70
	101.6					●					●	5.00
	127.0											6.30
	152.4											8.00
	203.0											10.00
3.0	50.8								●			3.65

Note: Other finishes available on request. Alternative specification A249 (welded heat exchanger tube)

● Stocked Item ○ Market Available

Insulated Tube

Manufactured to A554 (304 & 316), AS 1528 (304 & 316), A789 (2205)
Tube OD 25.4 to 101.6 mm,
Tube WT 1.2 to 2.0 mm
Length: 6 Mtrs

Supply
Manufactured upon request.

Polyurethane Insulation
- Manufactured to 38 mm tk, injected at min 55 Kgs/M3 density
- Length 5.7 Mtrs (150 mm exposed at each end for joining)
- Insulation ends sealed with waterproof mastic

Casing
- Manufactured from "colorbond" 0.55 mm Tk, spiral wound, encasing Stainless Steel Tube & Polyurethane Insulation.
- Length 5.7 Mtrs (150 mm exposed at each end for joining)

Size				
W.T.	O.D.	304	316	2205
1.2	25.40	○	○	○
	31.75	○	○	○
	38.10	○	○	○
	50.80	○	○	○
1.6	25.40	○	○	○
	31.75	○	○	○
	38.10	○	○	○
	50.80	○	○	○
	63.50	○	○	○
	76.20	○	○	○
	101.6	○	○	○
2.0	50.8	○	○	○
	63.5	○	○	○
	76.20	○	○	○
	101.6	○	○	○

For fittings information, please refer to "Insulation Fittings".

• Stocked Item ○ Market Available

Seamless Tube

Manufactured to A269/213
Cold Drawn Seamless Annealed
Length: 6 mtrs
Plain End & End Caps
Mechanical polish available for production quantity & lead time

Size W.T.	O.D.	304/304L	316/316L	Weight kg/metre	Burst Pressure PSI	Typical Safe Working Pressure
0.9	3.18	○	○	0.05	42,433	10,608
	4.76	○	●	0.08	28,348	7,087
	6.35	○	●	0.12	21,500	5,375
	7.94	○	○	0.15	17,200	4,300
	9.52	○	●	0.19	14,300	3,575
	12.70	○	●	0.26	10,750	2,687
1.2	6.35	○	●	0.15	28,333	7,083
	7.94	○	●	0.20	22,659	5,664
	9.52	○	●	0.25	19,200	4,800
	12.70	○	●	0.35	14,410	3,602
	15.88	○	●	0.45	11,520	2,880
	19.05	○	●	0.55	9,610	2,402
	25.40	○	●	0.75	7,200	1,800
1.6	6.35	○	●	0.19	37,777	9,444
	9.52	○	●	0.32	25,198	6,299
	12.70	○	●	0.45	19,250	4,812
	15.88	○	●	0.58	15,400	3,850
	19.05	○	●	0.71	12,830	3,207
	25.40	○	●	0.98	9,630	2,407
	31.75	○	●	1.24	7,700	1,925
	38.10	○	●	1.51	6,420	1,605
	50.80	○	●	2.03	4,810	1,202
2.0	19.05	○	●	0.89	15,740	3,935
	25.40	○	●	1.23	11,805	2,951
	31.75	○	●	1.57	9,590	2,397
	38.10	○	○	1.90	7,990	1,997
3.0	25.40	○	●	1.71	17,708	4,427
	31.75	○	●	2.19	14,166	3,541
	38.10	○	●	2.68	11,805	2,951
	50.80	○	○	3.65	9,600	2,400

SAFE WORKING PRESSURES FOR AUSTENITIC STAINLESS STEEL TUBING

The safe working pressure is obtained by dividing the working pressure (refer table above) by a suitable safety factor.

Alternative specifications: A213.
Alternative grades also available.

Safety Factor	Type of Pressure Fluctuation
5	None Present
8	Small and regular
12	Prolonged and excessive

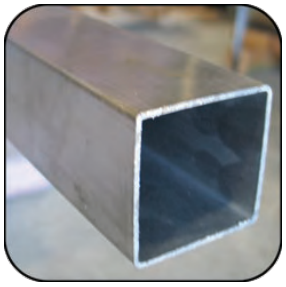
Please note, the typical safe working pressure figures in the table above were calculated on a safety factor of '4'.

● Stocked Item ○ Market Available

Tube Square & Rectangular Sections SHS & RHS

Manufactured to ASTM A554
Available in welded only, polished or unpolished.
Grades 304 and 316.

180 grit polish
400 grit polish
unpolished

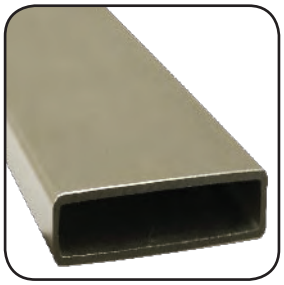


Square Sections Wall	Size	304 Unpolished	316 Unpolished	304 #180 Grit	316 #180 Grit	316 # 400 Grit	Weight kg/mtr
1.2	12.7 x 12.7	○	○	○	○	○	0.441
	15.88 x 15.88	○	○	○	○	○	0.631
	19.05 x 19.05	○	○	●	○	○	0.673
	22.22 x 22.22	○	○	●	○	○	0.883
	25.4 x 25.4	○	○	●	○	○	0.824
	31.8 x 31.8	○	○	●	○	○	1.085
	38.1 x 38.1	○	○	○	○	○	1.440
	50.8 x 50.8	○	○	○	○	○	1.900
1.6	19.05 x 19.05	○	○	●	○	○	1.174
	22.22 x 22.22	○	○	○	○	○	1.396
	25.4 x 25.4	○	○	●	●	●	1.552
	31.8 x 31.8	○	○	●	●	●	1.849
	38.1 x 38.1	○	○	●	●	●	1.875
	50.8 x 50.8	○	○	●	●	●	2.489
2.0	50.8 x 50.8	○	●	●	○	○	3.400
3.0	50.8 x 50.8	○	●	○	○	○	4.480
	80.0 x 80.0	○	●	○	○	○	7.30
	100.0 x 100.0	○	●	○	○	○	9.60

Size		Grade 304L # 180 Grit	316L # 180 Grit	316L # 400 Grit	Unpolished	Weight kg/mtr
Rectangular	50.8 x 25.4 x 1.6	●	●	●		1.90
	50.8 x 25.4 x 3.0 (400#)	○	○	●		3.30
	51 x 25 x 3.0	○	●			4.48
	65 x 38 x 3.0	○	○			5.42
	84 x 38 x 3.0	○	○			5.68
	80 x 40 x 1.6	●	○			3.05
	80 x 40 x 3.0	○	○		●	5.58
	100 x 50 x 3.0	○	○		●	7.36
Circular	33.4 x 2.65	○	○			2.01
	48.3 x 2.65	○	○			2.99
	60.3 x 2.65	○	○			3.77
	76.2 x 2.85	○	○			5.16
	88.9 x 2.85	○	○			6.05

"Flat" Rectangular Tube Section

Manufactured to ASTM A554
Available in welded grade 316 # 600 grit polish only



Size		316 # 600 Grit
Rectangular	50 x 10 x 1.5	●
	75 x 10 x 1.5	●

● Stocked Item ○ Market Available

Hypo & Capillary Tube

Hypodermic:
Welded hard drawn 304 grade stainless steel.
Polished drawn finsh.
Lengths are 2 metres.

Capillary
Welded annealed 316 grade stainless steel.
Available only in a coil form.

Hypodermic

Outside Diameter mm	Inside Diameter mm	Wall Thickness	Grade	Availabilty
0.40	0.22	0.09	304	○
0.45	0.25	0.10	304	○
0.50	0.20	0.15	304	○
0.60	0.30	0.15	304	○
0.70	0.38	0.16	304	○
0.80	0.50	0.15	304	○
1.00	0.60	0.20	304	○
1.20	0.80	0.20	304	○
1.40	1.00	0.20	304	○
1.60	1.20	0.20	304	○
1.80	1.50	0.15	304	○
2.00	1.50	0.25	304	○
2.20	1.70	0.25	304	○
2.50	2.00	0.25	304	○
2.80	2.30	0.25	304	○
3.00	2.50	0.25	304	○
4.00	3.50	0.25	304	○
4.50	3.50	0.50	304	○

Capillary

Outside Diameter mm	Inside Diameter mm	Wall Thickness	Grade	Availabilty
3.2	2.38	0.41	316	○
3.2	1.74	0.72	316	○

• Stocked Item ○ Market Available

Slotted Tube

Manufactured to ASTM A554
Round (Single & Double Slots).
Material: 316.
Length: 6 mtrs.
600# HiSix

Available O.D.	"U" Channel	W/T of Glass	Slot Type	316	kg/metre
50.8mm	15x15mm	5-13mm	Single	●	1.98
50.8	15x15mm	5-13mm	Double	●	1.98
63.5mm	20x20mm	8-18mm	Single	○	2.49
63.5mm	20x20mm	8-18mm	Double	○	2.49

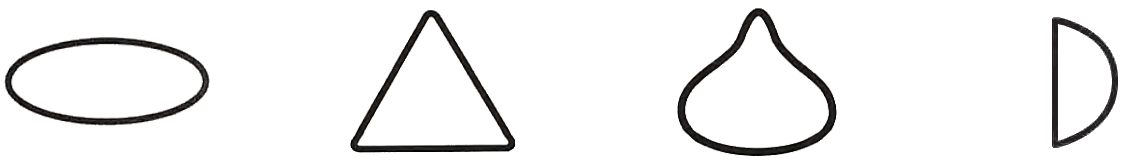
For double slotted tube, please enquire.

Oval Tube

Manufactured to ASTM A554
Material: 316
Polished 600#

Elliptical (Oval)		Triangle		Teardrop		"D" Section	
38 x 23mmx1.5	●	24mm	○	48 x 25.5mm	○	40 x 19mm	○
46 x 28mmx1.5	●	37mm	○			47 x 25mm	○
75 x 42mm x1.5	●	51mm	○			48 x 24mm	○
		78mm	○			48 x 23mm	○
		105mm	○			50 x 25mm	○
						55 x 29mm	○
						55 x 28mm	○
						56 x 27mm	○
						62 x 34mm	○
						63 x 33mm	○

All are 1.6mm wall thickness



● Stocked Item ○ Market Available

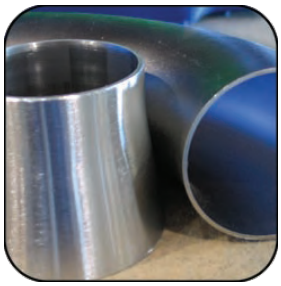
Buttweld Tube Fittings

Manufactured from ASTM A554 stainless steel tube.

Tube bends have centre line radius 1.5 time the diameter.
Short Radius available in 31.8x1.60mm 316. Other sizes/grades available upon request.

Available Polished or Unpolished in most sizes.
HiBev (AS 1528) specification also available.

Weights are in Kg.



W.T.	O.D.	90º Bend 316					45º Bend				180º Bend	
mm	mm	304	316	HiBev	2205	Wgt	304	316	HiBev	Wgt	316	Wgt
1.6	12.70		●			0.01				0.01		0.01
	19.05	○	●	●		0.02	○	●	●	0.02	○	0.03
	25.40	●	●	●	●	0.04	○	●	●	0.03	○	0.05
	31.75	●	●			0.06	○	○		0.05	○	0.08
	38.10	●	●	●	●	0.08	○	●	●	0.07	○	0.11
	50.80	●	●	●	●	0.15	○	●	●	0.12	○	0.20
	63.50	●	●	●		0.23	○	●	●	0.18	○	0.31
	76.20	●	●	●		0.34	○	●	●	0.27	○	0.45
	101.6	●	●	●		0.60	○	●	●	0.48	○	0.80
	127.0	○	○			0.95	○	○		0.75		1.26
	152.4	○	○			1.36	○	○		1.09		1.81
	203.0	○	○			2.42				1.94		3.23
	254.0	○	○			3.50				2.90		4.70
2.0	25.4		○			0.04				0.04		0.06
	31.75		○			0.07				0.06		0.09
	38.1		○			0.10				0.08		0.13
	50.80		●			0.18				0.15		0.24
	63.50		●		●	0.29				0.23		0.38
	76.20		●		●	0.42				0.33		0.56
	101.60		●		●	0.75				0.60		1.00
	127.00		●			1.17				0.94		1.57
	152.4		●			1.70				1.36		2.26
	203.2		●			3.02				2.42		4.03

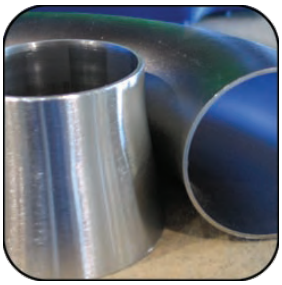
W.T.	O.D.	Equal Tee				Y-Piece		Tube Cap		Tube Cross	
mm	mm	316	316 HiBev	2205	Wgt	316	Wgt	316	Wgt	316	Wgt
1.6	12.70	●	●		0.05	○	0.05			○	
	19.05	●	●		0.08	○	0.08			○	
	25.40	●	●	●	0.13	○	0.13	○		○	
	31.75	●	●		0.20	○	0.20	○		○	
	38.10	●	●	●	0.30	○	0.30	●		○	
	50.80	●	●	●	0.50	○	0.50	●		○	
	63.50	●	●		0.80	○	0.80	○		○	
	76.20	●	●		1.10	○	1.10	○		○	
	101.6	●	●		1.60	○	1.60	○		○	
	127.0	○			1.80	○	1.80	○		○	
	152.4	○			2.80	○	2.80	○		○	
	203.0				3.50	○	3.50			○	
	254.0				4.30	○	4.30			○	
2.0	25.4				0.15		0.15				
	31.75				0.25		0.25				
	38.1				0.38		0.38				
	50.80				0.65		0.65				
	63.50			●	1.10		1.10				
	76.20			●	1.50		1.50				
	101.60			●	2.30		2.30				
	127.00				3.80		3.80				
	152.4				5.40		5.40				
	203.2				8.40		8.40				

● Stocked Item ○ Market Available

Buttweld Tube Fittings

Reducers
Manufactured with square cut ends to suit stainless steel tube diameters
HiBev (AS 1528) specification available.

Rings
Face rings are flat faced and manufactured from sheet.
Angle necks are manufactured from angle to suit tube diameters.



Reducers

Size (mm)		Concentric Reducer		Eccentric Reducer	
W.T.	Diameters	316	316 HiBev	316	Weight (kg)
1.6	25.40 x 12.70	●	●	○	0.04
	25.40 x 19.05	●	●	○	0.04
	31.75 x 25.40	●	●	○	0.05
	38.10 x 25.40	●	●	○	0.05
	38.10 x 31.75	●	●	○	0.05
	50.80 x 25.40	●	●	○	0.10
	50.80 x 38.10	●	●	○	0.10
	63.50 x 25.40	●	●	○	0.10
	63.50 x 31.75	○	○	○	0.10
	63.50 x 38.10	●	●	○	0.10
	63.50 x 50.80	●	●	○	0.10
	76.20 x 25.40	●	●	○	0.25
	76.20 x 38.10	●	●	○	0.25
	76.20 x 50.80	●	●	○	0.25
	76.20 x 63.50	●	●	○	0.25
	101.60 x 50.80	●	●	○	0.30
	101.60 x 63.50	●	●	○	0.30
	101.60 x 76.20	●	●	○	0.30
	152.40 x 50.80	○	○	○	0.70
	152.40 x 76.20	●	●	○	0.70
	152.40 x 101.60	●	●	○	0.70
2.0	76.10 x 50.80	●		○	0.38
	76.10 x 63.50	●		○	0.38

Rings

Outside Diameter mm	Type	Material	Grade 316
38.1	Flat face	3mm thick	○
50.8	Flat face	3mm thick	○
63.5	Flat face	3mm thick	○
76.2	Angle Neck	20 x 20 x 3	○
101.6	Angle Neck	20 x 20 x 3	○
152.4	Angle Neck	25 x 25 x 3	○
203.0	Angle Neck	25 x 25 x 3	○
254.0	Angle Neck	30 x 30 x 4	○
305.0	Angle Neck	30 x 30 x 4	○

● Stocked Item ○ Market Available

Insulated Tube Fittings

Manufactured from A554 (304 & 316), AS 1528 (304 & 316), A789 (2205) Tubing
Tube OD 25.4 to 101.6 mm
Tube WT 1.2 to 2.0 mm

Supply
Manufactured upon request

Polyurethane Insulation
Manufactured & Preformed to suit Fittings, with foil facing acting as vapor seal & supplied with foil tape.

Casing
Manufactured & Preformed from "colorbond" 0.55 mm Tk, with self drilling screws & silicone, to encase Stainless Steel Tube & Polyurethane Insulation.

Size		**90 deg Bend**		
W.T.	O.D.	304	316	2205
1.2	25.40	○	○	○
	31.75	○	○	○
	38.10	○	○	○
	50.80	○	○	○
1.6	25.40	○	○	○
	31.75	○	○	○
	38.10	○	○	○
	50.80	○	○	○
	63.50	○	○	○
	76.20	○	○	○
	101.6	○	○	○
2.0	50.8	○	○	○
	63.5	○	○	○
	76.20	○	○	○
	101.6	○	○	○

Size		**Equal Tee**		
W.T.	O.D.	304	316	2205
1.2	25.40	○	○	○
	31.75	○	○	○
	38.10	○	○	○
	50.80	○	○	○
1.6	25.40	○	○	○
	31.75	○	○	○
	38.10	○	○	○
	50.80	○	○	○
	63.50	○	○	○
	76.20	○	○	○
	101.6	○	○	○
2.0	50.8	○	○	○
	63.5	○	○	○
	76.20	○	○	○
	101.6	○	○	○

• Stocked Item ○ Market Available

Insulated Tube Fittings

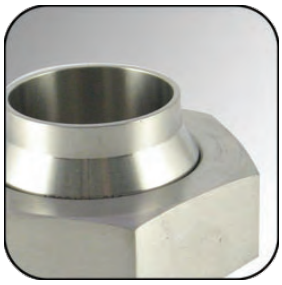
Size		Concentric Reducer		
W.T.	Dia	304	316	2205
1.2	25.40 x 12.70	○	○	○
	25.40 x 19.05	○	○	○
	31.75 x 25.40	○	○	○
	38.10 x 25.40	○	○	○
	38.10 x 25.40	○	○	○
	50.80 x 25.40	○	○	○
	50.80 x 38.10	○	○	○
1.6	25.40 x 12.70	○	○	○
	25.40 x 19.05	○	○	○
	31.75 x 25.40	○	○	○
	38.10 x 25.40	○	○	○
	38.10 x 31.75	○	○	○
	50.80 x 25.40	○	○	○
	50.80 x 38.10	○	○	○
	63.50 x 25.40	○	○	○
	63.50 x 31.75	○	○	○
	63.50 x 38.10	○	○	○
	63.50 x 50.80	○	○	○
	76.20 x 25.40	○	○	○
	76.20 x 38.10	○	○	○
	76.20 x 50.80	○	○	○
	76.20 x 63.50	○	○	○
	101.60 x 50.80	○	○	○
	101.60 x 63.50	○	○	○
	101.60 x 76.20	○	○	○

Size		Concentric Reducer		
W.T.	Dia	304	316	2205
2.0	50.80 x 25.40	○	○	○
	50.80 x 38.10	○	○	○
	63.50 x 25.40	○	○	○
	63.50 x 31.75	○	○	○
	63.50 x 38.10	○	○	○
	63.50 x 50.80	○	○	○
	76.20 x 25.40	○	○	○
	76.20 x 38.10	○	○	○
	76.20 x 50.80	○	○	○
	76.20 x 63.50	○	○	○
	101.60 x 50.80	○	○	○
	101.60 x 63.50	○	○	○
	101.60 x 76.20	○	○	○

● Stocked Item ○ Market Available

Hygienic Fittings

Stirlings' hygienic fittings are cast and then machined to BSM specifications.



CIP/BSM Union

Tri-Clover

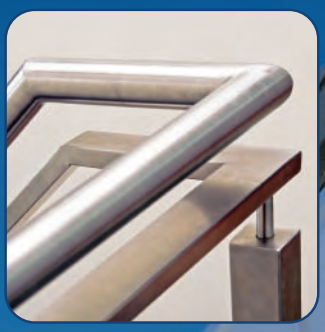
Type/Size	25mm	38mm	50mm	63mm	76mm	100mm	125mm	150mm
BSM Fittings								
Hexagon nut	●	●	●	●	●	●	○	○
Plain liner	●	●	●	●	●	●	○	○
Male part	●	●	●	●	●	●	○	○
O-Ring - EPDM	●	●	●	●	●	●	○	○
- Nitrile	○	○	○	○	○	○	○	○
- Teflon	○	○	○	○	○	○	○	○
CIP seal	●	●	●	●	●	●	○	○
Blank cap	●	●	●	●	●	●	●	○
Blank nut	○	○	○	○	○	○	○	○
Slotted nut	○	○	○	○	○	○	○	○
Blank nut c/w chain	○	○	○	○	○	○	○	○
Aluminium spanner	○	●	●	●	●	●	○	○
S/steel spanner	○	○	○	○	○	○	○	○
S/steel slotted spanner	○	○	○	○	○	○	○	○
Hygienic Flat Face Fittings								
Hexagon Nut	●	●	●	●	●	●	○	○
Liner	●	●	●	●	●	●	○	○
Male part	●	●	●	●	●	●	○	○
Seal - EPDM	●	●	●	●	●	●	○	○
- Teflon	○	○	○	○	○	○	○	○
Triclover fittings								
Clamp body	●	●	●	●	●	●	○	○
Ferrule - Standard	●	●	●	●	●	●	○	○
- Long	○	○	○	○	○	○	○	○
Blank Cap	○	○	○	○	○	○	○	○
Seal - EPDM	●	●	●	●	●	●	○	○
- Buna	○	○	○	○	○	○	○	○
- Teflon	○	○	○	○	○	○	○	○
- Viton	○	○	○	○	○	○	○	○
- Flanged Buna	○	○	○	○	○	○	○	○
Tube Clamps								
Plain	●	●	●	●	●	●	○	●
Bossed	●	●	●	●	●	●	○	○
Hose Tails								
Plain	●	●	●	●	●	●	○	○
BSM Male	○	○	○	○	○	○	○	○
BSM Female	○	○	○	○	○	○	○	○

● Stocked Item ○ Market Available

At Stirlings Australia Global Metals Distributor, we're committed to the building and construction industry. We believe your success is our success, and we understand that what you need to succeed in your business is **Top Quality Products**, at **Excellent Value** and with **Outstanding Service**.

So if you're looking for an experienced supply partner who is committed to your success, we're keen to assist you.



For all your architectural stainless steel needs.

Stirlings
AUSTRALIA
Global Metals Distributor

Hyg. Butterfly Valve

Body & Disc	-	Grade 316 S/S
Seat	-	Silicone
Stem	-	Grade 316 S/S
Pressure Rating	-	Full Vacuum to 700 KPa
Temp. Rating	-	Minus 5°C to 95°C
Ends		38.1 & 50.8mm - B/Weld-BSM Male & B/weld-B/weld 76.2 & 101.6mm - B/Weld-B/Weld

Type	Size (mm)						
	25.4	38.1	50.8	63.5	76.2	101.6	152.4
Butterfly Valve	○	●	●	○	●	●	○

Hyg. Ball Valve

Body & Disc	-	Grade 316 S/S
Seat	-	PTFE
Stem	-	Grade 316 S/S
Ends	-	BSP-T, BSM, IDF and 3A
Pressure Rating	-	25 to 65mm 1000KPa at 150°C
	-	80 to 100mm 600KPa at 210°C
Temp. Rating	-	Minus 5°C to 95°C

Type	Size (mm)		
	38.1	50.8	76.2
Ball Valve	●	●	●

Sample Valve

Body & Handle	-	Grade 316 S/S
Ends	-	PTFE

Sample Valve	B/Weld	BSP
15mm	●	●

Relief Valves

Stainless Steel
316L Stainless Steel
Double Acting Oil Fill 150hl/hr

PVC
Double Acting 500hl/hr

Size	Stainless Steel	PVC
31.75mm		

● Stocked Item ○ Market Available

Industrial Ball Valves

Ball Valves

Body, Ball & Stem	-	Grade 316
Seat and stem seal	-	PTFE
Gland, Handle, Nut & Washer	-	Grade 304

BSP female ends to suit N.B. pipe.
Stainless steel handle.

Outside Diameter		1-Pce Reduced Bore		2-Pce Full Bore		3-Pce Full Bore	
Imp	mm	800 PSI WOG	Wgt (kg)	1000 PSI WOG	Wgt (kg)	1000 PSI WOG	Wgt (kg)
¼	8	●	0.08	○	0.35	○	0.48
⅜	10	●	0.11	○	0.34	○	0.46
½	15	●	0.17	●	0.36	●	0.58
¾	20	●	0.25	●	0.65	●	0.92
1	25	●	0.45	●	0.93	●	1.19
1¼	32	○	0.74	○	1.65	○	2.07
1½	40	○	0.83	○	2.26	●	2.75
2	50	○	1.25	○	3.62	●	4.07
2½	65					○	8.12
3	80					●	12.71
4	100					○	21.12

Swing Check Valve & Y-Strainer

Industrial Swing Check Valves

Body, cap, disc & plug	-	Grade 316
Seal	-	PTFE

Y-Strainers 45°

Body & cap	-	Grade 316
Screen	-	Grade 304
Seal	-	PTFE

Size		Swing Check Valve	Y-Strainer
Imp	mm	200 PSI W.P.	45°
⅜	10	○	○
½	15	○	○
¾	20	○	○
1	25	○	○
1¼	32	○	○
1½	40	○	○
2	50	○	○

● Stocked Item ○ Market Available

Manways

Stirlings Australia carries Australia's largest range of Manway doors. All doors are made to Top Quality standards and offered at highly competitive prices. Technical assistance available.

Additional seals also available.

1 

2 

3 

ID	Code	AISI	Access Dia. (mm)	Neck Width (mm)	Neck Thick. (mm)	Lid Thick. (mm)	Max P. (Bar)	Wgt (kg)	Arm	Door
1	22/1S/A-6	316L	223	90	2.0	1.5	0.1	3.5	Single	Outward opening, not pivot hinged
2	40/1P-6	316L	402	60	2.0	2.0	0.1	6.0	Single	Outward opening, pivot hinged
2	50/1P/A-6	316L	502	90	2.0	2.0	0.1	8.8	Single	Outward opening, pivot hinged
3	60/1B/A-6	316L	602	100	3.0	2.0	0.1	14.2	Double	Outward opening, pivot hinged
3	80/1B-6	316L	802	100	3.0	2.0	0.1	32.5	Double	Outward opening, pivot hinged
3	80/1B/A-6	316L	802	200	3.0	2.0	0.1	38.2	Double	Outward opening, pivot hinged

4 

5 

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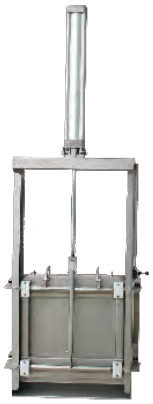
7 

ID	Code	AISI	Access Dia. (mm)	Neck Width (mm)	Neck Thick. (mm)	Lid Thick. (mm)	Max P. (Bar)	Wgt (kg)	Door
4	127/1-6	316L	440 x 308	60	6.0	2.0	3.0	6.9	Inward opening, two pin hinge
5	128/1-6	316L	440 x 308	60	6.0	2.0	3.0	7.5	Inward opening, single arm
6	125A-6	316L	510 x 410	100	10.0	2.5	2.0	18.9	In/outward opening, single arm, double centralisation
6	125B-6	316L	510x410	140	10.0	2.5	2.0	24.0	In/outward opening, single arm, double centralisation
7	XL	304	550 x 450	100	10.0	2.5	2.0	22.5	Inward/Outward opening, single arm, double centralisation

8 

9 

10 

11 

ID	Code	AISI	Access Size (mm)	Neck Width (mm)	Neck Thick. (mm)	Lid Thick. (mm)	Max P. Bar	Wgt (Kg)	Door
8	115-6	316L	530 x 406	60	10.0	2.0	1.1	20.1	Outward opening
9	116-6	316L	530 x 406	60	10.0	2.0	0.8	23.0	Outward opening
10	129A-6	316L	530 x 406	100	10.0	2.5	1.8	23.0	Inward/Outward opening
11	Pneumatic	304	600 x 600	130	8.0	N/A	2.5	80.0	Vertical Pneumatic Opening

Wire

Available Bright Annealed, Bright Drawn, Spring Tempered, or Hot Rolled Annealed and Pickled.

Up to 1.6mm dia - 50kg random coils.
2.0mm dia and above - 100kg random coils.

Stock availability on request.

Size Dia. mm	304 B.A.	304 B.D.	304 B.S.	304 H.R.A.P	316 B.A.	316 B.D.	316 B.S	316 H.R.A.P	Weight kg/mtr
1.00		○				○			0.0062
1.20		○				○			0.0089
1.25		○				○			0.0096
1.60	○	○	○		○	○	○		0.0158
2.00	○	○	○		○	○	○		0.0248
2.20	○	○	○		○	○	○		0.0300
2.50	○	○	○		○	○	○		0.0387
2.64	○	○	○		○	○	○		0.0432
2.68	○	○	○		○	○	○		0.0446
2.80	○	○	○		○	○	○		0.0486
2.90	○	○	○		○	○	○		0.0522
3.00	○	○	○		○	○	○		0.0558
3.15	○	○	○		○	○	○		0.0616
3.25	○	○			○	○			0.0655
3.50						○			0.0786
3.97	○	○	○		○	○	○		0.0978
4.00	○	○	○		○	○	○		0.0993
4.76	○	○	○		○	○	○		0.1406
5.00		○			○	○	○		0.1551
5.50				○					0.1877
6.00		○			○	○	○	○	0.2234
6.30		○							0.2463

Tensile Strength

Grade	B.A.	B.D.	B.S.	H.R.A.P.
304	600-700 MPA	750-900 MPA	1550-1750 MPA	550-610 MPA
316	550-750 MPA	750-900 MPA	1310-1480 MPA	550-610 MPA

Note: Other sizes and tensiles are available on request.

• Stocked Item ○ Market Available

Woven Mesh

Available through our wide range of suppliers and stockists.

All sizes listed are in mm.

Approx Aperture	Wire Diameter	Open Area %	Availability
22.4	3.15	77	○
16	2.5	75	○
12.7	3.0	65	○
11.1	1.6	77	○
10.6	2.0	70	○
10	2.5	63	○
7	1.6	66	○
6.3	2.0	57	○
5.3	1.0	71	○
4.7	1.6	55	○
3.9	1.2	58	○
3.5	1.6	46	○
3.3	0.91	61	○
3	1.2	51	○
2.7	1.6	38	○
2.5	0.7	60	○
2.3	0.91	51	○
2.1	0.45	67	○
2	1.20	39	○
1.9	0.61	58	○
1.6	0.91	41	○
1.6	0.50	58	○
1.4	0.71	44	○
1.3	0.5	52	○
1.2	0.9	32	○
1.2	0.37	58	○
1.1	0.45	51	○

Approx Apterture	Wire Diameter	Open Area %	Availability
1.0	0.56	42	○
0.9	0.71	31	○
0.9	0.37	50	○
0.81	0.45	41	○
0.745	0.31	49	○
0.71	0.56	31	○
0.6	0.45	32	○
0.57	0.27	46	○
0.53	0.31	39	○
0.415	0.22	40	○
0.31	0.2	38	○
0.26	0.16	35	○
0.21	0.15	34	○
0.19	0.125	34	○
0.15	0.1	36	○
0.13	0.08	37	○
0.11	0.071	37	○
0.1	0.063	37	○
0.09	0.05	42	○
0.075	0.052	36	○
0.063	0.04	38	○
0.053	0.04	32	○
0.045	0.036	31	○
0.040	0.032	31	○
0.034	0.03	27	○
0.025	0.025	25	○

Welded Mesh

Available through our wide range of suppliers and stockists.

All sizes listed are in mm.

Aperture	Wire Diameter	Pitch	Grade	Width (coil)	Availability
5.55	0.8	3.35	304	1220	○
9	1	10	304	1530	○
9.2	0.8	10	304	1220	○
11.1	1.6	12.7	304 & 316	1220	○
11.1	1.6	12.7	304	915	○
11.5	1.2	12.7	304	1220	○
16	2	18	304	1220	○
23.4	2	25.4	304 & 316	1220	○
23.8	1.6	25.4	304	1220	○
24.4	1	25.4	316	1220	○
48	2	50	316	1220	○

Aperture	Wire Diameter	Pitch	Grade	Size (Panels)	Availability
21.85	3.15	25	304	2000x1000	○
21.85	3.15	25	316	2500x1200	○
46	4	50	304	2000x1000	○
46	4	50	316	2500x1200	○
47	3	50	304	2500x1200	○
94	6	100	304	2500x1200	○
97	3.15	100	304	2500x1200	○

• Stocked Item ○ Market Available

Fasteners

Stirlings can order in all your fastener requirements.

Type	Specification	Grade	Size Range
Bolt Hex Head	BSW/UNC	304	¼ x 1¼ to ⅜ x 6
	BSW/UNC	316	¼ x 1¼ to 1 x 6
	Course metric	304	M6 x 30 to M20 x 150
	Course metric	316	M6 x 40 to M30 x 180
Setscrew Hex Head	BSW/UNC	304	3/16 x ⅜ to ¾ x 4
	BSW/UNC	316	3/16 x ½ to 1 x 3½
	Course metric	304	M5 x 8 to M20 x 100
	Course metric	316	M4 x 8 to M24 x 70
Nut Hex	BSW/UNC	304	⅛ to 1
	BSW/UNC	316	3/16 to 1¾
	Course metric	304	M2 x M30
	Course metric	316	M2.5 to M48
Nut Dome / Acorn	UNC	304	¼ to ⅝
	Course metric	304	M4 to M20
	Course metric	316	M6 to M16
Nut Wing	BSW/UNC	316	3/16 to 1¾
	Course metric	316	M3 to M20
Nut Nylon Inset Lock	BSW/UNC	304	¼ to 1
	BSW/UNC	316	¼ to ¾
	Course metric	304	M3 to M20
	Course metric	316	M5 to M24
Washer Flat	Imperial	304	⅛ to 1 I.D.
	Imperial	316	¼ to ¾
	Metric	304	M3 to M24 I.D.
	Metric	316	M6 to M48 I.D.
Washer Spring	Imperial	304	3/32 to ¾ I.D.
	Imperial	316	⅛ to 1¼ I.D.
	Metric	304	M3 to M20 I.D.
	Metric	316	M3 to M30 I.D.
Washer Internal Tooth	Imperial	410	⅛ to ⅝
	Metric	304	M3 to M16 I.D.
Washer External Tooth	Metric	304	M4 to M16 I.D.
Screw Machine Phillips	BSW	304	⅛ to ¼ to 5/16 x 3
Slotted	BSW	304	⅛ x ¼ to ½ x 4
Phillips	BSW	316	3/16 x ⅜ to ⅝ x 2½
Slotted	BSW	316	3/16 x ¼ to ⅜ x 3
Phillips	Metric	304	M2 x 5 to M6 x 10
Slotted	Metric	304	M3 x 5 to M12 x 60
Slotted	Metric	316	M2 x 5 to M10 x 50
Cap Screw Socket head	BSW/UNC	304	¼ x ⅜ to ⅜ x 3
	BSW/UNC	316	¼ x ¼ to ½ x 1
	Course metric	304	M5 x 12 to M5 x 40
	Course metric	316	M2 x 4 to M20 x 100
Screw Grub	UNC	304	¼ x ¼ to ½ x ¾
	UNC	316	¼ x ¼ to ½ x 1
	Course metric	304	M3 x 3 to M12 x 40
	Course metric	316	M4 x 6 to M12 x 30
Screw Self-Tapping	Pozi/Phillips/Slotted	304	4G x ¼ to 14G x 2
	Phillips/Slotted	316	4G x ⅜ to 14G x 2

Fasteners

Stirlings can order in all your fastener requirements.

Type	Specification	Grade	Size Range
Screw Coach Hex head	Course metric	316	M6 x 30 to M12 x 120
Allthread	BSW/UNC	304	3/16 to 1
	Course Metric	304	M5 to M24
	BSW/UNC	316	3/16 x 1½
	Course Metric	316	M3 x 30
Split Pins	Imperial	304	3/32 x ⅜ to ¼ x 3
	Metric	304	M1 x 10 to M10 x 100
U-Bolts	Imperial	304/316	Made to order
	Metric	304/316	Made to order
Single Ended Studs	BSW/UNC	304/316	Made to order
	Course Metric	304/316	Made to order
Double Ended Studs	BSW/UNC	304/316	Made to order
	Course metric	304/316	Made to order
Butt Hinge	Imperial	304	2 to 4 long
	Metric	304	50 to 100 long
Piano Hinge	Metric	304	30 x 1800 x 0.8
Chain	Metric	316	3.5 x 11 to 14 x 36mm

Imp. Dia. (in)	BSW	Threads per Inch UNC	UNF	BSF
⅛	40	40		
5/32	32	32		
3/16	24	24	32	32
¼	20	20	28	26
5/16	18	18	24	22
⅜	16	16	24	20
7/16	14	14	20	18
½	12	13	20	16
⅝	11	11	18	14
¾	10	10	16	12
⅞	9	9	14	11
1	8	8	12	10
1⅛	7	7	12	9
1¼	7	7	12	9
1½	6	6	12	8

Metric Dia. (mm)	Pitch ISO STD.	Fine STD.
3	0.50	0.50
4	0.70	0.75
5	0.80	0.80
6	1.00	1.00
8	1.25	1.00
10	1.50	1.00
12	1.75	1.50
16	2.00	1.50
20	2.50	1.50
22	2.50	1.50
24	3.00	2.00
30	3.50	2.00
36	4.00	3.00

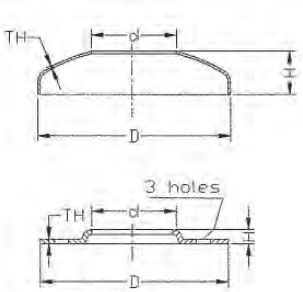
Balustrade Fittings Catalogue

Balustrade

Stirlings AUSTRALIA

value • quality • service

Base Plate (304 S/S) & Cover (316 S/S) Set



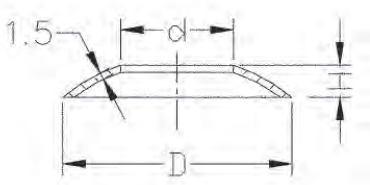
Base

Item No	Size	D (mm)	d (mm)	H (mm)	TH (mm)
16BPC13	1/2"	65	13	6	2
16BPC19	3/4"	65	19	5.5	2
16BPC25	1"	65	25	5.5	2
16BPC32	1.1/4"	80	32	6.5	2
16BPC38	1.1/2"	80	38	6	2
16BPC50	2"	100	51	8	3
16BPC63	2.1/2"	115	63.5	8	3
16BPC76	3"	115	76	6	6

Cover

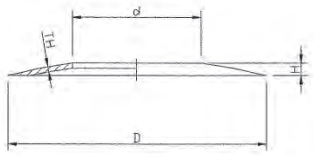
Item No	Size	D (mm)	d (mm)	H (mm)	TH (mm)
16BPC13	1/2"	67	13	15	1
16BPC19	3/4"	67	19	15	1
16BPC25	1"	67	25	15	1
16BPC32	1.1/4"	82	32	17	1
16BPC38	1.1/2"	82	38	17	1
16BPC50	2"	102	51	25	1
16BPC63	2.1/2"	117	63.5	28	1
16BPC76	3"	117	76	27	1

Tube Cover (316 S/S)



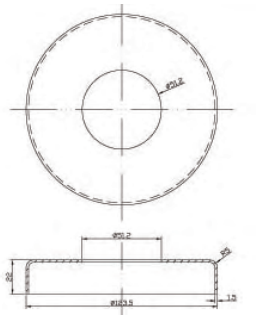
Item No	Size	D (mm)	d (mm)	H (mm)	TH (mm)
163TC1.5	3-1.1/2"	79	38	7	1.5
164TC1.5	4"-2"	101	52	9	1.5

Square Tube Cover (316 S/S)



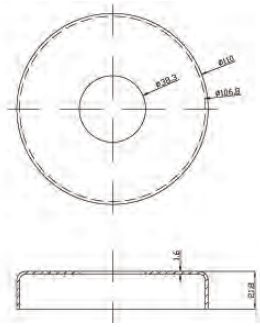
Item No.	Size	D (mm)	d (mm)	H (mm)	TH (mm)
163TCSQ1.5	3" - 1.1/2"	76.2	38.2x38.2	7	1.2
164TCSQ1.5	4" - 2"	102	51.5x51.5	9.5	1.5

Tube Cover 51mm (316 S/S)



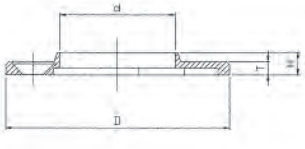
Item No	Size	D (mm)	d (mm)	H (mm)	TH (mm)
5049-508	2"	123.5	51.2	22	1.5

Tube Cover 38mm (316 S/S)



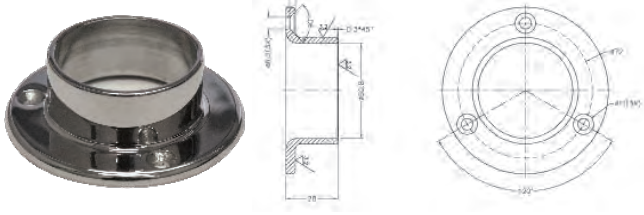
Item No	Size	D (mm)	d (mm)	H (mm)	TH (mm)
5049-381	1.5"	110	38.3	21.8	1.6

Base/Flange (316 S/S)



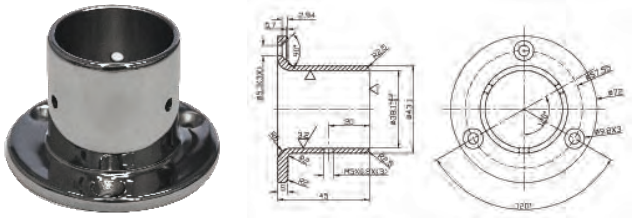
Item No.	Size	D (mm)	d (mm)	H (mm)	T (mm)
16FL51	2"(51mm)	99	51.8	10	7
SG-007			Mirror Finish		

Base/Flange (316 S/S)



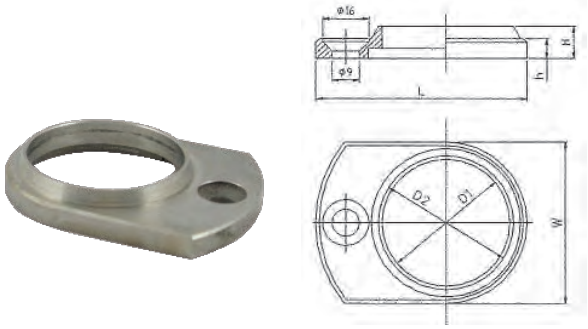
Item No	Size	OD (mm)	Thickness (mm)	H (mm)
5015-508	50.8mm	89	6	28

Base/Flange (316 S/S)



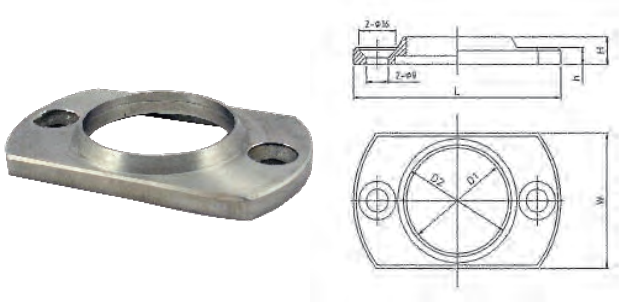
Item No	Size	OD (mm)	Thickness (mm)	H (mm)
5015-381	38mm	72	5	45

Short Base/Flange (Cast 316 S/S)



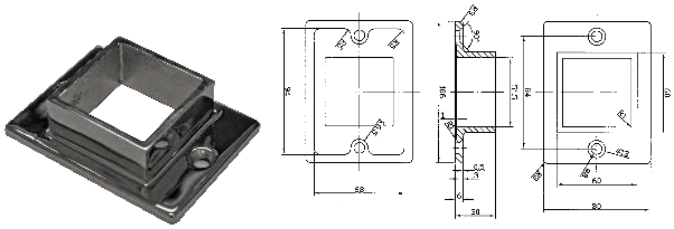
Item No	Size	D1 (mm)	D2 (mm)	W (mm)	L (mm)	H (mm)	h (mm)
16SB51	2" (51mm)	54	51	64	84	13	8

Long Base/Flange (Cast 316 S/S)



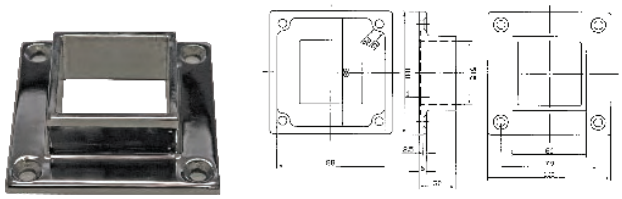
Item No	Size	D1 (mm)	D2 (mm)	W (mm)	L (mm)	H (mm)	h (mm)
16LB51	2" (51mm)	54	51	64	103	13	8

Oblong Base/Flange 51mm 2 hole Pol/Elec



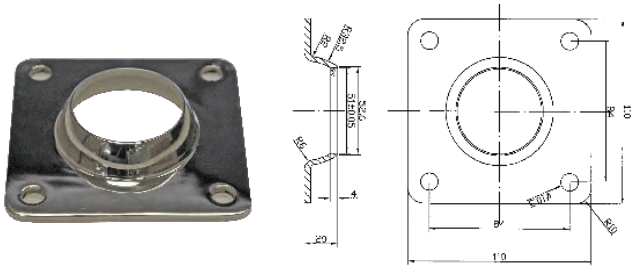
Item No	Size	W (mm)	L (mm)	H (mm)
SG-001	51mm	80	106	30

Square Tube Base / Flange 51mm 4 hole Pol/Elec



Item No	Size	W (mm)	L (mm)	H (mm)
SG-004	51mm	100	100	30

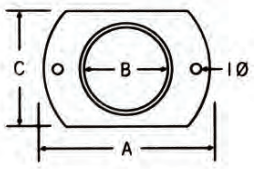
Square Base/Flange 51mm Heavy Duty Pol/Elec Round Tube ID



Item No	Size	W (mm)	L (mm)	H (mm)
SG-005	51mm	110	110	20

Oblong Base/Flange (316 S/S) Round Tube ID

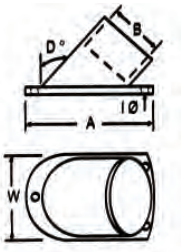
- Heavy duty cast "2" hole slab base
- Suitable for fixing handrails in between timber, masonry or steel posts
- May also be used for floor mounting where space is limited



Item No.	Tube Ø	A	B	C	I	Weight
SG-003-38	1.5"	75	38.1	56	5.0	140g
SG-003-51	2"	100	50.8	69	6.5	255g

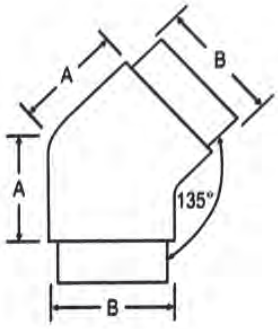
Wall Stop Base/Flange (316 S/S)

- "3" hole cast angled flange
- Suitable for fixing handrails down stairways between timber, masonry or steel posts
- Flange can be turned 180 degree to complete the stairway handrail



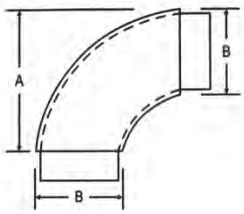
Item No.	Tube Ø	D	A	B	W	I	Weight
SG-006	2"	37°	110	50.8	70	6.0	260g

Flush Joiner 135 ° Bend (316 S/S)



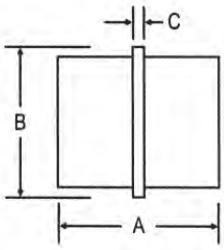
Item No.	Tube Ø	Wall	A	B	Weight
1503E	1.5"	1.5mm	41	38.1	200g
2003E	2"	1.5mm	45	50.8	285g

Flush Joiner 90 ° Radiused (316 S/S)



Item No.	Tube Ø	Wall	A	B	Weight
1501E	1.5"	1.5mm	66	38.1	271g
2001E	2"	1.5mm	66	50.8	385g

Flush Joiner In-Line (316 S/S)

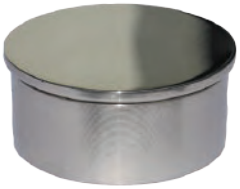


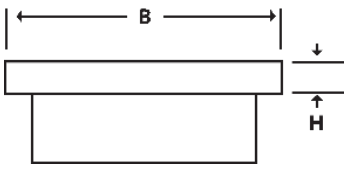
Item No.	Tube Ø	Wall	A	B	C	Weight
1504E	1.5"	1.5mm	51	38.1	3.0	48g
2004E	2"	1.5mm	54	50.8	3.0	120g

Flush Joiner 90 ° Miter Bend

Item No.	Tube Ø	Wall
FTBMDC9316038	1.5"	1.5mm
FTBMDC9316051	2"	1.5mm

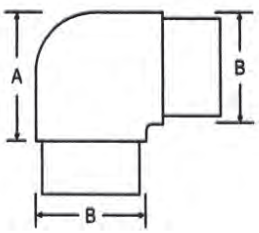
Flush Joiner Push Fit End Cap (316 S/S)





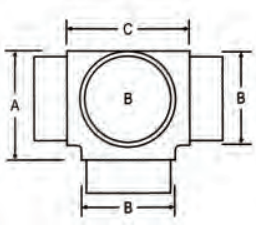
Item No.	Tube Ø	Wall	B	H	Weight
FTBFJ316EC038 Indent	1.5"	1.5mm	38.1	3.5	50g
2019A	2"	1.5mm	50.8	4.0	85g

Flush Joiner 90 ° Bend (316 S/S)



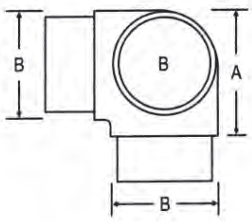
Item No.	Tube Ø	Wall	A	B	Weight
1502E	1.5"	1.5mm	51	38.1	230g
5055-508	2"	1.5mm	57	50.8	340g

Flush Joiner 4-Way Tee (316 S/S)



Item No.	Tube Ø	Wall	A	B	C	Weight
1508E	1.5"	1.5mm	51	38.1	60	300g
2008E	2"	1.5mm	57	50.8	67	560g

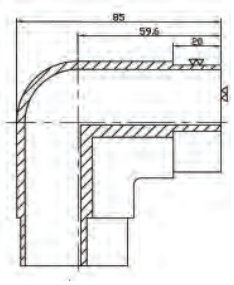
Flush Joiner 90 ° Tee (316 S/S)



Item No.	Tube Ø	Wall	A	B	Weight
1506E	1.5″	1.5mm	51	38.1	275g
5013-508	2″	1.5mm	57	50.8	435g

Flush Fit 90 Degree Bend 51mm

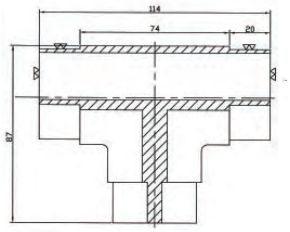
- Single Slot Pol/Elec



Item No.	Tube Ø	Wall	Weight
SG-009	51mm	1.5mm	510g
	Single Slot		

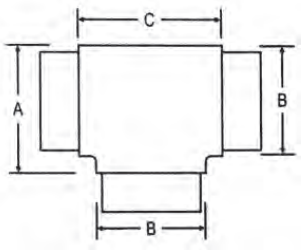
Flush Fit Tee 51mm

- Single Slot Pol/Elec



Item No.	Tube Ø	Wall	Weight
SG-010	51mm	1.5mm	740g
	Single Slot		

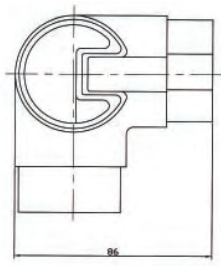
Flush Joiner Equal Tee (316 S/S)



Item No.	Tube Ø	Wall	A	B	C	Weight
1505E	1.5″	1.5mm	51	38.1	60	290g
2005E	2″	1.5mm	57	50.8	67	450g

Flush Fit Joiner 90 Degree Tee 51mm

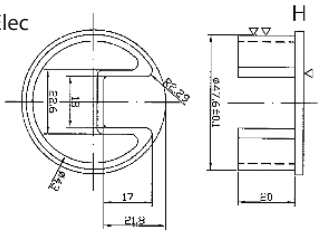
Single Slot Pol/Elec



Item No.	Tube Ø	Wall	Weight
SG-011	51mm	1.5mm	695g
	Single Slot		

Flush Fit End Cap 51mm

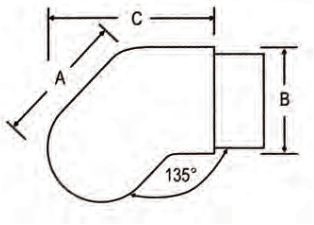
- Single and double Slot Pol/Elec



Item No.	Tube Ø	Wall	B	H	Weight
SG-015	51mm	1.5mm	50.8	3mm	80g
	Single Slot				
SG-016	51mm	1.5mm	50.8	3mm	113g
	Double Slot				

Handrail End 45 ° (316 S/S)

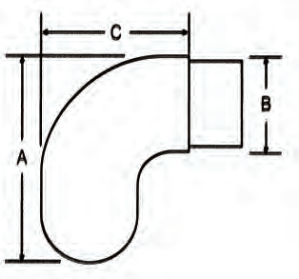
- A 45 degree cast handrail end mainly used for stairway handrail terminations



Item No.	Tube Ø	Wall	A	B	C	Weight
2025A	2″	1.5mm	70	50.8	83	400g

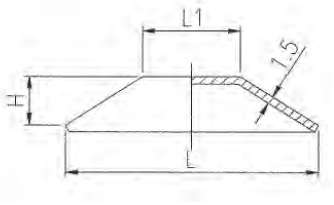
Handrail End 90 ° (316 S/S)

- A 90 degree cast handrail end mainly used for stairway handrail terminations



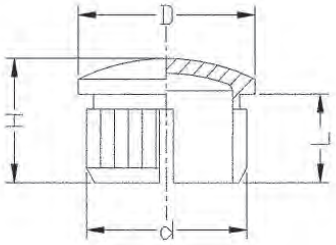
Item No.	Tube Ø	Wall	A	B	C	Weight
2026A	2″	1.5mm	89	50.8	70	420g

Square Tube Cap (316 S/S)



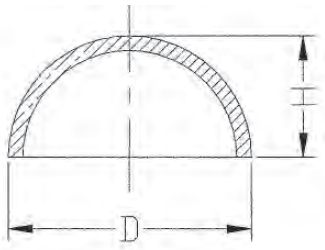
Item No.	Size	L (mm)	L1(mm)	H (mm)	TH (mm)
16SQCAP51	2"	51.5	20	10	1.5

Push End Cap (Cast 316 S/S)



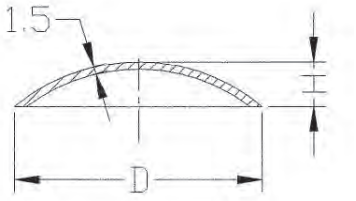
Item No	Size	D (mm)	d (mm)	H (mm)	L (mm)
16PEC32	1.1/4" (32mm)	32	29	18	12.5
16PEC38	1.1/2" (38mm)	38	35	15	10
16PEC50	2" (51mm)	51	48	16	10
16PEC63	2.1/2" (63mm)	63	60	20	12
16PEC76	3" (76mm)	76	73	27	16

Domed End Cap (316 S/S)



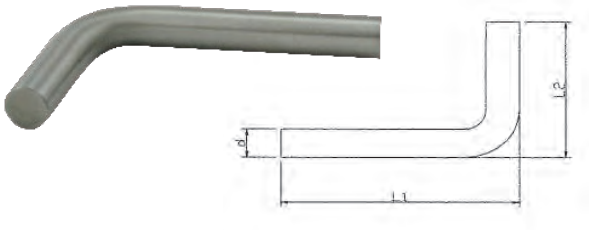
Item No	Size	D (mm)	H (mm)	TH (mm)
16DECAP20 Indent	3/4" (19mm)	19	10	1.5
16DECAP25 Indent	1" (25mm)	25	13	1.5
16DECAP32 Indent	1.1/4" (32mm)	32	16	1.5
16DECAP38	1.1/2" (38mm)	38	20	1.5
16DECAP51	2" (51mm)	51	25	1.5
16DECAP63 Indent	2.1/2" (63mm)	63	32	1.5
16DECAP76 Indent	3" (76mm)	76	38	1.5
16DECAP101 Indent	4" (101mm)	101	51	1.5
16DECAP127 Indent	5" (127mm)	127	64	1.5

Curved Tube Cap (316 S/S)



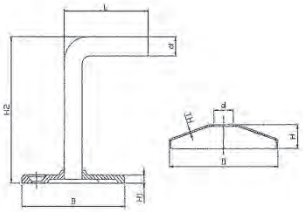
Item No	Size	D (mm)	H (mm)	TH (mm)
16CTC38	1.1/2" (38mm)	38	7	1.5
16CTC52	2" (51mm)	51	9	1.5
16CTC63	2.1/2" (63mm)	63	10.5	1.5
16CTC76	3" (76mm)	76	11.5	1.5
16CTC101	4" (101mm)	101	12.5	1.5

L-Bar (316 S/S)



Item No.	Size	L1 (mm)	L2 (mm)	d (mm)
16 LBAR12	12mm	86	57	12

Wall Bracket & Cover (316 S/S)



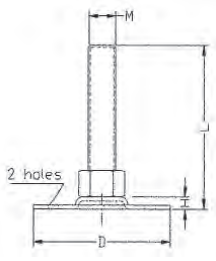
Wall Bracket

Item No.	Size	D (mm)	d (mm)	H1 (mm)	H2 (mm)	L (mm)
16WB12	12mm	70	12	6	90	56
16WB12-600			Mirror Finish			

Cover

Item No.	Size	D (mm)	d (mm)	H (mm)	TH (mm)
16WBC12	12mm	70	12	15	1
16WBC12-600			Mirror Finish		

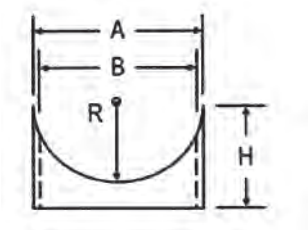
Bolt Down Adjustable Foot (304 S/S)



Item No.	Size	D (mm)	M (mm)	H (mm)	L (mm)
BD55 Indent	M10x50	55	10	15	60
BD65 Indent	M12x50	65	12	18	68
BD80 Indent	M16x60	80	16	22	84

Perpendicular Joiner External Cap (316 S/S)

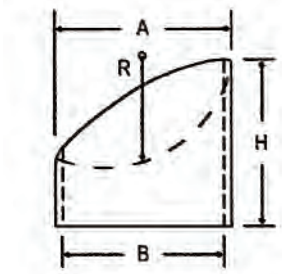
- Suitable for joining vertical posts to horizontal handrails
- The external fit negate the need for a true flat tube cut



Item No.	Tube Ø	A	B	H	R	Weight
313A-1.5	1.5″	43.0	39.0	25	1.5″	46g
SG-013	2″	55.0	51.5	39	2″	101g

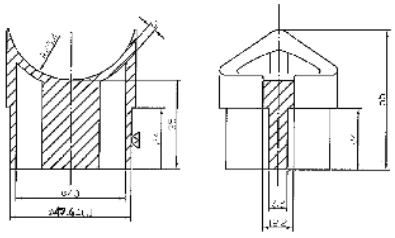
Perpendicular Joiner 37 ° External Cap (316 S/S)

- Suitable for joining vertical posts to angled stairway handrails
  The external fit negates the need for true flat tube cut
-



Item No.	Tube Ø	A	B	H	R	Weight
314A-1.5	1.5″	42.0	38.8	44	1.5″	91g
314A-2	2″	56.0	51.4	56	2″	188g

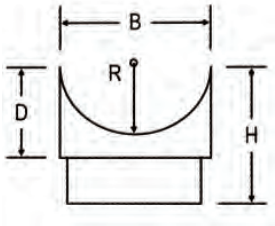
Perpendicular Joiner 51mm Flush Fit Double Slot Pol/Elec



Item No.	Tube Ø	H	R	Weight
SG-014	51mm	55mm	25.4mm	195g

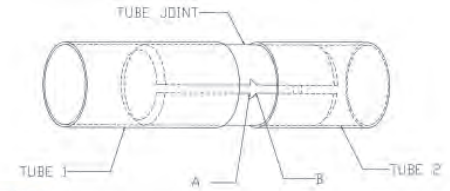
Perpendicular Joiner Flush Fitting (316 S/S)

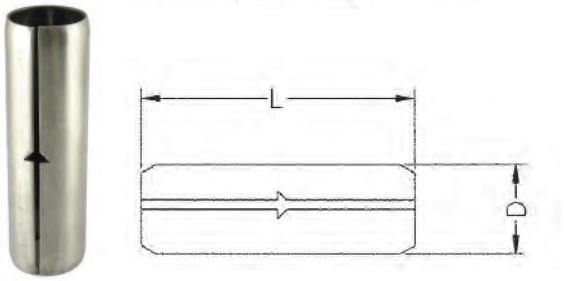
- Join posts to a horizontal h/rail or join horizontal h/rails to vertical posts
- All joiners are radiused to suit the top handrail as specification
- Fix joiners to the top h/rail with screws or rivets through the underneath internal



Item No.	Tube Ø	Wall	B	D	H	R	Weight
1527A-2	1.5″	1.5mm	38.1	15	41	1.5″	89g
SG-012	2″	1.5mm	50.8	32	57	2″	156g

Tube Joint (304 S/S)



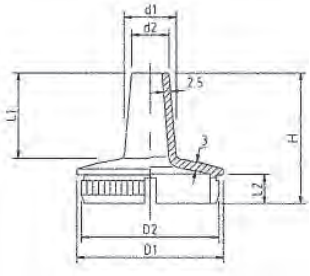


Item Number	Size	L (mm)	D (mm)
04TJ38	1.1/2″	114	35
04TJ51	2″	148	48

Railing Converter (316 S/S)

Satin Finish

Mirror Finish



Satin

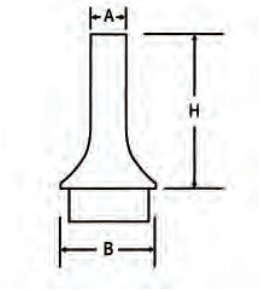
Item No	Size	D1	D2	d1	d2	L1	L2	H
16RC51	2″ (51mm)	50.8	47.8	18	13	45	10	62
16RC38	1.1/2″ (38mm)	38.1	35	15	10	35	10	50

Mirror

Item No	Size	D1	D2	d1	d2	L1	L2	H
FTBMRC316051	2″ (51mm)	50.8	47.8	18	13	45	10	62
FTBMRC316038	1.1/2″ (38mm)	38.1	35	15	10	35	10	50

Post Reducer Tapered (316 S/S)

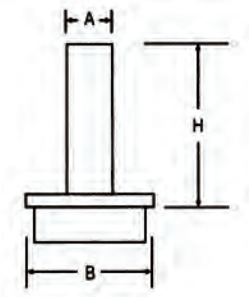
- Flush fitting slimline post top reducer for decorative look



Item No.	Tube Ø	Wall	A	B	H	Weight
1520A	1.5″	1.5mm	0.75″	38.1	81	118g
SG-022	2″	1.5mm	1″	50.8	81	198g

Post Reducer Flat (316 S/S)

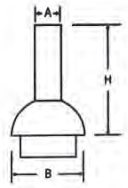
- Flush fitting slimline post top reducer for decorative look



Item No.	Tube Ø	Wall	A	B	H	Weight
1522A	1.5″	1.5mm	0.75″	38.1	87.5	84g
2022A	2″	1.5mm	1″	50.8	87.5	167g

Post Reducer Dome (316 S/S)

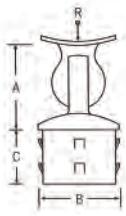
- Flush fitting dome post top reducer for decorative look



Item No.	Tube Ø	Wall	A	B	H	Weight
SG-023	2″	1.5mm	1″	50.8	87.5	207g

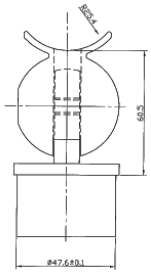
Adj Rail Support Radiused Internal Fit (316 S/S)

- Fully adj handrail support for fixing stairway posts to angled round handrails
- External spring leaves grip tube internal for extreme hold and easy installation



Item No.	Tube Ø	Wall	A	B	C	R	Weight
315A1.5	1.5″	1.5mm	45	38.1	29	1.5″	161g
SG-028	2″	1.5mm	51	50.8	32	2″	285g

Large Adj Rail Support Radiused Internal Fit



Item No.	Tube Ø	Wall	A	B	C	R	Weight
5070-508	2″	1.5mm	60.5	50.8	30	25.4	630g

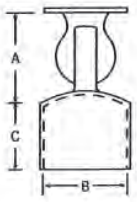
Adj Rail Support Radiused External Fit (316 S/S)

- Fully adj handrail support for fixing stairway posts to angled round handrails
- Internal ribs negate the need for welding or a true end cut of the tube

Item No.	Tube Ø	Wall	A	B	C	R	Weight
316A-1-2	1.5″	1.5mm	32	25.4	19	2″	80g
316A-2	2″	1.5mm	51	50.8	32	2″	302g

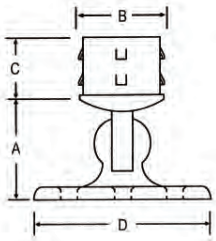
Adj Rail Support Flat External Fit (316 S/S)

- Fully adj handrail support for fixing stairway posts to angled flat handrails
- Internal ribs negate the need for welding or a true end cut of the tube



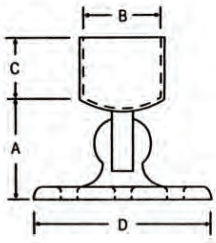
Item No.	Tube Ø	Wall	A	B	C	Weight
316AP-2	2″	1.5mm	51	50.8	32	288g

Adj Rail Support Round Base Internal Fit (316 S/S)



Item No.	Tube Ø	Wall	A	B	C	D	Weight
315AC-1.5	1.5″	1.5mm	38	38.1	22	76	370g
315AC-2	2″	1.5mm	51	50.8	26	101	600g

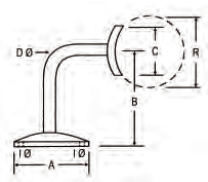
Adj Rail Support Round Base External Fit (316 S/S)



Item No.	Tube Ø	Wall	A	B	C	D	Weight
316AC-2	2″	1.5mm	51	50.8	26	101	600g

Handrail Support - Radiused (316 S/S)

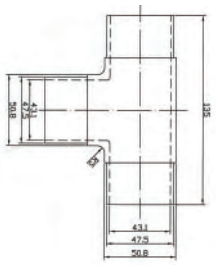
- Three hole handrail support designed for fixing to any type of wall
- Radiused top with countersunk holes allows a handrail to be attached without the need for welding



Item No.	A	B	C	D	I	R	Weight
1528A	63	85	31	12	5.5	1.5″	247g
SG-025	63	85	31	12	5.5	2″	247g

Flush Fit Square Tube Equal Tee 51mm

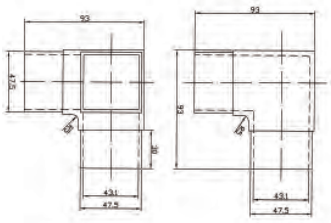
- Pol/Elec



Item No.	Tube Ø	Wall	Weight
SG-018	51mm	1.5mm	760g

Flush Fit Square Tube 90 Degree Tee 51mm

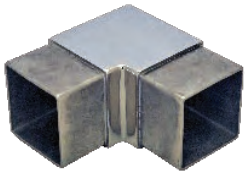
- Pol/Elec

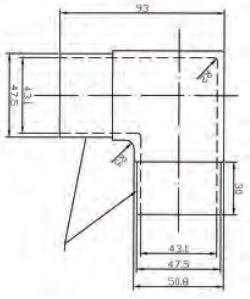


Item No.	Tube Ø	Wall	Weight
SG-019	51mm	1.5mm	750g

Flush Fit Square Tube 90 Degree Bend 51mm

- Pol/Elec

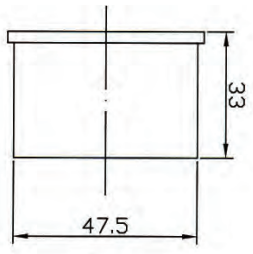




Item No.	Tube Ø	Wall	Weight
SG-017	51mm	1.5mm	750g

Flush Fit Square Tube End Cap 51mm

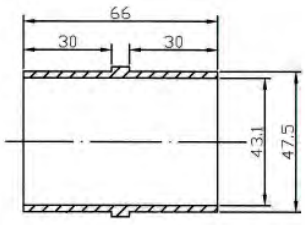
- Pol/Elec



Item No.	Tube Ø	Wall	Weight
SG-020	51mm	1.5mm	160g

Flush Fit Square Tube Inline Joiner 51mm

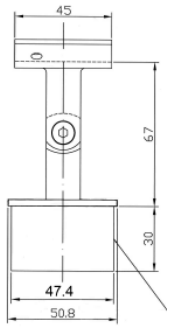
- Pol/Elec



Item No.	Tube Ø	Wall	Weight
SG-021	51mm	1.5mm	250g

Flush Fit Square Tube Post Reducer 51mm Adjustable

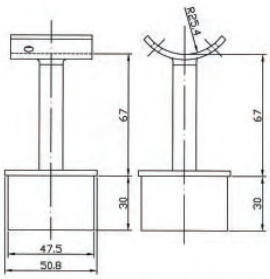
- Pol/Elec



Item No.	Tube Ø	Wall	Weight
SG-026	51mm	1.5mm	300g

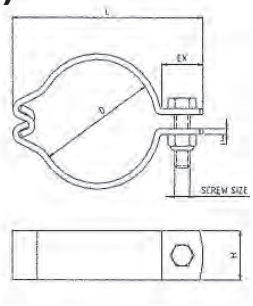
Flush Fit Square Tube Post Reducer 51mm

- Pol/Elec



Item No.	Tube Ø	Wall	Weight
SG-027	51mm	1.5mm	270g

Tube Clamp (304 S/S)



Item No.	Size	D (mm)	L (mm)	EX (mm)	H (mm)	TH (mm)	Screw
04TC13	1/2" (13mm)	13	42	16	25	2	M6 x 25
04TC19	3/4" (19mm)	19	48	16	25	2	M6 x 25
04TC25	1" (25mm)	25	64	22	25	3	M8 x 30
04TC32	1.1/4" (32mm)	32	69	22	25	3	M8 x 30
04TC38	1.1/2" (38mm)	38	74	22	25	3	M8 x 30
04TC51	2" (51mm)	51	90	24	25	3	M8 x 30
04TC63	2.1/2" (63mm)	63	102	22	25	3	M8 x 30
04TC76	3" (76mm)	76	114	22	25	3	M8 x 30
04TC101	4"(101mm)	101	138	22	25	3	M8 x 30

38.1mm Glass to Wall Standoff

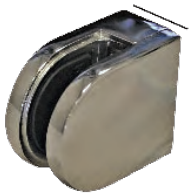
- Grade 316 Glass to Wall Standoff - Satin Finish
- This Glass to Wall Standoff is 38.1mm in diameter with 50mm body
- Includes Grade 304 M12 threaded stainless steel rod, rubber washers and sleaves

Item No	Diameter	Body	Weight
FTBSGSO316050	38.1mm	50mm	500g

Glass Clamps (316 S/S)

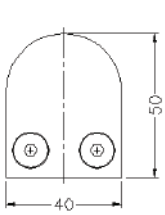
All Glass Clamps are Grade 316 Stainless Steel Mirror Polished/Electroplated.
All Glass Clamps are packaged c/w range of Gaskets, Security Pin (where applicable to Model) and Allen Key.

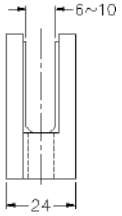
4050R, 4563R



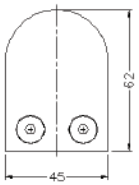
4050, 4563

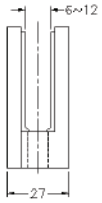
Satin Finish





4050





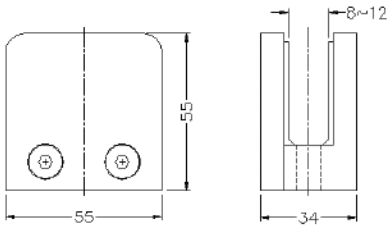
4563

Model No.	Stock Code	Description	Grade	Suit Post	Finish	H	L	W
4050R	FTBGCRB316M	Glass Clamp Curved Base	316	Round	Mirror	40mm	50mm	24mm
		(Suit 6, 8, 10 mm glass)						
4050	FTBGCFB316M	Glass Clamp Flat Base	316	Square/Flat	Mirror	40mm	50mm	24mm
		(Suit 6, 8, 10 mm glass)						
4563R	FTBGCRB316L	Glass Clamp Curved Base	316	Round	Mirror	45mm	62mm	27mm
		(Suit 6, 8, 10, 12 mm glass)						
4563	FTBGCFB316L	Glass Clamp Flat Base	316	Square/Flat	Mirror	45mm	62mm	27mm
		(Suit 6, 8, 10, 12 mm glass)						
	FTBSGCD316038	Glass Clamp Round Base	316	Round	Satin	45mm	65mm	24mm
		(Suit 8-10 mm glass)		suit 38.1 mm tube				
	FTBSGCD316051	Glass Clamp Round Base	316	Round	Satin	45mm	65mm	24mm
		(Suit 8-10 mm glass)		suit 50.8 mm tube				

NOTE: (1) Model number 4050R & 4050 can hold 35kgs each.
(2) Model number 4563R & 4563 can hold 40 kgs each, E.G. 4 clamps can hold 140-160 kgs. If installed with security pin, each clamp can hold 135 or 140 kgs, so 4 clamps can hold 540-560 kgs.

5555R

5555



5555

Model No.	Item No.	Description	Grade	Suit Post	Finish	H	L	W
5555R	FTBGCSRB316	Glass Clamp Square Curved Base	316	Round	Mirror Finish	55mm	55mm	34mm
		(Suit 8, 10, 12 mm glass)						
5555	FTBGCSFB316	Glass Clamp Square Flat Base	316	Square/Flat	Mirror Finish	55mm	55mm	34mm
		(Suit 8, 10, 12 mm glass)						

NOTE: (1) Model Number 5555R & 5555 can hold 40 kgs each, E.G. 4 clamps can hold 140-160 kgs. If installed with security pin, each clamp can hold 135 or 140 kgs, so 4 clamps can hold 540-560 kgs

GLASS CLAMPS & COMPONENTS DISCLAIMER / WARRANTY

Stirlings Australia disclaims all warranties and representations, express or implied, with regard to Glass Clamps and components, including all warranties of merchantability and fitness for any particular use or purpose. Goods supplied are subject to the chemical and mechanical composition, physical properties and product standards of the original manufacturer and are covered by such warranty as specified by the, original manufacturer. The company does not give any warranty beyond such warranty.

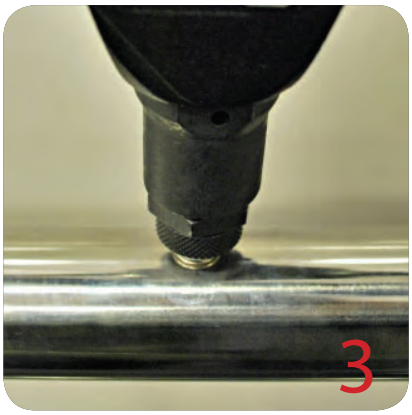
If this product is defective, Stirlings Australia's sole obligation, and your sole remedy, will be to provide you with a replacement, but only if you first return the defective product to Stirlings Australia. We have no obligation to replace the product if the defect resulted from improper installation, abuse or misuse. Neither Stirlings Australia nor its affiliates, suppliers, or agents are liable for any special, incidental, indirect, consequential or punitive damages whatsoever (including but not limited to lost profits and damages resulting from loss of the use of the product or any other pecuniary loss) however caused, including negligence and regardless of the form of action, whether in contract or tort.

Stirlings Australia's total liability for damages if the product is defective will not under any circumstances exceed the price that you paid for the product.

Glass Clamp Installation Guide

Mark and centre punch desired location of blind rivet nut location.

Drill centre punched hole in tube to suit blind rivet nut.



Insert blind rivet nut into tube and fasten with blind rivet tool.

Check installed blind rivet nut is secure and ready for install.

Align half glass clamp with blind rivet nut inline position. Screw in button head cap screw into thread and tighten with hex key.

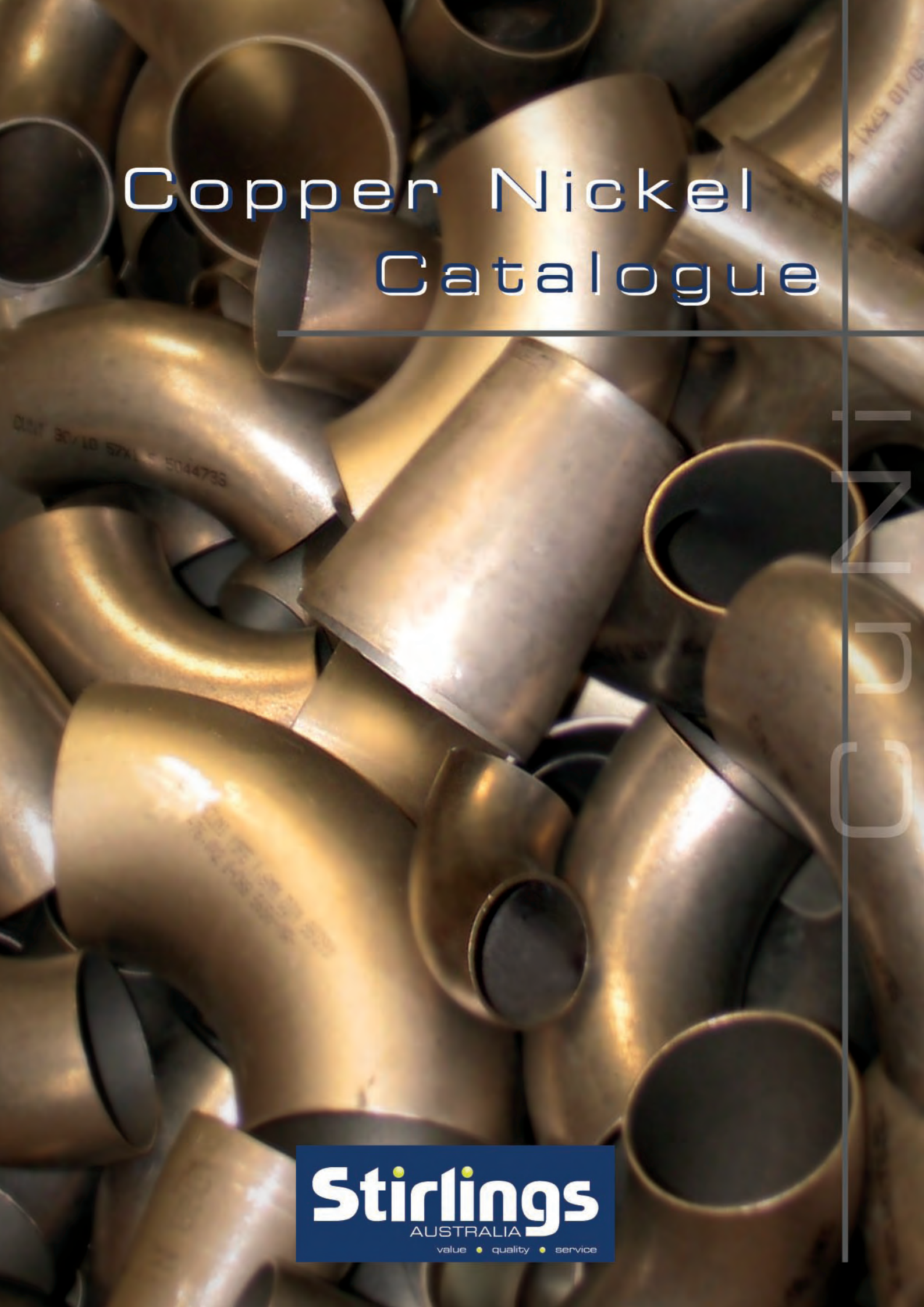
Select appropriate rubber gasket to suit glass panel thickness. Install rubber gasket into both sides of glass clamp. (Note rubber gasket marked with sizes).

If heavier clamping load is required please use supplied glass clamp pin, during the install process. Note glass panels will require drilling in order to fit glass clamp pins.

Fit glass panel into position, install second half of glass clamp secure with provided hex screws.

Tighten glass clamps with hex key, and check glass panel are secure with no movement.

Note: please refer to Balustrade Catalogue for glass clamp load specification for different models.
check you have the correct components, tools and safety equipment before installing your glass clamps. This publication is intended to be an aid for all traders and professionals involved with installing Stirlings Australia glass clamps and not to be a substitute for professional judgement.



Copper Nickel Catalogue

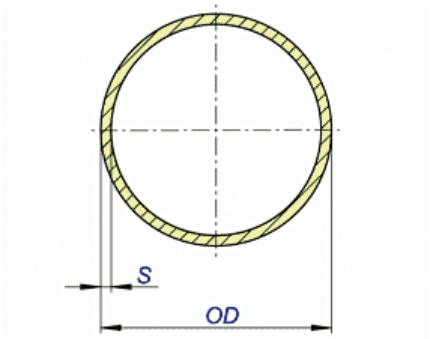
Stirlings AUSTRALIA

value • quality • service

CuNi Pipe (10 bar)

European Standard
10 bar
DIN 86019 / BS 2871 CN102

90/10 CuNi



10 bar

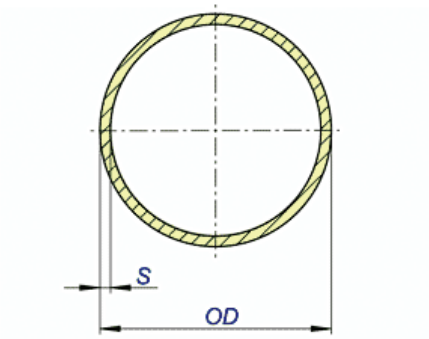
Outside diameter of pipe			Wall Thickness	Weight (theoretical)	
nominal		actual	actual		
inch	ND	mm	mm	kg/m	Availability
0.125		10	1.0	0.26	
0.25		12	1.0	0.31	
0.38	10	16	1.0	0.42	•
0.5	15	20	1.0	0.53	•
0.75	20	25	1.5	0.99	•
1	25	30	1.5	1.20	•
1.25	32	38	1.5	1.54	•
1.5	40	44.5	1.5	1.81	•
2	50	57	1.5	2.34	•
2.5	65	76.1	2.0	4.16	•
3	80	88.9	2.0	4.88	•
4	100	108	2.5	7.41	•
5	125	133	2.5	9.16	•
6	150	159	2.5	10.99	•
7	175	193.7	2.5	13.43	
8	200	219.1	3.0	18.21	•
10	250	267	3.0	22.24	•
12	300	323.9	4.0	35.94	•
14	350	368	4.0	40.9	
16	400	4191	4.0	46.62	
18	450	457.2	4.0	50.91	
20	500	508	4.5	63.63	
24	600	610	5.0	84.96	
28	700	711	6.0	118.80	
32	800	813	6.0	135.99	
36	900	914	8.0	203.57	

• Stocked Item ○ Market Available

CuNi Pipe (14 bar)

European Standard
14 bar
DIN 86019 / BS 2871 CN102

90/10 CuNi



14 bar

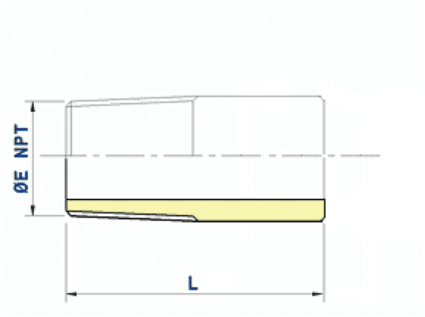
Outside diameter of pipe			Wall Thickness	Weight (theoretical)	
nominal		actual	actual		
inch	ND	mm	mm	kg/m	Availability
0.125		10	1.0	0.26	
0.25		12	1.0	0.31	
0.38	10	16	1.0	0.42	•
0.5	15	20	1.0	0.53	•
0.75	20	25	1.5	0.99	•
1	25	30	1.5	1.20	•
1.25	32	38	1.5	1.54	•
1.5	40	44.5	1.5	1.81	•
2	50	57	1.5	2.34	•
2.5	65	76.1	2.0	4.16	•
3	80	88.9	2.5	6.07	
4	100	108	2.5	7.41	
5	125	133	3.0	10.95	
6	150	159	3.0	13.14	
7	175	193.7	3.5	18.70	
8	200	219.1	3.5	21.19	
10	250	267	4.0	29.55	
12	300	323.9	5.0	44.78	
14	350	368	5.5	56.00	
16	400	4191	6.0	69.60	
18	450	457.2	6.0	76.03	
20	500	508	6.5	91.55	
24	600	610	8.0	135.26	
28	700	711	9.0	177.45	
32	800	813	10.0	225.53	
36	900	914	11.0	278.98	

• Stocked Item ○ Market Available

CuNi Nipples

NPT Thread

90/10 CuNi



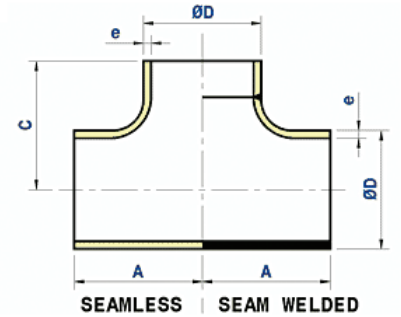
Outside diameter of pipe nominal inch	Outside diameter of pipe actual mm	ØE Thread (NPT)	L mm	Theoretical Weight Kg/piece	Availability
0.25	12	0.25″	35	0.04	•
0.38	16	0.38″	35	0.04	•
0.5	20	0.5″	35	0.04	•
0.75	25	0.75″	40	0.07	•
1	30	1″	40	0.11	•
1.25	38	1.25″	50	0.14	•
1.5	44.5	1.5″	50	0.21	•
2.0	57	2″	55	0.35	•
2.5	76.1	2.5″	75	0.68	•

• Stocked Item ○ Market Available

CuNi Tees

European Standard
10 bar
DIN 86088 / EEMUA 146

90/10 CuNi



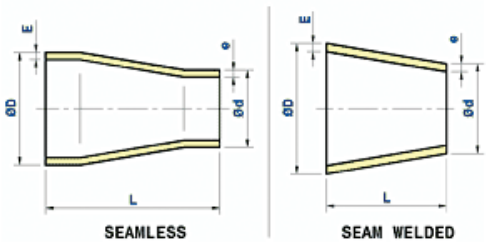
Outside diameter of pipe D nominal inch	actual mm	Wall Thickness e mm	A mm	C mm	Theoretical Weight Kg/piece	Availability
0.5	20	1	25	25	0.05	
0.75	25	1.5	29	29	0.07	●
1	30	1.5	38	38	0.10	
1.25	38	1.5	48	48	0.13	●
1.5	44.5	1.5	57	57	0.19	●
2	57	1.5	64	64	0.29	●
2.5	76.1	2	76	76	0.65	●
3	88.9	2	86	86	0.82	●
4	108	2.5	105	105	1.60	
5	133	2.5	121	121	3.10	●
6	159	2.5	143	143	4.40	
7	193.7	2.5	157	157	4.70	
8	219.1	3	178	178	12.8	●
10	267	3	216	216	16.6	
12	323.9	4	254	254	31.5	
14	368	4	279	279	39.4	
16	419.1	4	305	305	55.1	
18	457.2	4	343	343	67.65	
20	508	4.5	381	381	92.8	
24	610	5	432	432	126.6	

● Stocked Item ○ Market Available

CuNi Reducers

European Standard
10 bar
DIN 86089 / EEMUA 146

90/10 CuNi



Outside diameter		Wall thickness		Length	Theoretical Weight	Availability
ØD x Ød nominal inch	ØD x Ød actual mm	E mm	e mm	L mm	Kg/piece	
0.5 x 0.38	20 x 16	1	1	30	0.01	
0.75 x 0.38	25 x 16	1.5	1	30	0.02	
0.75 x 0.5	25 x 20	1.5	1	30	0.03	●
1 x 0.38	30 x 16	1.5	1	35	0.03	
1 x 0.5	30 x 20	1.5	1	35	0.04	●
1 x 0.75	30 x 25	1.5	1.5	35	0.05	●
1.25 x 0.38	38 x 16	1.5	1	50	0.05	
1.25 x 0.5	38 x 20	1.5	1	50	0.06	●
1.25 x 0.75	38 x 25	1.5	1.5	50	0.07	●
1.25 x 1	38 x 30	1.5	1.5	50	0.08	●
1.5 x 0.5	44.5 x 20	1.5	1	80	0.09	●
1.5 x 0.75	44.5 x 25	1.5	1.5	80	0.11	●
1.5 x 1	44.5 x 30	1.5	1.5	80	0.12	
1.5 x 1.25	44.5 x 38	1.5	1.5	80	0.13	●
2 x 0.5	57 x 20	1.5	1.5	80	0.14	●
2 x 0.75	57 x 25	1.5	1.5	80	0.14	●
2 x 1	57 x 30	1.5	1.5	80	0.15	●
2 x 1.25	57 x 38	1.5	1.5	80	0.16	●
2 x 1.5	57 x 44.5	1.5	1.5	80	0.24	●
2.5 x 1	76.1 x 30	2	1.5	90	0.25	
2.5 x 1.25	76.1 x 38	2	1.5	90	0.25	●
2.5 x 1.5	76.1 x 44.5	2	1.5	90	0.26	●
2.5 x 2.0	76.1 x 57	2	1.5	90	0.29	●
3 x 1.25	88.9 x 38	2	1.5	90	0.29	
3 x 1.5	88.9 x 44.5	2	1.5	90	0.30	
3 x 2.0	88.9 x 57	2	1.5	90	0.32	●
3 x 2.5	88.9 x 76	2	2	90	0.40	●
4 x 1.5	108 x 44.5	2.5	1.5	100	0.46	
4 x 2	108 x 57	2.5	1.5	100	0.48	
4 x 2.5	108 x 76.1	2.5	2	100	0.57	●
4 x 3	108 x 88.9	2.5	2	100	0.61	●

● Stocked Item ○ Market Available

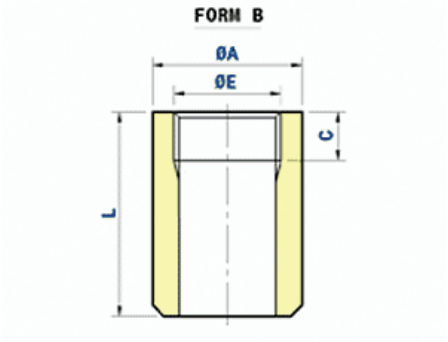
Outside diameter		Wall thickness		Length	Theoretical Weight	Availability
ØD x Ød nominal inch	ØD x Ød actual mm	E mm	e mm	L mm	Kg/piece	
5 x 2	133 x 57	2.5	1.5	140	0.8	
5 x 2.5	133 x 76.1	2.5	2	140	0.93	
5 x 3	133 x 88.9	2.5	2	140	0.98	
5 x 4	133 x 108	2.5	2.5	140	1.16	●
5 x 2	133 x 57	3	1.5	140	0.86	
5 x 2.5	133 x 76.1	3	2	140	1.06	
5 x 4	133 x 108	3	2.5	140	1.34	
6 x 2.5	159 x 76.1	2.5	2	150	1.13	
6 x 3	159 x 88.9	2.5	2	150	1.19	
6 x 4	159 x 108	2.5	2.5	150	1.38	●
6 x 5	159 x 133	2.5	2.5	150	1.51	●
7 x 3	193.7 x 88.9	2.5	2	155	1.39	
7 x 4	193.7 x 108	2.5	2.5	155	1.58	
7 x 5	193.7 x 133	2.5	2.5	155	1.71	
7 x 6	193.7 x 159	2.5	2.5	155	1.86	
7 x 4	193.7 x 108	3.5	2.5	155	2.21	
8 x 4	219.1 x 108	3	2.5	155	2.47	
8 x 5	219.1 x 133	3	2.5	155	2.6	●
8 x 6	219.1 x 159	3	2.5	155	2.74	●
8 x 7	219.1 x 193.7	3	2.5	155	2.93	
8 x 4	219.1 x 108	3.5	2.5	155	2.88	
10 x 5	267 x 133	3	2.5	210	3.3	
10 x 6	267 x 159	3	2.5	210	3.49	
10 x 7	267 x 193.7	3	2.5	210	3.75	
10 x 8	267 x 219.1	3	3	210	4.25	●
12 x 5	323.9 x 133	4	2.5	210	5.3	
12 x 6	323.9 x 159	4	2.5	210	5.6	
12 x 7	323.9 x 193.7	4	2.5	210	6.02	
12 x 8	323.9 x 219.1	4	3	210	6.3	●
12 x 10	323.9 x 267	4	3	210	6.88	
14 x 6	368 x 159	4	2.5	300	8.75	
14 x 7	368 x 193.7	4	2.5	300	9.34	
14 x 8	368 x 219.1	4	3	300	9.76	
14 x 10	368 x 267	4	3	300	10.57	
14 x 12	368 x 323.9	4	4	300	11.53	
16 x 7	419.1 x 193.7	4	2.5	325	11.04	
16 x 8	419.1 x 219.1	4	3	325	11.5	
16 x 10	419.1 x 267	4	3	300	12.38	
16 x 12	419.1 x 323.9	4	4	300	13.42	
16 x 14	419.1 x 368.1	4	4	300	14.22	
18 x 8	457.2 x 219.1	4	3	350	13.14	
18 x 10	457.2 x 267	4	3	350	14.08	
18 x 12	457.2 x 323.9	4	4	350	15.2	
18 x 14	457.2 x 368	4	4	350	16.06	
18 x 16	457.2 x 419.1	4	4	350	17.07	

● Stocked Item ○ Market Available

CuNi Sockets

Sockets form B in copper nickel

90/10 CuNi

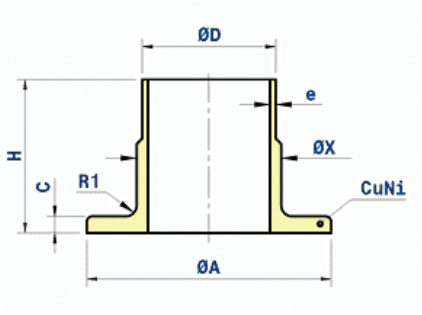


ØD Thread (NPT)	ØA mm	C mm	Form B L mm	Theoretical Weight Kg/piece	Availability
0.25	20	12	20	0.03	•
0.38	25	12	20	0.05	•
0.50	30	14	23	0.08	•
0.50	30	14	50	0.17	
0.50	30	14	75	0.25	
0.50	30	14	100	0.34	
0.50	30	14	125	0.44	
0.75	38	16	25	0.14	•
0.75	38	16	50	0.28	
0.75	38	16	75	0.42	
0.75	38	16	100	0.56	
0.75	38	16	125	0.70	
1	45	18	28	0.19	•
1	45	18	50	0.35	
1	45	18	75	0.52	
1	45	18	100	0.70	
1	45	18	125	0.88	
1.25	55	20	30	0.29	•
1.5	60	22	32	0.37	•
2	75	23	40	0.68	•

• Stocked Item ○ Market Available

CuNi Weld Neck Flanges

Composite weld neck
Inner Flange
10 bar
Din 86037 / EEMUA 145
90/10 CuNi (70/30 available on request)
Galvanised backing flanges available in stock, to suit.



Outside Diameter of pipe ØD		Wall thickness	ØA	H	C	ØX	R1	Theoretical Weight	Availability
nominal inch	actual mm	e mm	mm	mm	mm	mm	mm	Kg/piece	
0.5	20	1.5	45	28	5	22	3	0.08	•
0.75	25	1.5	58	40	5	27	3	0.14	•
1	30	1.5	68	40	5	32	4	0.24	•
1.25	38	1.5	78	40	5	40	4	0.26	•
1.5	44.5	1.5	88	45	6	46.5	4	0.42	•
2	57	1.5	102	45	6	59	5	0.53	•
2.5	76.1	2	122	45	6	78	5	0.64	•
3	88.9	2	138	50	7	91	5	0.86	•
4	108	2.5	158	50	7	110	5	1.10	•
5	133	2.5	188	50	7	135.5	5	1.50	•
6	159	2.5	212	50	9	161.5	5	2.00	•
7	193.7	2.5	242	50	9	197	5	2.30	
8	219.1	3	268	50	9	222	5	2.70	•
10	267	3	320	50	9	270	5	3.40	•
12	323.9	4	370	50	11	327	7	4.60	•
14	368	4	430	50	11	371	7	6.20	
16	419.1	4	482	50	12	422	7	7.50	
18	457.2	4	530	50	12	460	7	9.00	
20	508	4.5	585	50	12	511	7	10.65	
24	610	5	685	60	14	613	9	14.90	

Galvanised backing flanges available in stock, to suit.

• Stocked Item ○ Market Available

Galvanised Backing Flanges

Mild Steel Galvanised
Manufactured to AS250
Suitable for composite weld neck flanges.
Din 86037

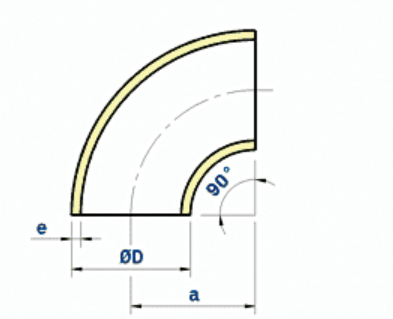
Size Pipe NB/ Tube (mm)	Overall Diametre (mm)	Internal Diametre (mm)	PCD	Thickness	Hole Diametre	Number of Holes	Approximate Weight (Kg)	Availability
20 / 25	102	33	73	12	14	4	0.67	●
25 / 30	114	40	83	12	14	4	0.85	●
32 / 38	121	48	87	12	14	4	0.90	●
40 / 44.5	133	54.5	98	12	14	4	1.13	●
50 / 57	152	69	114	12	17.5	4	1.44	●
65 / 76	165	88	127	12	17.5	4	1.51	●
80 / 89	184	101	146	12	17.5	4	1.97	●
100 / 108	216	120	178	13	17.5	8	2.54	●
125 / 133	254	145.5	210	14	17.5	8	2.58	●
150 /159	279	171.5	235	17	22	8	4.39	●
200 / 219	337	232	292	19	22	8	7.39	●
250 / 267	406	280	356	22	22	12	11.57	○
300 /324	457	341	406	25	26	12	14.37	●

● Stocked Item ○ Market Available

CuNi Elbows

European Standard
10 bar
DIN 86089 / EEMUA 146

90/10 CuNi



Outside diameter of pipe ØD		Wall thickness	Radius	Theoretical Weight	Availability
Nominal Inch	actual mm	e mm	a mm	kg/piece	
0.5	20	1	25	0.02	•
0.75	25	1.5	27.5	0.04	•
1	30	1.5	33.5	0.06	•
1.25	38	1.5	45	0.10	•
1.5	44.5	1.5	51	0.14	•
2	57	1.5	72	0.26	•
2.5	76.1	2	95	0.61	•
3	88.9	2	114.5	0.87	•
4	108	2.5	142.5	1.64	•
5	133	2.5	181	2.58	•
6	159	2.5	216	3.70	•
7	193.7	2.5	270	5.65	
8	219.1	3	305	8.66	•
10	267	3	378	13.10	•
12	323.9	4	457	25.61	•
14	368	4	533.5	34.00	
16	419.1	4	609.5	39.40	
18	457.2	4	686	48.40	
20	508	4.5	762	75.62	
24	610	5	915	121.24	

• Stocked Item ○ Market Available

Technical Data

45.51	46408	45540	44880	9300	64.12	653.86	641.40	632.40	316	Austenitic	S31600	.05	2.0 Max	12.0	17.0	2.5	.045	.03	1.0 Max
46.20	47105	46230	45560	9400	64.81	660.89	648.60	639.20	316L	Austenitic	S31603	.03 Max	2.0 Max	12.0	17.0	2.5	.045	.03	1.0 Max
46.88	47809	46920	46240	9500	65.50	667.92	655.50	646.00	316Ti	Austenitic	S31635	.08 Max	2.0 Max	11.0	17.0	2.5	.045	.03	1.0 Max
47.57	48512	47610	46920	9600	66.19	674.95	662.40	652.80	317L	Austenitic	S31703	.03 Max	2.0 Max	13.0	19.0	3.5	.045	.03 Max	1.0 Max
48.26	49215	48300	47600	9700	66.88	681.98	669.30	659.60	310	Austenitic	S31000	.25 Max	2.0 Max	20.0	25.0		.045		
48.95	49918	48990	48280	9800	67.57	689.01	676.20	666.40	321	Austenitic	S32100	.08 Max	2.0 Max	10.0	18.0		.045 Max	.03 Max	1.0 Max
49.64	50621	49680	48960	9900	68.26	696.04	683.10	673.20											
50.33	51324	50370	49640	10000	68.95	703.07	690.00	680.00	253MA	Austenitic	S30815	.10		11.0	21.0				
51.02	52027	51060	50320	11000	75.84	773.84	759.00	748.00	904L	Austenitic	N08904	.02		25.0	20.0	4.5			
51.71	52730	51750	51000	12000	82.74	843.68	828.00	816.00	420	Martensitic	S42000	.15 Min	1.0 Max	2.0	13.0		.04 Max	.03 Max	1.0 Max
52.40	53438	52440	51680	13000	89.63	913.99	897.00	884.00	431	Martensitic		.20 Max	1.0 Max	1.0	16.0		.04 Max	.03 Max	1.0 Max
53.09	54136	53130	52360	14000	96.53	984.30	966.00	952.00	416 (630)	Martensitic	S43100	.05							
53.78	54839	53820	53040	15000	103.42	1054.6	1035.0	1020.0	440C	Martensitic	S17400	1.0	1.0 Max	1.0	17.0	0.75 Max	.04 Max	.03 Max	1.0 Max
									444	Ferritic	S44400	.02	1.0	1.0	18.5	2.0	.04	.03	
									3CR12	Ferritic	-	.03	1.5	1.5	11.0		.03	.03	
									2205	Duplex	S31803	.03	2.0 Max	5.5	22.0	3.0	.03	.02	
									2304	Duplex	S32304	.03	.03	4.0	23.0		.03	.02	

illimetres	Fractional Inch 1/64	1/32	1/16	1/8	Decimal Part of an Inch	Millimet
0.4	33				0.516	13.1
0.7	34	17			0.531	13.5
1.1	35				0.547	13.9
1.5	36	18	9		0.563	14.3
1.9	37				0.578	14.7
2.3	38	19			0.594	15.1
2.7	39				0.609	15.5
3.1	40	20	10	5	0.625	15.9
3.5	41				0.641	16.3
4.0	42	21			0.656	16.7
4.4	43				0.672	17.1
4.8	44	22	11		0.688	17.5
5.2	45				0.703	17.9
5.6	46	23			0.719	18.3
6.0	47				0.734	18.7
6.4	48	24	12	6	0.750	19.1
6.7	49				0.766	19.5
7.1	50	25			0.781	19.8
7.5	51				0.797	20.2
7.9	52	26	13		0.813	20.6
8.3	53				0.828	21.0
8.7	54	27			0.844	21.4
9.1	55				0.859	21.8
9.5	56	28	14	7	0.875	22.2
9.9	57				0.891	22.6
10.3	58	29			0.906	23.0
10.7	59				0.922	23.4
11.1	60	30	15		0.938	23.8
11.5	61				0.953	24.2
11.9	62	31			0.969	24.6
12.3	63				0.984	25.0
12.7	64	32	16	8	1.000	25.4

C	C F	F
-51	-60	-76
-46	-50	-58
-40	-40	-40
-34	-30	-22
-29	-20	- 4
-23	-10	14
-17.8	0	32
-17.2	1	33.8
-16.7	2	35.6
-16.1	3	37.4
-15.6	4	39.2
-15.0	5	41.0
-14.4	6	42.8
-13.9	7	44.6
-13.3	8	46.4
-12.8	9	48.2
-12.2	10	50.0
-11.7	11	51.8
-11.1	12	53.6
-10.6	13	55.4
-10.0	14	57.2
- 9.4	15	59.0
- 8.9	16	60.8
- 8.3	17	62.6
- 7.8	18	64.4
- 7.2	19	66.2
- 6.7	20	68.0
- 6.1	21	69.8
- 5.6	22	71.6

5/9(°Fahrenheit - 32) = °Centigra
5/9(°Centegrade + 32) = °Fahren

quivalents of Inches Feet and Miles

s	Feet	Miles	Metres	Kilometres
	25	-	7.62	0.0254
	50	-	15.24	0.3048
	75	-	22.86	0.6096
	100	-	30.48	0.9144
	125	-	38.10	1.0000
	150	-	45.72	1.2192
	300	-	91.44	1.5240
	500	-	152.40	1.8288
	1000	-	304.80	2.1336
	3280.84	0.6214	1000.00	2.4384
	5280	1.0000	1609.35	2.7432

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Recommended Filler Metals for Dissimilar Metal Joint Welding

Parent Metal ASTM (AISI)	201 202	303(1) 304 304L	309 309S	310 310S	317 316	317L 316L 316Ti	321 347	S30815 (253MA)
201	308	308	308	308	308	308	347	308
202	308L	308L	308L	308L	308L	308L	318	347
		312	347	347	347	318	308	
					318			
304(1)		308	308	308	308	308	347	22.12.HT
304L		308L	308L	308L	308L	308L	308	308
303		347	347	347	347	347	308L	347
							318	
309			309	309	309	309	374	22.12.HT
309S			309L	309L	309L	309L	308	309
				310		316L	308L	347
						318		
310				310	317L	317L	347	22.12.HT
310S				310L	316L	316L	308	310
					318	318	308L	309
					309	309	310	
						309L		
317					317	317L	347	22.12.HT
316					316	316L	318	309
					318	316	316	
						318		
317L						317L	347	22.12.HT
316L						316L	318	309
316Ti						318	308	
							316L	
321							347	22.12.HT
347							318	309
							308	347
S30815 (253MA)								22.12.HT
409								
410								
430								
446								
S31500								
S31803								
S32304								
NiCrFe(2) Alloys								

Notes:
(1) This group includes free-cutting steels. When such a steel is a member of the joint certain precautions have to be taken. Buttering the free-cutting steel with 312 before welding the joint with a filler metal that suits the other part of the joint or welding the whole joint with 312 is normally a safe procedure.

(2) Higher strength can be obtained by using NiCrFe-6 with subsequent heat treatment.

General Notes:
• If the dilution is high, eg. in submerged arc welding, special high ferrite grades are often preferred.

• If the working conditions require heat treatment, the filler metal choice may have to be reconsidered. Owing to the infinite combinations of materials and working conditions, no general rules can be applied.

• Filler metals are stated in order of preference. Normally, MMA, TIG, sub-arc welding is assumed. For MIG welding grades with higher silicon contents, eg. 308LSi, 308Si are preferred.

• Where 309 is specified 309MoL may be used. Where 309 is specified filler metals 310, 312, NiCr-3 may generally be used, however, care must be exercised with this selection: eg. i) to avoid high ferrite levels (312 consumable) which may lead to sigma phase embrittlement, ii) to avoid high nickel contents (NiCr-3) which can be attacked in sulphur bearing high temperature environments.

409 410 430	446	Duplex S31500 S31803 S32304	NiCrFe(2) Steels	Carbon(1) Steels	Low(1) Alloy Steels	501 502 505	Parent Metal ASTM (AISI)
309	309	22.8.3L	NiCr-3	309	309	309	201
310	310	309	NiCrFe-6				202
309	309	22.8.3L	NiCr-3	309	309	309	304(1)
310	310	309L	NiCrFe-6				304L
		309					303
309	309	22.8.3L	NiCr-3	309	309	309	309
310	310	309	NiCrFe-6				309S
		309L					
309	310	22.8.3L	NiCr-3	310	310	310	310
310	309	309	NiCrFe-6	309	309	309	310S
		309L					
309	309	22.8.3L	NiCr-3	309	309	309	317
310	310	309Mo	NiCrFe-6				316
		309					
309	309	22.8.3L	NiCr-3	309	309	309	317L
310	310	309Mo	NiCrFe-6				316L
		317L					316Ti
		316L					
309	309	22.8.3L	NiCr-3	309	309	309	321
310	310	309	NiCrFe-6				347
22.12.HT	22.12.HT	22.8.3L	NiCr-3	22.12.HT	22.12.HT	22.12.HT	S30815
309	309	309	NiCrFe-6	309		309	(253MA)
310	310	310		310		310	
410	446	22.8.3L	NiCr-3	309	309	309	409
309	310	309	NiCrFe-6				410
	309	309L					430
	446	309	NiCr-3	309	309	309	446
	310	309L	NiCrFe-6				
	309						
		22.8.3L	NiCr-3				S31500
		309Mo	NiCrFe-6				S31803
							S32304
			NiCr-3				NiCrFe(2)
			NiCrFe				Alloys
			Alloys				

• Where designated consumables are not available, more highly alloyed grades may be used. However, due care must be taken with their selection.

• For high temperature transition joints carbon diffusion has tobe considered. In such cases, 310 or NiCr-3 is recommended.

• When joining dissimilar but highly corrosion resistant steels, ferrite-free deposits are often demanded. Although each case has to be considered separately, the use of NiCr-3, 20.25.5LCu, or 27.31.4LCu can often be recommended.

• In addition to the grades specified here filler metals with specific properties are available, eg. low ferrite content, high carbon, extra low interstitials, high purity, etc.

• This table is not exhaustive. Other alloys may also be suitable.

Welding Practice

Joint Preparation and Cutting

Cutting or preparation of edges should be carried out by guillotine, machining, grinding or plasma arc. Edges cut by plasma arc should be smooth and free from gutters or notches and shall have oxides removed. All other edges should be deburred. Any cutting or preparation carried out with the carbon arc process or by powder cutting should have 1.5mm dressed from the cut edge. Carbon arc gouging is not recommended for cutting of stainless steels under any circumstances. All spatter is to be removed and the surface of the parent metal dressed smooth.

Electrode Care

Electrodes that have been removed from their packets should be transferred to a holding oven or welder's hot box and maintained at a temperature of 110ºC to prevent moisture pick-up until required for use. Electrodes that have become damp should be redried at 250ºC for 2 hours prior to use.

General Welding Practice and Technique

Cleaning

Cleaning may be necessary before welding and during welding (interpass) and is usually essential after welding in order to ensure maximum corrosion resistance.

Pre-weld cleaning involves dressing the cut edge and removing all contaminants such as oil, paint, grease, crayon marks, adhesive tapes, etc. The area on both sides of weld should be cleaned before welding by brushing with a clean stainless steel brush and wiped with a solvent moistened cloth. All moisture must be removed and if a flame is used care must be taken to see that any water (a product of combustion) does not remain on the surface or in the weld preparation. Liquid petroleum gas particularly creates a large amount of water when burnt.

Each welding run must be thoroughly cleaned to remove slag and spatter before proceeding with the next run. The cleaning method used (chipping, brushing, grinding) will depend on the welding process, bead shape, etc. but care should be taken to see that the weld area is not contaminated in the process. Any cleaning equipment should be suitable for stainless steel and kept for that purpose.

During welding, a gas purge on the reverse side may be advantageous.

After welding, weld spatter, flux, scale, arc strikes and the overall heat discolouration should be removed. This can involve grinding and polishing, blasting and brushing with a stainless steel wire brush, or use of a descaling solution or paste. The preferred procedure is usually dictated by end use.

Grinding and dressing is to be carried out with iron-free brushes, abrasives, etc. and should not be so heavy as to discolour and overheat the metal. Rubber and resin bonded wheels are satisfactory. Wheels should be dressed regularly to prevent them becoming loaded thereby producing objectionable scratches. In any blasting process steel shot shall not be used.

Welding Procedure

Efficient arc striking is essential in welding all types of stainless steels as indiscriminate arc striking tends to scar or burn the surface of the steel thus providing areas for premature chemical attack. Care and skill are required to obtain satisfactory weld starts and restarts on continuous seams. As both burn-through on light section material and cold lack of penetration starts on heavier material can easily result from imperfect technique, the suggested procedure is to strike the electrode in the joint approximately 8-10mm forward of the actual start point. With the arc established and electrode correctly angled it can then be rapidly taken to the start point for complete fusion of the previous weld and/or the joint root of a new weld.

Efficient tack welding on austenitic steels is essential in controlling distortion. The length of tack welds varies from 12-40mm depending on sheet or plate thickness. Generally tack welds are more closely spaced than when welding mild steel of similar dimensions.

The use of a long arc or excessive current is capable of causing losses of manganese and chromium which can impair the corrosion resistance of the weld joint. Arc length should therefore be kept as short as possible consistent with satisfactory welding performance, ie. minimum spatter, complete fusion, acceptable bead shape.

Welding should be carried out at the lowest current consistent with good fusion at the selected welding speed to minimise heat input and control distortion. Higher welding speeds can be an advantage.

Stringer beads are recommended in preference to weaving in order to keep the heat input to an acceptable level. Where weaving is necessary both the weave width and side dwell time should be kept to a minimum. Interpass temperatures generally should not exceed 150ºC except in the case of martensitic alloys.

Breaking the arc in an abrupt manner can result in slag inclusions and shrinkage cracks. Craters should be filled by using a circular motion at the end of the weld followed by a gradual lengthening of the arc to the point of extinguishing it.

Welding conditions and welding technique should be such as to produce a smooth weld surface which requires minimum dressing.

Fillet weld beads shall be of full throat thickness and correct contour, consistent with good operation. Concave fillet welds are to be avoided.

The root side of the weld must be protected against oxidation especially in gas-shielded arc welding. Protection with shielding gas is commonly applied. Back-gouging (grinding) of the root and welding from the reverse side of the joint can also be used when the design so permits.

Forms of Corrosion

Stainless steels are not indestructible materials, nor immune to all corrosive attack. However, the family of stainless steels are excellent combatants of corrosion and provide a wide choice of materials which, with careful selection and proper fabrication, enable the manufacture of cost effective critical components to meet the diverse needs of many industry sectors.

The more common forms of corrosion which affect all metals and alloys, including stainless steel, are briefly outlined.

General corrosion
General corrosion is a uniform attack of the entire metal surface. It is the least dangerous because rates of corrosion can be measured and predicted. Stainless steels have very low general corrosion rates in many aggressive environments.

Galvanic corrosion
Galvanic corrosion occurs when two different metals are in electrical contact and immersed in the same corrosive solution. Stainless steels are noble metals and therefore seldom suffer increased corrosion rates as a result of galvanic corrosion.

Erosion/abrasion corrosion
Erosion/abrasion corrosion is a combination of mechanical and corrosive attack. Abrasive particles in suspension, or high velocities, expose fresh metal surfaces which then suffer high rates of corrosion. Stainless steels offer a high resistance due to the tenacious and stable passive film on their surface.

Intergranular corrosion
Intergranular corrosion is due to the formation of chromium carbides at high temperatures (450°-859°C). These form preferentially at the grain boundaries thus reducing the chromium content and resulting in a path of lower corrosion resistance around the grains. With correct choice of material ("L" or stabilised grades) and care during fabrication this form of corrosion should not occur.

Pitting corrosion
Pitting corrosion is a dangerous, very localised form of corrosion which results in small holes or perforations through the material, but with little measurable general metal loss. Some corrosive environments (commonly those containing the aggressive chloride ion) have the ability to attack localised weak points in the passive film. Due care in the selection of material should be taken if aggressive (eg chloride) ions are present, especially in acidic solutions at elevated temperatures. If conditions which promote pitting corrosion cannot be modified, materials with higher alloy content such as the duplex stainless steels and the stainless alloys will often give a solution to the problem.

Crevice/shielded corrosion
Crevice/shielded corrosion occurs where the surface of stainless steel is shielded or occluded thus preventing the free access and availability of oxygen to the surface. The passive film therefore tends to break down in these areas. Any conditions which give rise to a "crevice" should be avoided.

Microbiologically induced corrosion (MIC)
MIC results from the attraction and adherence of bacteria to the surface of the metal. A condition similar to a crevice is thereby produced. Certain bacteria produce aggressive metabolic products which aggravate the situation.

Stress corrosion cracking (SCC)
Both pitting and crevice corrosion can lead to SCC under certain conditions. Stress corrosion cracking is a brittle fracture occurring in an otherwise ductile material. The austenitic crystal structure is prone to SCC whereas the ferritic crystal structure prevents its development.

SCC requires the following three factors for development:
- The presence of tensile stress. This can be either applied or residual stress as occurring as a result of the metal forming, fabrication and welding procedure.
- A minimum temperature – generally SCC does not occur under 60°C.
- The presence of a particular ion, eg. the chloride ion. It is often difficult to quantify the exact chloride concentration needed, but localised concentration of chlorides will often initiate SCC.

These three factors are synergistic to a degree. SCC is a process whereby initiation may take considerable time. However, once the pit has developed it acts as a local stress raiser, the pit yawns open and fresh electrolyte reaches the anodic tip of the pit. Corrosion occurs locally at the tip of the pit where further yawning and possible branching occurs.

Eventually, the progress of attack reaches such a degree that the yield stress of the material is exceeded due to the residual of sound material.

High resistance to SCC is obtained by use of duplex stainless steels, stainless alloys and super ferritic stainless steels.

Corrosion

	Stainless Steel 18/8 (304, 304L, 321)			Molybdenum Stainless Steel (316, 316L)			Duplex Stainless Steel (2205)			3CR12 / 5CR12		
Temperature °C	20°	60°	100°	20°	60°	100°	20°	60°	100°	20°	60°	100°
Aldehydes	R1	R1	R1	R1	R1	R1	R1	R1	R1	R1	R1	R1
Acetic Acid (10%)	R	R	R	R	R	R	R	R	R	R	R	ND
Acetic Acid (glac. & anh.)	R	R	NR	R	R	R	R	R	NR	ND	ND	ND
Acetic anhydride	R2	NR	NR	R	R	NR	R	R	R	R2	NR	ND
Ketones	R	R	R	R	R	R	R	R	R	R	ND	ND
Acetylene	R	R	R	R	R	R	R	R	R	R	ND	ND
Acid Fumes	R3	R3	R3	R3	R3	R3	R4	NR	NR	NR	NR	NR
Alcohols	R	R	R	R	R	R	R	R	R	R	R	R
Alphatic Esters	R	R	R	R	R	R	R	R	R	R	ND	ND
Alkyl Chlorides	R5	R5	R5	R5	R5	R5	R	R	R	R5	ND	ND
Alum	R	R6	NR	R	R	NR	R	R	NR	ND	ND	ND
Ammonia	R	R	R	R	R	R	R	R	R	R	R	R
Amyl Acetate	R	R	R	R	R	R	R	R	R	R	R	R
Aniline	R	R	R	R	R	R	R	R	R	R	R	R
Antimony Trichloride	R5	NR	NR	R5	R5	NR	R	R	NR	NR	NR	NR
Aromatic Solvents	R	R	R	R	R	R	R	R	R	R	R	R
Atmospheric												
Industrial	R7	ND	ND	R	ND	ND	R	ND	ND	R7	ND	ND
Marine	R7	ND	ND	R	ND	ND	R	ND	ND	R7	ND	ND
Rural	R	ND	ND	R	ND	ND	R	ND	ND	R7	ND	ND
Ascorbic Acid	R1	R1	R1	R	R	R	R	R	R	R1	ND	ND
Benzoic Acid	R	R	R	R	R	R	R	R	R	R	R	R
Boric Acid	R	R	R	R	R	R	R	R	R	R	R	R
Brines, saturated	R8	NR	NR	R8	NR	NR	R	R	R	NR	NR	NR
Bromide (K) soln.	R9	NR	NR	R9	R9	R9	R	ND	ND	NR	NR	NR
Bromine (+ aqu.)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Butyl Acetate	R	R	R	R	R	R	R	R	R	R	R	R
Calcium Chloride	NR	NR	NR	R8	NR	NR	R10	R10	R10	NR	NR	NR
Carbon Disulphide	R	R	ND	R	R	ND	R	R	R	R	R	R
Carbonic Acid	R	R	R	R	R	R	R	R	R	R	R9	NR
Carbon Tetrachloride	R	R	R	R	R	R	R	R	R	R	R	R
Caustic Soda & Potash	R	R	R6	R	R	R6	R6	R6	ND	ND	R6	R6
Cellulose Paint	R	R	R	R	R	R	R	R	R	R	R	R
Chlorates of Na, K, Ba	R1	R1	R1	R1	R1	R1	R	R	R	ND	ND	ND
Chlorine, dry	R	R	R	R	R	R	R	R	ND	ND	ND	ND
Chlorine, wet	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chlorides of Na, K, Mg, Ca, Ni, NH4, Al, Sn, Zn	R10	NR	NR	R9	R11	R11	R	R	ND	R5	NR	NR
Chlorosulphuric Acid	NR	NR	NR	NR10	NR	NR	ND	ND	ND	ND	ND	ND
Chromic Acid (80%)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Citric Acid	R6	R6	R6	R	R	R6	R	R	R	NR	NR	NR
Cresylic Acids (50%)	R	R	R	R	R	R	R	R	R	R	R	R
Detergents, synthetic	R	R	R	R	R	R	R	R	R	R	R	R
Emulsifiers (all conc.)	R	R	R	R	R	R	R	R	R	ND	ND	ND
Esters & Ethers	R	R	R	R	R	R	R	R	R	R	R	R
Fatty Acids (> C6)	R	R	R	R	R	R	R	R	R	R	R	R
Ferric Chloride	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluorinated Refrigerants, Aerosols e.g. Freon	R5	R	R	R5	R	R	R	R	R	R6	R	NR
Fluorine, dry	R	ND	ND	R	ND	ND	R	R	ND	ND	ND	ND
Fluorine, wet	NR	NR	NR	R	ND	ND	ND	ND	ND	NR	NR	NR
Formic Acid	R	NR	NR	R	R	ND	R	R	ND	NR	NR	NR
Fruit Juices	R12	R	R	R	R	R	R	R	R	R13	NR	NR
Gelatine	R1	R	R	R1	R	R	R	R	R	R1	R1	ND
Glycols	R	R	R	R	R	R	R	R	R	R	R	R
Hydrobromic Acid (50%)	NR	NR	ND	NR	NR	ND	NR	NR	ND	NR	NR	NR
Hydrochloric Acid (10%)	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR
Hydrochloric Acid (conc.)	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR
Hydrocyanic Acid	R	R	ND	R	R	ND	R	R	ND	R	ND	ND
Hydrofluoric Acid	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Hydrogen Peroxide (30%)	R	R	R	R	R	R	R	R	R	R	R	ND

Corrosion

	Stainless Steel 18/8 (304, 304L, 321)			Molybdenum Stainless Steel (316, 316L)			Duplex Stainless Steel (2205)			3CR12 / 5CR12		
Temperature °C	20°	60°	100°	20°	60°	100°	20°	60°	100°	20°	60°	100°
Hydrogen Sulphide	R5	R5	R5	R5	R5	R5	R5	R5	R5	R5	R5	R5
Hypochlorite (Na 12-14%)	R14	NR	NR	R14	ND	ND	R14	ND	ND	R14	ND	ND
Lactic Acid (100%)	R	NR	NR	R	R	NR	R	R	ND	NR	NR	NR
Lead Acetate	R	R	R	R	R	R	R	R	R	R	R	R6
Lead Perchlorate	R1	R1	R1	R	R1	ND	ND	ND	ND	NR	NR	NR
Lime (CaO)	R	R	R	R	R	R	R	R	R	R	R	R
Manganate, Potassium (K)	R	R	R	R	R	R	R	ND	ND	R6	ND	ND
Meat Juices	R	R	ND	R	R	ND	R	R	R	R7	NR	NR
Mercuric Chloride	NR	NR	NR	NR	NR	NR	R	R	R	NR	NR	NR
Milk and its products	R	R	R	R	R	R	R	R	R	R	NR	NR
Molasses	R	R	R	R	R	R	R	R	R	R	R	R
Monoethanolamine	R	R	R	R	R	R	R	R	R	R	R	R
Naphthalene	R	R	R	R	R	R	R	R	R	R	R	R
Nitrates of Na, K, NH3, Ag	R	R	R	R	R	R	R	R	R	R	R	R
Nitric Acid (< 25%)	R	R	R	R	R	R	R	R	R	R	R15	NR
Nitric Acid (50%)	R	R	R	R	R	R	R	R	R	R	R15	NR
Nitric Acid (90%)	R	NR	NR	R	NR	NR	R	NR	ND	R	NR	NR
Nitric Acid (Fuming)	R	R2	NR	R	R2	NR	R	NR	NR	R	NR	NR
Oil, Diesel, Petroleum, Spirits	R	R	R	R	R	R	R	R	ND	R	R	R
Oils, essential	R	R	R	R	R	R	R	R	R	R	R	R
Oil, Lube with aromatic adds.	R	R	R	R	R	R	R	R	R	R	R	R
Oils, vegetable and animal	R	R	R	R	R	R	R	R	R	R	R	R
Oxalic Acid	R6	NR	NR	R6	R16	NR	R	R	R	NR	NR	NR
Perchloric Acid	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Phenoll	R	R	R	R	R	R	R	R	R	R	R	R
Phosphoric Acid (20%)	R	R	R	R	R	R	R	R	R	NR	NR	NR
Phosphoric Acid (50%)	R	R	NR	R	R	R	R	R	R	NR	NR	NR
Phosphoric Acid (95%)	R	R	NR	R	R	NR	R17	R17	R17	NR	NR	NR
Phosphorous Pentoxide	R	R	R5	R	R	R5	R	R	R	ND	ND	ND
Pyridine	R	R	R	R	R	R	R	R	R	R	R	R
Sea Water	R9	NR	NR	R9	NR	NR	R	NR	NR	NR	NR	NR
Silicic Acid	R	R	R	R	R	R	R	R	R	R	R	R
Sodium Peroxide	R16	NR	NR	R6	R16	R16	R	R	R	NR	NR	NR
Sodium Silicate	R	R	R	R	R	R	R	R	R	R	R	R
Sodium Sulphide	R	R	NR	R	R	NR	R	R	NR	R6	R6	NR
Starch	R	R	R	R	R	R	R	R	R	R	R	R
Sugar, Syrups, Jams	R12	R	R	R	R	R	R	R	R	R12	R12	R12
Sulphamic Acid	R18	NR	NR	R	R19	NR	R	R	NR	NR	NR	NR
Sulphates (Na, K, Mg, Ca, Al, Fe)	R	R	R	R	R	R	R	R	R	R	R	R
Sulphates	R	R	R	R	R	R	R	R	R	NR	NR	NR
Sulphur Dioxide, dry	R	R	R	R	R	R	R	R	R	R	R	R
Sulphur Dioxide, wet	R	NR	NR	R	R	NR	R	R	NR	NR	NR	NR
Sulphur Dioxide, aqu. soln. (96%)	R	NR	NR	R	R	R	R	R	R	NR	NR	NR
Sulphur Trioxide	NR	NR	NR	R5	R5	R5	R5	R5	R5	NR	NR	NR
Sulphuric Acid (<50%)	NR	NR	NR	R16	NR	NR	R	R	NR	NR	NR	NR
Sulphuric Acid (70%)	NR	NR	NR	NR	NR	NR	R	NR	NR	NR	NR	NR
Sulphuric Acid (95%)	R	NR	NR	R	NR	NR	R	NR	NR	R15	NR	NR
Sulphuric Acid, fuming	R	R2	NR	R	R	NR	R	R	NR	R2	R2	NR
Tannic Acid (10%)	R	R	R	R	R	R	R	R	R	R	R	NR
Tartaric Acid	R	R	R	R	R	R	R	R	R	NR	NR	NR
Trichlorethylene	R5	R5	R5	R5	R5	R5	R5	R5	R5	R5	R5	R5
Urea (30%)	R	R	R	R	R	R	R	R	R	R	R	R
Water, pure	R	R	R	R	R	R	R	R	R	R	R	R
Yeast	R	R	R	R	R	R	R	R	R	R	R	R

R indicates the material is resistant to the named chemical up to the temperature shown, subject to limitations indicated by the footnotes.

NR indicates that the material is not recommended.

ND indicates that no data is available.

1 - not if chlorides present
2 - limited data
3 - depending upon the acid
4 - acid fumes dry, attack may occur if moisture builds up
5 - anhydrous
6 - depending upon concentration
7 - may discolour with time
8 - in strong solutions only when inhibited
9 - pitting possible in stagnant conditions
10 - possibility of pitting
11 - may cause stress corrosion cracking
12 - when free of SO_2
13 - may cause contamination of product
14 - dilute hypochlorites can be used to sterilise some stainless steel with extreme care.
15 - general corrosion may become excessive
16 - 10%
17 - in the absence of impurities
18 - dilute
19 - some attack at high temperatures

Commonly Used Stainless Steels

Grade	Type	UNS No. Related Specification	Typical Chemical Composition								
			C	Mn	Ni	Cr	Mo	P	S	Si	Other
303	Austenitic	S30300	.15 Max	2.0 Max	8-10	17-19	0.6 Max	.20 Max	.15 Min	1.0 Max	
304	Austenitic	S30400	.08 Max	2.0 Max	8-10.5	18-20		.045 Max	.03 Max	1.0 Max	
304L	Austenitic	S30403	.03 Max	2.0 Max	8-12	18-20		.045 Max	.03 Max	1.0 Max	
316	Austenitic	S31600	.08 Max	2.0 Max	10-14	16-18	2-3	.045 Max	.03 Max	1.0 Max	
316L	Austenitic	S31603	.03 Max	2.0 Max	10-14	16-18	2-3	.045 Max	.03 Max	1.0 Max	
316Ti	Austenitic	S31635	.08 Max	2.0 Max	10-14	16-18	2-3	.045 Max	.03 Max	1.0 Max	Ti 0.5
317L	Austenitic	S31703	.03 Max	2.0 Max	13.0	18-20	3-4	.045 Max	.03 Max	1.0 Max	
310	Austenitic	S31000	.25 Max	2.0 Max	19-22	24-26		.045 Max	.03 Max	1.5 Max	
321	Austenitic	S32100	.08 Max	2.0 Max	9-12	17-19		.045 Max	.03 Max	1.0 Max	Ti0.5 Min
253MA	Austenitic	S30815	0.05-0.1	0.8 Max	10-12	20-22		0.04 Max	.03 Max	1.4-2	N .18 Ce .15
904L	Austenitic	N08904	.02 Max	2.0 Max	23-28	19-23	4-5	.045 Max	.03 Max	1.0 Max	Cu 1.5
420C	Martensitic	S42000	.15 Min	1.0 Max		12-14		.04 Max	.03 Max	1.0 Max	
431	Martensitic	S43100	.2 Max	1.0 Max	1.25-2.5	15-17		.04 Max	.03 Max	1.0 Max	
17-4 PH (630)	Martensitic	S17400	.07 Max	1.0 Max	3-5	15-17.5		.04 Max	.03 Max	1.0 Max	Cu 4 Nb + Ta .3
440C	Martensitic	S44004	0.95-1.2	1.0 Max	1.0 Max	16-18	0.75 Max	.04 Max	.03 Max	1.0 Max	
444	Ferritic	S44400	.02 Max	1.0 Max	1.0 Max	17.5-19.5	1.7-2.5	.04 Max	.03 Max	1.0 Max	Ti 0.4
3CR12	Ferritic	S41003	.03 Max	1.5 Max	1.5 Max	10.5-12.5		.04 Max	.03 Max	1.0 Max	Ti 4(C+N)
2205	Duplex	S31803	.03 Max	2.0 Max	4.5-6.5	21-23	2.5-3.5	.03 Max	.02 Max	1.0 Max	N 0.15
2304	Duplex	S32304	.03 Max	2.5 Max	3-5.5	21.5-24.5	.05-.6	.04 Max	.03 Max	1.0 Max	N 0.1

Disclaimer

Whilst great care was taken in preparation of the data contained in this handbook, Stirlings Australia accepts no liability for the accuracy of information supplied, and should only be used as a guide only.

Commonly Used Stainless Steels

Typical Mechanical Properties				% Min Tensile Elongation		Condition	Common Applications
Yield Strength MPa Min	UTS MPa Min	Hardness BHN Max	Hardness Rb Max	<1.2mm	>1.2mm		
240	585	160	84	50	50	Annealed	Free machining steel used where extensive machining is required. Corrosion resistance and weldability inferior to 302.
205	520	202	92	40	40	Annealed	General purpose steel with good corrosion resistance for most applications. Used for architecture, food processing, domestic sinks and tubs and deep drawing applications.
170	485	183	88	40	40	Annealed	Chemical plant and food processing equipment, where freedom from senitisation is required in plate.
205	520	219	95	40	40	Annealed	Most commonly used s/s main applications ie. marine, chemical, food, mining.
170	485	217	95	40	40	Annealed	A low carbon modification of 316 where heavy section weldments are required without the risk of intergranular corrosion.
205	520	217	95	40	40	Annealed	A titanium stabilised version of 316. Excellent high temperature strength.
205	515	217	95	40	40	Annealed	For chemical plant. Has greater corrosion resistance than 316L notably with brines and halogen salts.
205	520	170	85	40	40	Annealed	Furnace parts and equipment. Resistant to temperatures 900°C to 1100°C.
205	520	217	95	40	40	Annealed	Heavy weldments in chemical and other industries. Suitable for heat resisting applications to 800°C. Not suitable for bright polishing.
310	600	-	-	40	40	Annealed	Furnace parts and equipment. Resistant to temperatures up to 1150°C.
-	-	-	-	40	40	Annealed	High resistance to: general corrosion in e.g. sulphuric and actic acids; crevice corrosion; stress corrosion cracking; pitting in chloride bearing solutions. Good weldabilty.
-	S20	192	92		12	Hardenable	Developed for high hardness after heat treatment. Used for cutting tools, surgical knives, etc.
	965 Max	262	10	-	-	Hardenable	Used for pump shafts etc. Similar corrosion resistance to T302.
1000	1070	331	-	12	12	Solution Hardened	Main applications: pump shafts, marine boat shafts, valve stems. Similar corrosion resistance to type 304.
-	-	223	97	-	-	Hardenable	Capable of being hardened to 60 Rc. Highest hardness and abrasion resistance of all the stainless steels. Corrosion resistance similar to 410.
310	415	200	95	20	20	Annealed	Heat exchanger and hot water tanks, and in chloride containing waters. Not prone to chloride stress corrosion - superior resistance to pitting, crevice and intergranular corrosion. Possesses excellent deep drawing properties.
340	460	-	160	40	40	Annealed	Excellent wet abrasion resistance. Used in hoppers, bins, tanks etc.
450	620	290	32RC	25	25	Annealed	Superior corrosion resistance to 316L and 317L, combined with high strength. Excellent stress corrosion and abrasion resistance. Typically used in heat exchangers, gas scrubbers, fans, chemical tanks, flowlines, marine and refinery applications.
400	600	290	31RB	25	25	Annealed	Similar corrosion resistance to 316L. Higher yield strength, corrosion and stress-corrosion crackling resistance is required in marine, mining, chemical, food and power industries. Particularly useful in nitric acid.

Glossary of Terms

Anneal
A heat treatment to fully soften the material and/or to dissolveand take back into equilibrium solution any intermetallic compounds (eg carbides) which may have formed within the crystal structure. For most metals and alloys this involves heating to a specified high temperature and subsequently cooling at a slow rate. However, for austenitic stainless steels the subsequent cooling must be rapidly effected.

Bright annealing
Using a furnace with an inert atmosphere no scale is formed and the resulting surface has a bright finish.

Carbide
A compound formed when an element combines with carbon. The carbides of metals are usually intensely hard.

Carbide precipitation
chemical reaction whereby the intermetallic carbides are formed within the crystal structure. They are hard particles which impart hardness and abrasion resisting properties. However, in stainless steels heating to within a high temperature range (±450°-850°C) causes the formation chromium carbide. This takes place preferentially at the grain boundaries. A small amount of carbon locks up a large amount of chromium. The material is thus "sensitised". The chromium depleted grain boundaries are therefore prone to suffer preferential and accelerated corrosive attack along the grain boundaries (intergranular corrosion).

Cold drawing
The process is effected without the metal being first heated to high temperatures. Examples of the process are the drawing of a tube through a die and over a mandrel to reduce its OD and/or wall thickness, or drawing wire through successive dies in series to reduce its diameter.

Creep
The slow and continuous deformation of a metal at high temperatures. The deformation (strain) is dependent on the stress, the temperature and time. At the high temperatures creep can occur at very low levels of stress, less than 10MPa.

Ductility
The property of a metal to deform in a plastic manner (ie undergo permanent strain) without fracturing. Elongation and reduction of area (RA) are reported properties which give an indication of the ductility.

Electropolishing
A process whereby the metal surface is actually corroded away under very carefully controlled electrolytic conditions. A smoothing and levelling of the surface takes place. Burrs are also removed from any rough edges. The surface of electropolished stainless steel has a high degree of reflectivity, and the passive film produced on the surface is superior (more corrosion resistant) owing to the formation of oxygen gas at the surface during the process.

Extrusion
Aprocess which confers a given shape on the cross section of a length of metal by pushing the metal, in the solid but plastic state, through a die.

Fatigue
If metals are subjected to repeated fluctuating (reversing) loads at stresses below the tensile strength, a fatigue crack can initiate in the material which, with increasing number of loading cycles, propagates through the material until final failure by fracture of the metal remaining occurs. Fatigue is an interrelationship between stress and the number of load cycles, the lower the stress the greater the number of cycles that can be tolerated (in some metals a stress below a certain limiting stress value will never induce fatigue). Failure by fatigue is very sensitive to any surface defects or imperfections which radically lower the fatigue resistance.

Free machining grades
Brought about the the addition of sulphur or selenium, increases cutting speeds by approximately 75% on stainless steel. Sulphur is preferred for heavy machining because of the large and fairly continuous inclusions. Selenium is better for light work where a good finish is required.

Hardenable
This means that a material can be hardened by heat treatment which involves heating the material to a specified high temperature and subsequently cooling it (quenching) at a rapid rate. Quenching must be followed by tempering in order to develop the correct required combination of strength, hardness, ductility and toughness.

Heat affected zone (HAZ)
This is within the parent metal adjacent to the weld metal (deposit). It is heated through a range of temperatures up to the melting point which occurs at the junction with the weld metal. The actual temperature attained at any point within the HAZ is an interrelated factor of distance from the weld and the amount of heat input. The high temperatures induced cause changes to and within the crystal structure of the parent metal, which in turn affect the mechanical, physical and corrosion properties within the HAZ.

Heat treatment
Any high temperature treatment of a metal or alloy in order to modify (improve) the mechanical properties, (and sometimes the physical properties).

Mechanical properties
A measure of the metal's response to an applied force or load (ie stress). The commonly reported mechanical properties include yield strength, tensile strength, elongation, reduction of area (RA), hardness, toughness (Charpy V) and fatigue.

Passive film
Chromium contents in excess of ±11% Cr in stainless steels result in the formation of a chromium oxide passive film on the surface, provided there is a sufficient availability of oxygen for its formation. This passive film is extremely thin, continuous, tenacious, stable and self-repairable. It renders the surface inert to many chemical reactions and therefore passive. This is stainless steel's natural built-in corrosion resistance.

Passivation
The treatment of the surface of stainless steels with dilute solutions (or pastes) of nitric acid HNO3. This, being an oxidising acid, promotes the formation and improves the integrity of the passive film on any freshly created surface (eg through grinding, machining or mechanical damage). The acid treatment also has the secondary beneficial effect of dissolving any free iron or steel contamination which may have been picked up during handling, forming or fabrication operations, and if this were not removed would impair the corrosion resistance. Nitric acid is the only acid which should be used to effect passivation of stainless steels.

Physical properties
Defined as the properties other than mechanical that pertain to the physics of a material, eg density, electrical conductivity, heat conductivity and thermal expansion.

Glossary of Terms

Pickling
The removal of the oxide film from the surface of a metal by chemical means. An exposure to high temperature (eg during welding or heat treatment) will scale the surface. In the case of stainless steel such high temperature scale has inferior corrosion resistance and must be removed. Pickling, using formulations of hydrofluoric (HF) and nitric HNO3 acids, removes the scale and restores the corrosion resistance. For applications in aggressive environments it is advisable to develop full corrosion resistance by a passivation treatment subsequent to the pickling operation.

Solution treatment
A heat treatment which effects the solution of intermetallic compounds or precipitates (eg carbides) at high temperatures. Subsequent cooling must be fast enough to prevent their reformation during the cooling cycle.

Stabilised
This refers to the alloying of titanium (Ti) or niobium (Nb) to the austenitic grades. These elements form stable carbides, thereby locking up the carbon and preventing the formation of chromium carbides. Prevents sensitisation and intergranular corrosion (weld decay) in the region next to the weld in welded components of thicker material (> ±2.5mm).

Tempering
Quenched materials are hard and strong, but extremely brittle and of low ductility. Tempering should immediately follow quenching, and be effected at a temperature necessary to increase the toughness and ductility. This will usually incur a loss of hardness and strength, more so if higher tempering temperatures are used. The tempering is chosen to bring about the correct desired combination of properties. The maximum tempering temperature is below that at which change of crystal structure will be induced.

Tempers
Used to define the levels to which austenitic stainless steels are strengthened by cold rolling or cold rawing, without any subsequent annealing operation. Cold rolled sheet, coil and strip are produced to 1/4, 1/2, 3/4 and full hard tempers; wire is produced to annealed, soft, intermediate and spring tempers.

Tensile strength
The value of the maximum stress in tension that a material will withstand.

Weldability
This is not an exactly quantifiable or precise property, but rather implies the ability of the material to be joined by standard welding processes so that the resultant mechanical, physical and chemical properties of the weld zone (ie both the weld metal and the HAZ) are at least equivalent to those of the parent metal.

Work hardening
Most metals and alloys will exhibit a slight degree of increase in both strength and hardness if subjected to cold work (eg cold rolling, cold drawing, cold bending etc). The austenitic stainless steels show a marked response to work hardening and are therefore termed 'hardenable by cold work' or 'work hardenable' materials.

Yield strength
At a stress below the tensile strength the material reaches a point at which permanent strain (deformation) occurs. In some steels there is a marked increase of strain for no increase in stress ie yield point. If this does not occur (as in austenitic grades of stainless steel) a stress value for a specified amount of strain (usually 0.2%) is taken. The stress at the yield point or at 0.2% strain is reported as the yield strength.

Temperature Conversion

C	C F	F
-51	-60	-76
-46	-50	-58
-40	-40	-40
-34	-30	-22
-29	-20	- 4
-23	-10	14
-17.8	0	32
-17.2	1	33.8
-16.7	2	35.6
-16.1	3	37.4
-15.6	4	39.2
-15.0	5	41.0
-14.4	6	42.8
-13.9	7	44.6
-13.3	8	46.4
-12.8	9	48.2
-12.2	10	50.0
-11.7	11	51.8
-11.1	12	53.6
-10.6	13	55.4
-10.0	14	57.2
- 9.4	15	59.0
- 8.9	16	60.8
- 8.3	17	62.6
- 7.8	18	64.4
- 7.2	19	66.2
- 6.7	20	68.0
- 6.1	21	69.8
- 5.6	22	71.6

C	C F	F
- 5.0	23	73.4
- 4.4	24	75.2
- 3.9	25	77.0
- 3.3	26	78.8
- 2.8	27	80.6
- 2.2	28	82.4
- 1.7	29	84.2
- 1.1	30	86.0
- 0.6	31	87.8
0	32	89.6
0.6	33	91.4
1.1	34	93.2
1.7	35	95.0
2.2	36	96.8
2.8	37	98.6
3.3	38	100.4
3.9	39	102.2
4.4	40	104.0
5.0	41	105.8
5.6	42	107.6
6.1	43	109.4
6.7	44	111.2
7.2	45	113.0
7.8	46	114.8
8.3	47	116.6
8.9	48	118.4
9.4	49	120.2
10.0	50	122.0
10.6	51	123.8

C	C F	F
11.1	52	125.6
11.7	53	127.4
12.2	54	129.2
12.8	55	131.0
13.3	56	132.8
13.9	57	134.6
14.4	58	136.4
15.0	59	138.2
15.6	60	140.00
16.1	61	141.80
16.7	62	143.60
17.2	63	145.4
17.8	64	147.2
18.3	65	149.0
18.9	66	150.8
19.4	67	152.6
20.0	68	154.4
20.6	69	156.2
21.1	70	158.0
21.7	71	159.8
22.2	72	161.6
22.8	73	163.4
23.3	74	165.2
23.9	75	167.0
24.4	76	168.8
25.0	77	170.6
25.6	78	172.4
26.1	79	174.2
26.7	80	176.0

C	C F	F
27.2	81	177.8
27.8	82	179.6
28.3	83	181.4
28.9	84	183.2
29.4	85	185.0
30.0	86	186.8
30.6	87	188.6
31.1	88	190.4
31.7	89	192.2
32.2	90	194.0
32.8	91	195.8
33.3	92	197.6
33.9	93	199.4
34.4	94	201.2
35.0	95	203.0
35.6	96	204.8
36.1	97	206.6
36.7	98	208.4
37.2	99	210.2
37.8	100	212.0
43.0	110	230.0
49.0	120	248.0
54.0	130	266.0
60.0	140	284.0
66.0	150	302.0
71.0	160	320.0
77.0	170	338.0
82.0	180	356.0
88.0	190	374.0

(°Fahrenheit - 32) x 5 /9 = °Centigrade
°Centigrade x 9 / 5 + 32 = °Fahrenheit

Lineal Measurement Conversion

Fractional Inch				Decimal Part of an Inch	Millimetres
1/64	1/32	1/16	1/8		
1				0.016	0.4
2	1			0.031	0.7
3				0.047	1.1
4	2	1		0.063	1.5
5				0.078	1.9
6	3			0.094	2.3
7				0.109	2.7
8	4	2	1	0.125	3.1
9				0.141	3.5
10	5			0.156	4.0
11				0.172	4.4
12	6	3		0.188	4.8
13				0.203	5.2
14	7			0.219	5.6
15				0.234	6.0
16	8	4	2	0.250	6.4
17				0.266	6.7
18	9			0.281	7.1
19				0.297	7.5
20	10	5		0.313	7.9
21				0.328	8.3
22	11			0.344	8.7
23				0.359	9.1
24	12	6	3	0.375	9.5
25				0.391	9.9
26	13			0.406	10.3
27				0.422	10.7
28	14	7		0.438	11.1
29				0.453	11.5
30	15			0.469	11.9
31				0.484	12.3
32	16	8	4	0.500	12.7
33				0.516	13.1
34	17			0.531	13.5
35				0.547	13.9
36	18	9		0.563	14.3
37				0.578	14.7
38	19			0.594	15.1
39				0.609	15.5
40	20	10	5	0.625	15.9
41				0.641	16.3
42	21			0.656	16.7
43				0.672	17.1
44	22	11		0.688	17.5
45				0.703	17.9
46	23			0.719	18.3
47				0.734	18.7
48	24	12	6	0.750	19.1
49				0.766	19.5
50	25			0.781	19.8
51				0.797	20.2
52	26	13		0.813	20.6
53				0.828	21.0
54	27			0.844	21.4
55				0.859	21.8
56	28	14	7	0.875	22.2
57				0.891	22.6
58	29			0.906	23.0
59				0.922	23.4
60	30	15		0.938	23.8
61				0.953	24.2
62	31			0.969	24.6
63				0.984	25.0
64	32	16	8	1.000	25.4

Lineal Measurement Units

Millimetre, Metre and Kilometre Equivalents of Inches Feet and Miles

Feet	Inches	Millimetres	Metres
1/12	1	25.4	0.0254
1	12	304.8	0.3048
2	24	609.6	0.6096
3	36	914.4	0.9144
3.28	39.36	1000.0	1.0000
4	48	1219.2	1.2192
5	60	1524.0	1.5240
6	72	1828.8	1.8288
7	84	2133.6	2.1336
8	96	2438.4	2.4384
9	108	2743.2	2.7432
10	120	3048.0	3.0480

Feet	Miles	Metres	Kilometres
25	-	7.62	
50	-	15.24	
75	-	22.86	
100	-	30.48	
125	-	38.10	
150	-	45.72	
300	-	91.44	
500	-	152.40	0.15240
1000	-	304.80	0.30480
3280.84	0.6214	1000.00	1.00000
5280	1.0000	1609.35	1.60935

Pressure Conversion

PSI	MPa	kgf/ cm2	BARS	Atmos- pheres	PSI	MPa	kgf/ cm2	BARS	Atmos- pheres	PSI	MPa	kgf/ cm2	BARS	Atmos- pheres	PSI	MPa	kgf/ cm2	BARS	Atmos- pheres
25	.17	1.76	1.72	1.7	2500	17.24	175.77	172.50	170.00	5200	35.85	365.60	358.80	353.60	7900	54.47	555.42	545.10	537.20
50	.34	3.52	3.45	3.4	2600	17.93	182.80	179.40	176.80	5300	36.54	372.63	365.70	360.40	8000	55.16	562.46	552.00	544.00
75	.52	5.27	5.18	5.10	2700	18.62	189.83	186.30	183.60	5400	37.23	379.66	372.60	367.20	8100	55.85	569.49	558.90	550.80
100	.69	7.03	6.90	6.80	2800	19.30	196.86	193.20	190.40	5500	37.92	386.69	379.50	374.00	8200	56.54	576.52	565.80	557.60
200	1.38	14.06	13.8	13.60	2900	19.99	203.89	200.10	197.20	5600	38.61	393.72	386.40	380.80	8300	57.23	583.55	572.70	564.40
300	2.07	21.09	20.7	20.40	3000	20.68	210.92	207.00	204.00	5700	39.30	400.75	393.30	387.60	8400	57.92	590.58	579.60	571.20
400	2.76	28.12	27.6	27.20	3100	21.37	217.95	213.90	210.80	5800	39.99	407.78	400.20	394.40	8500	58.61	597.61	586.50	578.00
500	3.45	35.15	34.5	34.00	3200	22.06	224.98	220.80	217.60	5900	40.68	414.81	407.10	401.20	8600	59.30	604.64	593.40	584.80
600	4.14	42.18	41.40	40.80	3300	22.75	232.01	227.70	224.40	6000	41.37	421.84	414.00	408.00	8700	59.98	611.67	600.30	591.60
700	4.83	49.21	48.30	47.60	3400	23.44	239.04	234.60	231.20	6100	42.06	428.87	420.90	414.80	8800	60.67	618.70	607.20	598.40
800	5.52	56.24	55.20	54.40	3500	24.13	246.07	241.50	238.00	6200	42.75	435.90	427.80	421.60	8900	61.36	625.73	614.10	605.20
900	6.20	63.28	62.10	61.20	3600	24.82	253.10	248.40	244.80	6300	43.44	442.93	434.70	428.40	9000	62.05	632.76	621.00	612.00
1000	6.90	70.31	69.00	68.00	3700	25.51	260.14	255.30	251.60	6400	44.13	449.96	441.60	435.20	9100	62.74	639.79	627.90	618.80
1100	7.58	77.34	75.90	74.80	3800	26.20	267.17	262.20	258.40	6500	44.82	457.00	448.50	442.00	9200	63.43	646.82	634.80	625.60
1200	8.27	84.37	82.80	81.60	3900	26.89	274.20	269.10	265.20	6600	45.51	464.03	455.40	448.80	9300	64.12	653.86	641.70	632.40
1300	8.96	91.40	89.70	88.40	4000	27.58	281.23	276.00	272.00	6700	46.20	471.06	462.30	455.60	9400	64.81	660.89	648.60	639.20
1400	9.65	98.43	96.60	95.20	4100	28.27	288.26	282.90	278.80	6800	46.88	478.09	469.20	462.40	9500	65.50	667.92	655.50	646.00
1500	10.34	105.46	103.50	102.00	4200	28.96	295.29	289.80	285.60	6900	47.57	485.12	476.10	469.20	9600	66.19	674.95	662.40	652.80
1600	11.03	112.49	110.40	108.80	4300	29.65	302.32	296.70	292.40	7000	48.26	492.15	483.00	476.00	9700	66.88	681.98	669.30	659.60
1700	11.72	119.52	117.30	115.60	4400	30.34	309.35	303.60	299.20	7100	48.95	499.18	489.90	482.80	9800	67.57	689.01	676.20	666.40
1800	12.41	126.55	124.20	122.40	4500	31.03	316.38	310.50	306.00	7200	49.64	506.21	496.80	489.60	9900	68.26	696.04	683.10	673.20
1900	13.10	133.58	131.10	129.20	4600	31.72	323.41	317.40	312.80	7300	50.33	513.24	503.70	496.40	10000	68.95	703.07	690.00	680.00
2000	13.79	140.61	138.00	136.00	4700	32.41	330.44	324.30	319.60	7400	51.02	520.27	510.60	503.20	11000	75.84	773.38	759.00	748.00
2100	14.48	147.64	144.90	142.80	4800	33.10	337.47	331.20	326.40	7500	51.71	527.30	517.50	510.00	12000	82.74	843.68	828.00	816.00
2200	15.17	154.68	151.80	149.60	4900	33.78	344.50	338.10	333.20	7600	52.40	534.33	524.40	516.80	13000	89.63	913.99	897.00	884.00
2300	15.86	161.71	158.70	156.40	5000	34.47	351.54	345.00	340.00	7700	53.09	541.36	531.30	523.60	14000	96.53	984.30	966.00	952.00
2400	16.55	168.74	165.60	163.20	5100	35.16	358.57	351.90	346.80	7800	53.78	548.39	538.20	530.40	15000	103.42	1054.6	1035.0	1020.0

PSI X .0068948 = megapascals (MPa) = meganewton/metre²
PSI X .070307 = kilogram-force per square centimetre
PSI X .0690 = Bars
PSI X .0680 = Atmospheres

Stirlings Australia Global Metals Distributor

Western Australia
Cnr Baile Road and Modal Crescent
Canning Vale, Western Australia 6155
Phone: +61 8 9366 6700
Fax: +61 8 9366 6710

Tasmania
21 Greenbanks Rd
Bridgewater Tasmania 7030
Phone: +61 3 6262 6300
Fax: +61 3 6263 6590

sales@stirlingsaus.com.au
www.stirlingsaustralia.com.au

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