Redefining the Art of Excellence in STEEL

Radisson Impex™

AN ISO 9001: 2015 CERTIFIED CO.

INDEX

Radisson Impex™
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WHY RADISSON IMPEX ?

Radisson Impex™
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Commitment

Continuing with our legacy inherited from our experience spanning last 2 decades, we have travelled a long distance to reach our today's position as one of the pioneers and leading manufacturer, exporter and suppliers of Stainless Steel, Alloy Steel, High Nickel Alloys and other industrial raw materials.

Right from inception, we have been moved by our philosophy i.e "EXPLORING NEW BENCHMARKS IN CORPORATE GOVERNANCE" keeping our core values of **Integrity, Quality and Transparency** intact. At Radisson Impex, it is always encouraged to think new, fresh and with a determined action to set new benchmarks.

With such focused and committed approach, we have ruffled many feathers in the Indian Steel industry for our professional approach, ability to understand client's exact requirements, extensive knowledge about various materials, their usage and work ethics which is unparalleled.

COMPANY PROFILE

Radisson Impex™
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We take the pleasure to introduce ourselves as one of the largest manufacturers, exporters, stockists and suppliers of the following materials : Steel Pipes, Flanges, Fittings, Sheets, Plates & Coils confirming to TP-304, 304L, 309, 310, 310s, 316, 316L, 316S, 316Ti, 321, 904L, Carbon Steel, Alloy Steel, Nickle, Monel, Inconel, Titanium, other high Nickel alloy grades, Abrasion & Wear resistant Plates etc.

We are regularly supplying these products to many core sector industries such as Oil & Gas, Petrochemicals, Chemical industries, Power plants, Fertilizer companies, Refineries, Paper mills, Cement plants, Sugar mills, etc.

As we are regularly maintaining bulk stock in every item, we can arrange supplies in time and that too at the most competitive rates. With an experience of more than two decades, we have gained expertise and understanding of this industry and have set benchmarks for others to follow in this field.

Vision

Putting best of our efforts to outperform customer expectations every time to achieve Total Customer Satisfaction through continuous innovation, world class manufacturing practices & Quality management that exceeds customer expectations.

Mission

To be on a committed mission to make Radisson Impex a professionally managed company within the domain expertise and a respected Indian conglomerate with significant Global presence .

Why Us

- Deliver best quality products for all your needs of Pipes, Flanges, Fittings, Plates, Sheets & Coils on time every time.

- One stop shop for all steel raw materials

Each of our department right from Vendor Evaluation Procurement, Production, Inventory, Sales and Services are Fully committed to offer the best product quality and prompt services to our Clients.

FAST RESPONSE
Fast response with submission of quotations, all products supplied with necessary documents.

COMPLETE PIPING SOLUTIONS
Good industry knowledge and experience, with an extensive support network of Approved manufacturers from across the Globe.

FLEXIBLE LOGISTICS
Freight packages tailored to the customer requirements.

NO HIDDEN CHARGES
Fixed prices on all offers from order placement until delivery of material to site.

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QUALITY POLICY

At Radisson Impex each product undergoes a series of comprehensive mandatory and customer specified supplementary tests at its in-house testing facilities by its qualified personnel in accordance with various International & National standards / specifications.

We can also supply under any renowned Third Party Inspection agencies and carry out detailed stage wise inspection & testing. Inspection by customer's own surveyors can also be offered.

Inspection & Testing which we can offer by any Government approved laboratories are as under :-

- Mechanical Testing, Chemical Testing
- Fully equipped laboratory for Corrosion Testing
- Micro Structure Examination / Analysis
- Laboratory Spectrometer
- Positive Material Identification (PMI) Test
- Hydro Testing

Non Destructive Testing offered :

- Ultrasonic Testing (UT)
- Radiography Testing (X-RAY)
- Dye - Penetrant Test

FLANGES & FORGED FITTINGS

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MANUFACTURING PROCESS

Our flange manufacturing is based on steam hammer technology for open die forgings and drop hammer for close die forgings.

After receiving steel from manufacturer, visual and dimensional check of raw material is done. The test certificate from suppliers for raw material is reviewed.

Thereafter, chemical and physical testing of each material is done. The different types of raw material are given lot number and details such as source of supply, heat number, supplier's certificate number, company's lot number are decided. The required material's length and weight are verified. The raw materials, which are in shape of long rods of various diameters, are cut with the use of bandsaw cutting machines.

Cutting is the process done to cut the raw materials as per the required weight of flanges / Components. Currently, we have various Band saw machines to cut raw material from 25 mm to 1000 mm diameter to do this operation.

Heat treatment is very critical process to achieve all the required properties of the forged piece. Our heat treatment facilities are equipped with calibrated oil fired and electrical furnaces.

After completion of heat treatments we carry out various testings like hardness & physical testing to ensure that all the required properties are met.

Machining is the process of removing excess material and achieving exact dimensions as per the requirements. The process of machining converts the forged part into a fully finished and ready-to assemble component. In machining we undertake various operations like turning, threading, grooving, drilling, milling etc.

Machining is done as per relevant code / Standard or customer drawing. The material surface is checked for finish & micro defects and gasket surface. After machining, all the parts are marked for company's logo, Grade, size, rating, schedule, material lot number etc.

BUTTWELD FITTINGS

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MANUFACTURING PROCESS

This is to introduce ourselves as the most reliable manufacturers of Buttweld pipe fittings in all kinds of steel. Our panel of experienced technicians ensures excellent quality fittings meeting exacting standards of National & International quality.

These Pipe Fittings are manufactured from ferrous & non-ferrous metals such as Carbon Steel, Alloy Steel, Low Temperature Carbon Steel, Stainless Steel, Copper, Brass & High Nickel alloys. Both Seamless and E.R.W. Pipe Fittings are Produced by our special manufacturing process involving either hot or cold forming.

These Pipe Fittings are perfectly round, rugged, leak proof, corrosion resistant (Wherever required), meeting all the requirements to A/SA/BS/DIN/IS codes. These quality fittings extend the life of piping systems, facilitate direct pipe welding, permit compact installations & reduce the space necessary for installing a piping network. The key to our success lies in our modern manufacturing practice, state of the art equipments and precision inspection tools in the hands of our dedicated workforce.

We have forging & Hydraulic presses, heat treatment facilities like electric furnaces for annealing, normalizing with temperature recorders which produce the charts proving the process. In addition we have machining centres, testing equipments and finishing equipment capabilities. We closely monitor the products from its raw material stage to its shipping stage without compromising on quality.

Our products have high tensile strength, durability and accurate alloy composition using high-tech fabrication processes and methods like casting and descaling so that our products remains long on quality and standards as well as embodies notable properties such as long-lasting, leak-proof, unmatched joining, and sturdiness.

In order to provide surface treatment to our products, they are painted with anti-corrosive oil and even galvanized coatings on the request of clients. Made available in different sizes and dimensions, the range of Buttweld Fitting comes in different thickness, sizes, schedule and types like seamless, welded, EFW etc.

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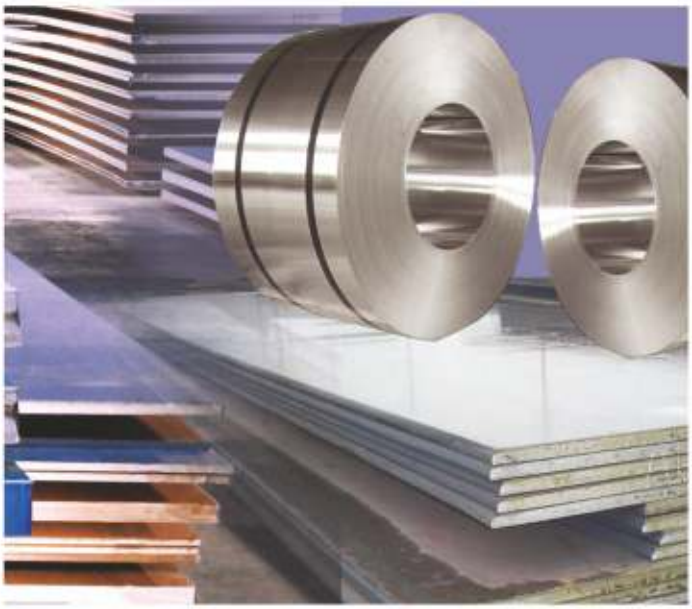
PIPES

FLANGES

FITTINGS

SHEETS / PLATES / COILS



PIPES / TUBES SPECIFICATIONS

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MOC

Stainless Steel : ASTM A / ASME SA 312 GR. TP 304, 304L, 304H, 309S, 309H, 310S, 310H, 316, 316L, 316Ti, 316H, 316LN, 317, 317L, 321, 321H, 347, 347H, 904L.

Duplex Steel : ASTM A / ASME SA 790 UNS NO S32205 / S32760 / S31803

Carbon Steel : ASTM A / ASME SA 53 GR. A & B, ASTM A / ASME SA 106 GR. A, B & C, API 5L GR.B, API 5L X 42, X46, X52, X56, X60, X65 & X 70, X80 (PSL1 & PSL2) ASTM A / ASME SA 671 / 672 GR 60 CL 12 / 22 / 32

Alloy Steel : ASTM A / ASME SA 335 GR P1, P5, P9, P11, P12, P22, P91, P92, ASTM A / ASME SA 691 Gr. 1 cr, 1¼ cr, 2¼ cr, 5 cr ,9cr

Nickel Alloys : Monel, Nickel, Inconel, Hastelloy, Titanium, Tantalum, Cupro-Nickel

Non-Ferrous : Copper, Bronze, Aluminium, High speed Steel. Zinc, Lead

Types : Round, Square, Rectangular.

Size : 3/8" NB to 24" NB. (Seamless)
½" NB to 120" NB. (Welded) ERW / SAW

Wall Thickness : Sch.5S to Sch. XXS & as specified.

FLANGES SPECIFICATIONS

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MOC

Stainless Steel : ASTM A / ASME SA 182 F304/304L/304H/316/316L/316H/317/317L/321/310/347/904L

Duplex Steel : ASTM A / ASME SA 182 F51/F52/F53/F54/F55/F57/F59/F60/F61

Carbon Steel : ASTM A / ASME SA 105, A694 F42/46/52/56/60/65, A516 Gr. 60/70, IS 2062 (Plate flange)

Alloy Steel : ASTM A / ASME SA 182 F1/F5/F9/F11/F12/F22/F91/F92

Nickel Alloys : Monel, Nickel, Inconel, Hastelloy, Titanium, Tantalum, Cupro-Nickel

Non-Ferrous : Copper, Bronze, Aluminium, High speed Steel, Zinc, Lead

Size : ½"to 100" NB

Class : 150#, 300#, 600#, 900#, 1500# & 2500#

Types

- Slip - On
- Threaded
- Orifice
- Weldneck
- Socket Weld
- Deck Flange
- Long Weldneck
- Lap Joint
- RTJ
- Blind
- Spectacle Blind

FORGED FITTINGS SPECIFICATIONS

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MOC

Stainless Steel	: ASTM A / ASME SA182 F304/304L/304H/316/ 316L/317 / 317L/321/310/347/904L etc
Duplex Steel	: ASTM A / ASME SA 182 F51/F52/F53/F54/F55/ F57/F59/F60/F61
Carbon Steel	: ASTM A / ASME SA 105, A694 F42/46/52/56/60/ 65/70, A350 LF2/LF3
Alloy Steel	: ASTM A / ASME SA 182 F1/F5/F9/F11/F12/F22/ F91/F92
Nickel Alloys	: Monel, Nickel, Inconel, Hastelloy, Titanium, Tantalum, Cupro-Nickel
Non-Ferrous	: Copper, Bronze, Aluminium, High speed Steel, Zinc, Lead
Size	: 1/4" NB TO 6" NB (Socketweld & Threaded)
Class	: 3000#, 6000#, 9000#
Pressure	: 1000#, 2000#, 3000#, 6000#, 9000#

Types

- Elbow
- Union
- Weldolet
- Caps
- Couplings
- Threadolet
- Plugs
- Inserts
- Sockolet
- Adaptor
- Nipples
- Nippolets
- Tee
- Hexagon Nut
- Welding Boss

BUTTWELD FITTINGS SPECIFICATIONS

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MOC

Stainless Steel : ASTM A / ASME SA 403 WP 304 / 304L / 304H / 316 / 316H / 316L / 317 / 317L / 321 / 310 / 347 / 904L ETC.

Duplex : ASTM A / ASME SA 815 UNS NO S32205/ S32750/ S32760

Carbon Steel : ASTM A / ASME SA 234 WPB, A420 WPL3 / WPL6, MSS-SP-75 WPHY 42 / 46 / 52 / 56 / 60 / 65 / 70

Alloy Steel : ASTM A / ASME SA 234 WP1 / WP5 / WP11 / WP12 / WP22 / Wp91 / WP92

Nickel Alloy : Monel, Nickel, Inconel, Hastelloy, Titanium, Tantalum, Cupro-Nickel

Non-Ferrous : Copper, Bronze, Aluminium, High speed Steel, Zinc, Lead

Size : 1/4" NB TO 48" NB (Seamless & Welded)

Wall Thickness : Sch. 5S To Sch. XXS. & as specified

Types

- Elbow (long/short)
- Swage Nipple
- Coupling
- Tee (equal & reducing)
- Bends
- Plug & union
- Reducer (concentric & eccentric)
- Stub-End
- Cap

SHEETS / PLATES

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Types

Hardox

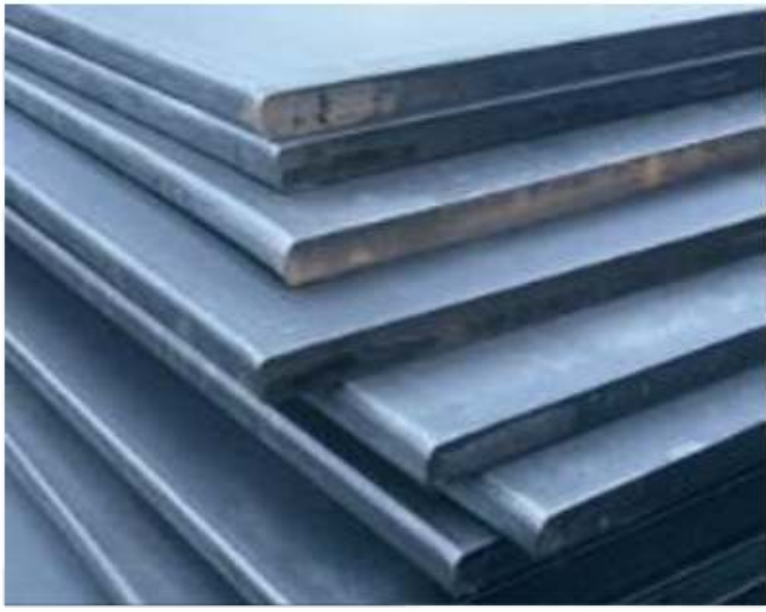
Abrex

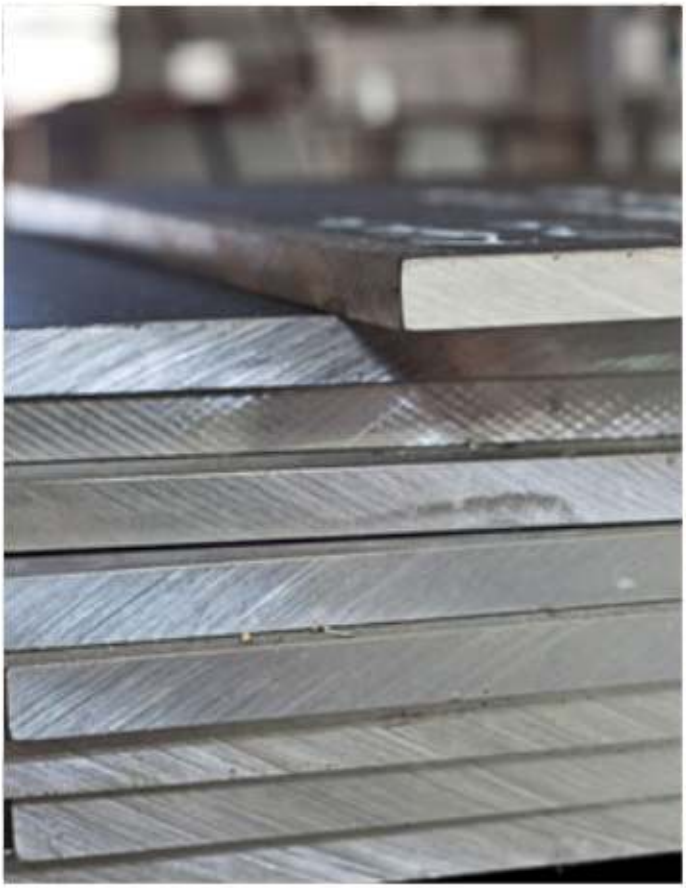
Strenx

Stainless Steel / Duplex

Alloy Steel

Boiler Quality





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HARDOX®
WEAR PLATE

Radisson Impex is one of the leading Importer & Stockist of high quality and fabulous abrasion resistance Hardox material In Mumbai – India.

HARDOX PLATE – Full spectrum of material range we offer

Hardox wear plate — The renowned hard and tough steel for aggressive environments. Abrasive applications and aggressive wear environments are simply no match for Hardox. Whatever your wear challenges, Hardox wear plate offers better wear resistance, higher payload and longer service life.

The Hardox family features the original wear plate — thinner and thicker than ever at 0.7-160 mm (0.027-6.25") — as well as tubes and round bars. By delivering superior quality, reliability and performance, Hardox keeps your equipment — and your business — up and running.

Brinell hardness, HBW, as per EN ISO 6506-1, on a processed surface 0.5 - 3 mm beneath surface. No less than one test example for every heat and 40 tons. The ostensible material thickness won't go amiss more than + 15 mm from that of the test examples. The plates are through-solidified to at least 90 % of the ensured least surface hardness.

Salient Features

- Throughly Hardened for Long Wear Life
- Superb Cold Bending & Welding Properties
- High Impact Properties
- Flat Clean, Shot Blasted and Primed Finished Products
- Grain-Refined

Material Application

- Conveyors
- Dump Truck Bodies
- Loading Buckets & Bulldozers
- Chutes
- Crushers & many more
- Excavator Buckets
- Shredder Blade
- Fork Buckets & Lift Molds
- Dumper & Tippers
- Chutes & Hoppers

Chemical Composition of Hardox

Grade	Thickness range	C* (max %)	Si* (max%)	Mn* (max%)	P (max%)	S (max%)	Cr* (max%)	Ni* (max%)	Mo* (max%)	B* (max%)	Hardness (BHN)
HARDOX 400	6mm to 130mm	0.32	0.70	1.60	0.025	0.010	1.50	1.50	0.60	0.004	370 - 450
HARDOX 450	6mm to 130mm	0.26	0.70	1.60	0.025	0.010	1.40	1.50	0.60	0.005	425 - 475
HARDOX 500	6mm to 103mm	0.30	0.70	1.60	0.020	0.010	1.50	1.50	0.60	0.005	470 - 530
HARDOX 500 TUF	6mm to 25.4mm	0.30	0.70	1.30	0.020	0.010	1.50	1.50	0.60	0.005	470 - 505
HARDOX 550	6mm to 65 mm	0.37	0.50	1.30	0.020	0.010	1.40	1.40	0.60	0.004	525 - 575
HARDOX 600	6mm to 65mm	0.47	0.70	1.40	0.015	0.010	1.20	2.50	0.70	0.005	570 - 640

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ABREX

Radisson Impex stocks and distributes ABREX Plates manufactured by Nippon steel & Sumitomo Metal Corporation, Japan.

The use of abrasion resistance ABREX steel plate markedly reduces the weight of structural members exposed to serve abrasive conditions. Compare with regular steel, ABREX steel plate reduces structural weight and delivers economic merits.

Adoption of high performance abrasion resistant ABREX will prolong the service life of machinery and component.

Thickness : 6mm to 100mm THK

Abrex Plate Applications :

- Dump Truck Liners
- Cutting Edges
- Drag line Bucket Wear Liners
- Screen Plates - Chute Liners
- Conveyor Buckets
- Hoppers
- Ore Scrapers

Type	Designation	Plate Thickness t (mm)	Brinel Hardness (HBW)*1		Charpy Impact Test (L Direction)*2	
			Aiming	Range	Test Temperature (*C)	Absorbed Energy (J)
Standard Type	ABREX 400	6(4.0) ~ 100	400	360~440	–	–
	ABREX 450	6(4.5) ~ 50	450	410~490	–	–
	ABREX 500	6(4.5) ~ 50	500	450~550	–	–
	ABREX 600	6 ~ 25	600	550~650	–	–
Extra Tough Type	ABREX 400LT	6 ~ 60	400	360~440	-40	≧27
	ABREX 450LT	6 ~ 25	450	410~490	-40	≧27
	ABREX 500LT	6 ~ 25	500	450~550	-40	≧21

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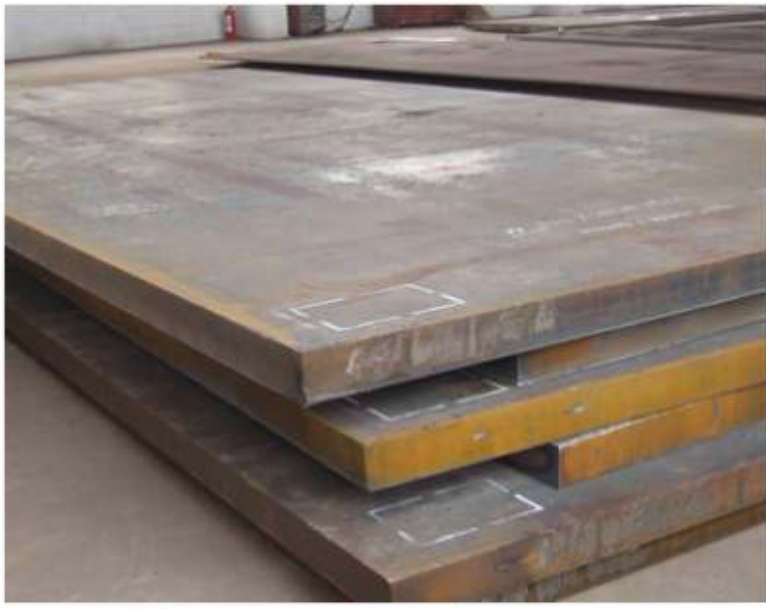
STRENX™
PERFORMANCE STEEL



Strenx™ 700 MC is a hot-rolled structural steel made for cold forming, with a minimum yield strength of 700 MPa for stronger and lighter structures. Strenx 700 MC meets or surpasses the necessities of S700MC in EN 10149-2. Average applications incorporate an extensive variety of segments and parts in requesting load-bearing structures.

Strenx 700 MC comes in loops, opening curls or slice to-length sheets. Strenx 700 is a high quality basic steel (700 MPa) with exceptional durability for a few of burden conveying structures and different applications. Driving elements are uniform properties, simple to weld and conceivable to curve genuine tight.

Properties

- Environmental friendly
- Technical support
- Less weight
- Increased payload
- "Close to customer"
- Stay within legal limits for on-road transportation
- Lighter products

Chemical Composition of Strenx 700

Grade	C max%	Si max%	Mn max%	P max%	S max%	Cr max%	Cu max%	Ni max%	Mo max%	B max%
Strenx 700	0.20	0.60	1.60	0.020	0.010	0.80	0.30	2.0	0.70	0.005

The steel grain is refined. * intentional alloying elements

Thickness mm	Yeild strength RP 0.2, min. Mpa	Tensile strength Rm Mpa	Elongation A5 Min %
6 - 53.0	700	780 - 930	14
53.1 - 100.0	700	780 - 930	14
100.1 - 160.0	700	710 - 900	14

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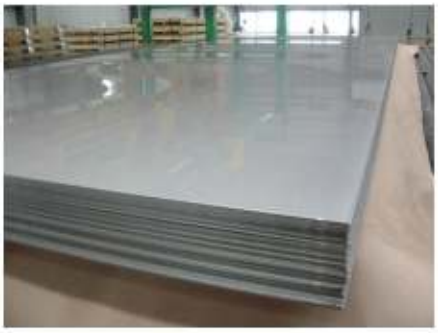
STAINLESS STEEL, ALLOY STEEL & BOILER QUALITY PLATES

Stainless Steel Plates

Radisson Impex is a leading Stockists & suppliers of Stainless Steel, Duplex and Super Duplex Steel Plates & Sheets.
Available in a wide range of specifications and thicknesses, plates can be shipped to any destination worldwide.
Plates can be cut to any size or shape as customer require and can also be cut to desired drawings utilizing our high definition plasma machines or by laser cutting.



Specifications :

ASME/ASTM SA/A 240
ASME/ASTM SA/A 167
BS EN10028-7
NACE MR 0175/ISO 15156

Grades

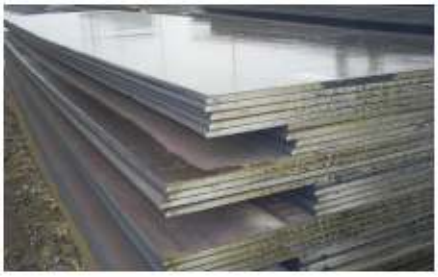
304 / 304L / 316 / 316L /321 /
321H / 317L / 310S / 309/
31803 / 32750

Alloy Steel Plates

Alloy steel plates are defined as steel plates with a definite range or definite minimum quantity of additional elements, depending on the alloy. Common alloying elements like Aluminum, Boron, Cobalt, Molybdenum, Nickel, Titanium, Tungsten, Vanadium Zirconium etc.
As plates, these include strength, hardness, toughness, wear resistance and corrosion resistance. Many of the alloy steels are easy to machine, stamp and fabricate and can be manufactured to precise tolerances.

ASTM SA387 GRADE 5 Class 1
ASTM SA387 GRADE 9 Class 1
ASTM SA387 GRADE 11 Class 1
ASTM SA387 GRADE 12 Class 1
ASTM SA387 GRADE 22 Class 1
ASTM SA387 GRADE 91 Class 1

ASTM SA387 GRADE 5 Class 2
ASTM SA387 GRADE 9 Class 2
ASTM SA387 GRADE 11 Class 2
ASTM SA387 GRADE 12 Class 2
ASTM SA387 GRADE 22 Class 2
ASTM SA387 GRADE 91 Class 2



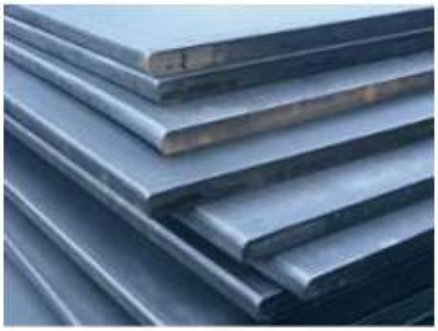
Boiler Quality Steel Plates

We offer complete range of Pressure Vessel Steel Plates & Boiler Steel Plates. Boiler Steel Plates are Primarily utilized in the fabrication of boilers for numerous industries. Boiler steel plates covers a number of different grades used in Boilers, Heat exchangers, Pressure vessels, Columns, Storage tanks, Pipelines etc.

Produced to a high quality, our boiler steel plates are ideal for high temperature and high pressure applications. Available ex stock, including cutting and profiling from our extensive global warehousing facilities we can supply plate widths up to 2m to locations worldwide.

Technical Specifications :

ASME/ASTM SA/A 516-60
ASME/ASTM SA/A 516-70
EN10028- P265GH
BS1501-161-430A/B
En10207 P265S
EN10028-3 P275NH



NICKEL ALLOYS - PRODUCT RANGE

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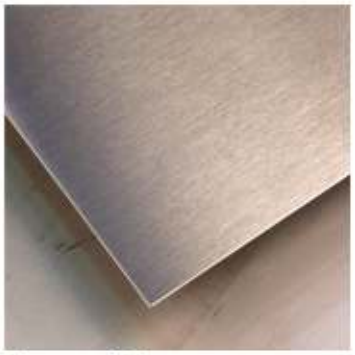
Flanges


Pipes


Fittings


Sheets / Plates

- Duplex-31803
- Super Duplex-32750, 32760
- Nickel-200, 201
- Monel-400, K-500
- Inconel Alloy-600, 601, 625
- Incoloy Alloy-800, 800HT, 825
- Hastelloy
- Tantalum
- SMO-254
- Alloy-904L
- Alloy-20
- Titanium - 1,2, 5, 7

CHEMICAL COMPOSITION & MECHANICAL PROPERTIES OF STEEL PIPES & TUBES (ASTM)

PIPE SPECIFICATION	CHEMICAL PROPERTIES								MECHANICAL PROPERTIES			OTHERS
	C%	Mn%	P% (Max)	S% (Max)	Si%	Cr%	Ni%	Mo%	U.T.S. (Min) Mpa	Y.S. (Min) Mpa	ELONG. (Min)	
ASTMA 312 Gr. TP 304	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-11.0	-	515	205	35	25	-
ASTMA 312 Gr. TP 304L	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-13.0	-	485	170	35	25	-
ASTMA 312 Gr. TP 304H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-11.0	-	515	205	35	25	-
ASTMA 312 Gr. TP 304LN	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-12.0	-	515	205	35	25	N%=0.10-0.16
ASTMA 312 Gr. TP 309S	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	22.0-24.0	12.0-15.0	0.75 Max	515	205	35	25	-
ASTMA 312 Gr. TP 310S	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	24.0-26.0	19.0-22.0	0.75 Max	515	205	35	25	-
ASTMA 312 Gr. TP 316	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	11.0-14.0	2.00-3.00	515	205	35	25	-
ASTMA 312 Gr. TP 316L	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	10.0-14.0	2.00-3.00	485	170	35	25	-
ASTMA 312 Gr. TP 316H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	11.0-14.0	2.00-3.00	515	205	35	25	-
ASTMA 312 Gr. TP 316LN	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	11.0-14.0	2.00-3.00	515	205	35	25	N%=0.10-0.16
ASTMA 312 Gr. TP 317	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	11.0-14.0	3.00-4.00	515	205	35	25	-
ASTMA 312 Gr. TP 317L	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	11.0-15.0	3.00-4.00	515	205	35	25	-
ASTMA 312 Gr. TP 321	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-12.0	-	515	205	35	25	Ti%=(5XC)-0.70
ASTMA 312 Gr. TP 321H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-12.0	-	515	205	35	25	Ti%=(4XC)-0.60
ASTMA 312 Gr. TP 347	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-13.0	-	515	205	35	25	Cb%=(10XC)-1.00
ASTMA 312 Gr. TP 347H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-13.0	-	515	205	35	25	Cb%=(8XC)-1.10
ASTMA 358 Gr. TP 304	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	18.0-20.0	8.0-10.5	-	515	205		40	N%=0.10 Max, HRB=92 Max
ASTMA 358 Gr. TP 304L	0.035 Max	2.00 Max	0.045	0.030	0.75 Max	18.0-20.0	8.0-12.0	-	485	170		40	N%=0.10 Max, HRB=92 Max
ASTMA 358 Gr. TP 309S	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	22.0-24.0	12.0-15.0	-	515	205		40	HRB=95 Max
ASTMA 358 Gr. TP 310S	0.080 Max	2.00 Max	0.045	0.030	1.50 Max	24.0-26.0	19.0-22.0	-	515	205		40	HRB=95 Max
ASTMA 358 Gr. TP 316	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	16.0-18.0	10.0-14.0	2.00-3.00	515	205		40	N%=0.10 Max, HRB=95 Max
ASTMA 358 Gr. TP 316L	0.035 Max	2.00 Max	0.045	0.030	0.75 Max	16.0-18.0	10.0-14.0	2.00-3.00	485	170		40	N%=0.10 Max, HRB=95 Max
ASTMA 358 Gr. TP 321	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	17.0-19.0	9.0-12.0	-	515	205		40	N%=0.10 Max, Ti%=5X(C-N)-0.70, HRB=95 Max
ASTMA 358 Gr. TP 347	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	17.0-19.0	9.0-13.0	-	515	205		40	Cb%=(10XC)-1.00, HRB=92 Max
ASTM A 106 Gr. A	0.25 Max	0.27-0.93	0.035	0.035	0.10 Min	0.40 Max	0.40 Max	0.15 Max	330	205	35	25	Cu%:0.40 Max, Va%: 0.08
ASTM A 106 Gr. B	0.30 Max	0.29-1.06	0.035	0.035	0.10 Min	0.40 Max	0.40 Max	0.15 Max	415	240	30	16.5	Cu%:0.40 Max, Va%: 0.08
ASTM A 106 Gr. C	0.35 Max	0.29-1.06	0.035	0.035	0.10 Min	0.40 Max	0.40 Max	0.15 Max	485	275	30	16.5	Cu%:0.40 Max, Va%: 0.08
ASTM A 53 Gr. A	0.25 Max	0.95 Max	0.050	0.045	-	0.40 Max	0.40 Max	0.15 Max	330	205	30	16.5	Cu%:0.40 Max, Va%: 0.08
ASTM A 53 Gr. B	0.30 Max	1.20 Max	0.050	0.045	-	0.40 Max	0.40 Max	0.15 Max	415	240	30	16.5	Cu%:0.40 Max, Va%: 0.08
ASTM A 333 Gr. 1	0.30 Max	0.40-1.06	0.025	0.025	-	-	-	-	380	205	35	25	Impact Test= -45 °C, J=18 Min, HRB=85 Max
ASTM A 333 Gr. 6	0.30 Max	0.29-1.06	0.025	0.025	0.10 Min	-	-	-	415	240	30	16.5	Impact Test= -45 °C, J=18 Min, HRB=85 Max
ASTM A 335 Gr. P1	0.10-0.20	0.30-0.80	0.025	0.025	0.10-0.50	-	-	0.44-0.65	380	205	30	20	
ASTM A 335 Gr. P2	0.10-0.20	0.30-0.61	0.025	0.025	0.10-0.30	0.50-0.81	-	0.44-0.65	380	205	30	20	
ASTM A 335 Gr. P5	0.15 Max	0.30-0.60	0.025	0.025	0.50 Max	4.00-6.00	-	0.45-0.65	415	205	30	20	
ASTM A 335 Gr. P9	0.15 Max	0.30-0.60	0.025	0.025	0.25-1.00	8.00-10.00	-	0.90-1.10	415	205	30	20	
ASTM A 335 Gr. P11	0.05-0.15	0.30-0.60	0.025	0.025	0.50-1.00	1.00-1.50	-	0.44-0.65	415	205	30	20	
ASTM A 335 Gr. P12	0.05-0.15	0.30-0.61	0.025	0.025	0.50 Max	0.80-1.25	-	0.44-0.65	415	220	30	20	
ASTM A 335 Gr. P22	0.05-0.15	0.30-0.60	0.025	0.025	0.50 Max	1.90-2.60	-	0.87-1.13	415	205	30	20	
ASTM A 335 Gr. P91	0.08-0.12	0.30-0.60	0.020	0.010	0.20-0.50	8.00-9.50	0.40 Max	0.85-1.05	620	440	20	-	V%=0.18-0.25, N%=0.030-0.070, Al%=0.02 Max, Cb%=0.06-0.10
ASTM A 213 Gr. T2	0.10-0.20	0.30-0.61	0.025	0.025	0.10-0.30	0.50-0.81	-	0.44-0.65	415	205		30	HRB=85 Max
ASTM A 213 Gr. T5	0.15 Max	0.30-0.60	0.025	0.025	0.50 Max	4.00-6.00	-	0.45-0.65	415	205		30	HRB=85 Max
ASTM A 213 Gr. T11	0.05-0.15	0.30-0.60	0.025	0.025	0.50-1.00	1.00-1.50	-	0.44-0.65	415	205		30	HRB=85 Max
ASTM A 213 Gr. T12	0.05-0.15	0.30-0.61	0.025	0.025	0.50 Max	0.80-1.25	-	0.44-0.65	415	220		30	HRB=85 Max
ASTM A 213 Gr. T22	0.05-0.15	0.30-0.60	0.025	0.025	0.50 Max	1.90-2.60	-	0.87-1.13	415	205		30	HRB=85 Max
ASTM A 179	0.06-0.18	0.27-0.63	0.035	0.035	-	-	-	-	325	180		35	HRB=72 Max
ASTM A 210 Gr. A1	0.27 Max	0.93 Max	0.035	0.035	0.10 Min	-	-	-	415	255		30	HRB=79 Max

Radisson Impex™
AN ISO 9001: 2015 CERTIFIED CO.

CHEMICAL COMPOSITION & MECHANICAL PROPERTIES OF STEEL PIPES & TUBES (API / BS / DIN / IS)

PIPE SPECIFICATION	CHEMICAL PROPERTIES								MECHANICAL PROPERTIES			OTHERS
	C%	Mn%	P% (Max)	S% (Max)	Si%	Cr%	Ni%	Mo%	U.T.S. (Min) Mpa	Y.S. (Min) Mpa	ELONG. (Min) L T	
API 5L Gr. A	0.22 Max	0.90 Max	0.030	0.030	-	-	-	-	331	207		For Seamless : C% Will be 0.028 for Gr. B to x 70 Mn% will be 1.40 for Gr. X65 to X 70
API 5L Gr. B	0.26 Max	1.20 Max	0.030	0.030	-	-	-	-	414	241		
API 5L Gr. X 42	0.26 Max	1.30 Max	0.030	0.030	-	-	-	-	414	290		
API 5L Gr. X 46	0.26 Max	1.40 Max	0.030	0.030	-	-	-	-	434	317		
API 5L Gr. X 52	0.26 Max	1.40 Max	0.030	0.030	-	-	-	-	455	359		
API 5L Gr. X 56	0.26 Max	1.40 Max	0.030	0.030	-	-	-	-	490	386		
API 5L Gr. X 60	0.26 Max	1.45 Max	0.030	0.030	-	-	-	-	517	414		
API 5L Gr. X 65	0.26 Max	1.65 Max	0.030	0.030	-	-	-	-	531	448		
API 5L Gr. X 70	0.26 Max	1.65 Max	0.030	0.030	-	-	-	-	565	483		
BS 3059 PT-I Gr. 320	0.16 Max	0.30-0.70	0.040	0.040	0.35 Max	-	-	-	320-480	195	25	
BS 3059 PT-II Gr. 360	0.17 Max	0.40-0.80	0.035	0.035	0.10-0.35	-	-	-	360-500	235	24	
BS 3059 PT-II Gr. 440	0.12-0.18	0.90-1.20	0.035	0.035	0.10-0.35	-	-	-	440-580	245	21	
BS 3059 PT-I Gr. 620	0.10-0.15	0.40-0.70	0.030	0.030	0.10-0.35	0.70-0.10	-	0.45-0.65	460-610	180	22	
BS 6323 Gr. 1	0.13 Max	0.60 Max	0.050	0.050	-	-	-	-	300	200	20	
BS 6323 Gr. 2	0.16 Max	0.70 Max	0.050	0.050	-	-	-	-	340	250	15	
BS 6323 Gr. 3	0.20 Max	0.90 Max	0.050	0.050	0.35 Max	-	-	-	400	300	12	
BS 1387	0.20 Max	1.20 Max	0.045	0.045	-	-		-	320-460	195	20	
DIN 17175 Gr. St 35.8	0.17 Max	0.40-0.80	0.040	0.040	0.10-0.35	-		-	225	360-480	25	
DIN 17175 Gr. St 45.8	0.21 Max	0.40-1.20	0.040	0.040	0.10-0.35	-		-	245	410-530	21	
DIN 17175 Gr. 17Mn4	0.14-0.20	0.90-1.20	0.040	0.040	0.20-0.40	0.30 Max		-	275	460-580	23	
DIN 17175 Gr. 19Mn5	0.17-0.22	1.00-1.30	0.040	0.040	0.30-0.36	0.30 Max		-	315	510-610	19	
DIN 17175 Gr. 15Mo3	0.12-0.20	0.40-0.80	0.035	0.035	0.10-0.35	-		0.25-0.35	275	550-600	22	
DIN 17175 Gr. 13CrMo44	0.10-0.18	0.40-0.80	0.035	0.035	0.10-0.35	0.70-1.10		0.45-0.65	295	440-590	22	
DIN 17175 Gr. 10CrMo910	0.08-0.15	0.40-0.70	0.035	0.035	0.50 Max	2.00-2.50		0.90-1.20	385	550-600	20	
DIN 17175 Gr. 13CrMo910	0.10-0.18	0.40-0.70	0.035	0.035	0.10-0.35	0.70-1.10		0.45-0.65	295	440-590	22	
DIN 17175 Gr. 14MoV63	0.10-0.18	0.40-0.70	0.035	0.035	0.10-0.35	0.50-0.70		0.50-0.70	325	460-610	20	V: 0.22-0.32
DIN 17175 Gr. X20CrMoV121	0.17-0.23	1.00 Max	0.030	0.030	0.50 Max	0.80-1.20	0.30-0.80	0.80-1.20	490	690-850	17	V: 0.25-0.35
IS 1239 Part I	-	-	0.050	0.050	-	-	-	-	320	-	20	
IS 3589 Gr. Fe 380	0.16 Max	1.20 Max	0.040	0.040	-	-	-	-	330	195	20	
IS 3589 Gr. Fe 410	0.20 Max	1.30 Max	0.040	0.040	-	-	-	-	410	235	18	
IS 1978 Gr. YST 210	0.22 Max	0.90 Max	0.040	0.050	-	-	-	-	330	210		
IS 1978 Gr. YST 240	0.27 Max	1.15 Max	0.040	0.050	-	-	-	-	410	240		
IS 1979 Gr. YST 290	0.28 Max	1.25 Max	0.040	0.050	-	-	-	-	410	290		
IS 1979 Gr. YST 320	0.30 Max	1.35 Max	0.040	0.050	-	-	-	-	430	320		
IS 1979 Gr. YST 360	0.30 Max	1.35 Max	0.040	0.050	-	-	-	-	450	360		
IS 1979 Gr. YST 390	0.26 Max	1.35 Max	0.040	0.050	-	-	-	-	490	390		
IS 1979 Gr. YST 410	0.26 Max	1.35 Max	0.040	0.050	-	-	-	-	520	410		
IS 1979 Gr. YST 450	0.26 Max	1.40 Max	0.040	0.050	-	-	-	-	530	450		
IS 1979 Gr. YST 480	0.26 Max	1.60 Max	0.040	0.040	-	-	-	-	565	480		

$e = 625\,000\ A^{0.2} / U^{0.9}$

$e = 1942\ 57\ A^{0.2} / U^{0.9}$

Radisson Impex™
AN ISO 9001: 2015 CERTIFIED CO.

STAINLESS STEEL PIPE DIMENSIONS AS PER ASTM & WEIGHT/KG PER MTR. (ANSI B 36.19 - 1965)

Nominal Bore		Outside Diameter	Schedule 5S		Schedule 10S		Schedule 40S		Schedule 80S		Schedule 160S		Schedule XXS	
mm	INCH	mm	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)	Wt mm	Weight (Kg/mt)
3	1/8	10.3	1.24	0.276	1.24	0.28	1.73	0.37	2.41	0.47	-	-	-	-
6	1/4	13.7	1.24	0.390	1.65	0.49	2.24	0.631	3.02	0.80	-	-	-	-
10	3/8	17.1	1.24	0.490	1.65	0.63	2.31	0.845	3.20	1.10	-	-	-	-
15	1/2	21.3	1.65	0.800	2.11	1.00	2.77	1.27	3.75	1.62	4.75	1.94	7.47	2.55
20	3/4	26.7	1.65	1.03	2.11	1.28	2.87	1.68	3.91	2.20	5.54	2.89	7.82	3.63
25	1	33.4	1.65	1.30	2.77	2.09	3.38	2.50	4.55	3.24	6.35	4.24	9.09	5.45
32	1¼	42.2	1.65	1.65	2.77	2.70	3.56	3.38	4.85	4.47	6.35	5.61	9.70	7.77
40	1½	48.3	1.65	1.91	2.77	3.11	3.68	4.05	5.08	5.41	7.14	7.25	10.16	9.54
50	2	60.3	1.65	2.40	2.77	3.93	3.91	5.44	5.54	7.48	8.74	11.1	11.07	13.44
65	2½	73.0	2.11	3.69	3.05	5.26	5.16	8.63	7.01	11.4	9.53	14.9	14.2	20.39
80	3	88.9	2.11	4.51	3.05	6.45	5.49	11.30	7.62	15.2	11.1	21.3	15.24	27.65
100	4	114.3	2.11	5.84	3.05	8.36	6.02	16.07	8.56	22.3	13.49	33.54	17.12	41.03
125	5	141.3	2.77	9.47	3.40	11.57	6.55	21.8	9.53	31.97	15.88	49.11	19.05	57.43
150	6	168.3	2.77	11.32	3.40	13.84	7.11	28.3	10.97	42.7	18.2	67.56	21.95	79.22
200	8	219.1	2.77	14.79	3.76	19.96	8.18	42.6	12.7	64.6	23.0	111.2	22.23	107.8
250	10	273.1	3.40	22.63	4.19	27.78	9.27	60.5	12.7	96.0	28.6	172.4	25.40	155.15
300	12	323.9	3.96	31.25	4.57	36.00	9.52	73.88	12.7	132.0	33.32	238.76	25.40	186.97
350	14	355.6	3.96	34.36	4.78	41.3	11.13	94.59	19.05	158.08	35.71	281.70	-	-
400	16	406.4	4.19	41.56	4.78	47.29	12.7	123.30	21.41	203.33	40.46	365.11	-	-
450	18	457.2	4.19	46.80	4.78	53.42	14.27	155.80	23.8	254.36	45.71	466.40	-	-
500	20	508.0	4.78	59.25	5.54	68.71	15.09	183.42	26.19	311.2	49.99	564.68	-	-
600	24	609.6	5.54	82.47	6.35	94.45	17.48	255.41	30.96	442.08	59.54	808.22	-	-
650	26	660.4			7.92	129.40	9.53	155.32	12.70	205.97	-	-	-	-
700	28	711.2			7.92	139.47	9.53	167.44	12.70	222.13	-	-	-	-
750	30	762.0	6.35	120.15	7.92	149.55	9.53	179.56	12.70	238.28	-	-	-	-
800	32	812.8	-	-	7.92	159.62	9.53	191.69	12.70	254.44	-	-	-	-
850	34	863.6	-	-	7.92	169.64	9.53	203.74	12.70	270.50	-	-	-	=
900	36	914.4	-	-	7.92	179.77	9.53	215.93	12.70	286.75	-	-	-	-

WEIGHT OF STAINLESS STEEL PIPES & TUBES

OD (mm) - W.T. (mm) X W.T. (mm) X 0.02466 = Kg. per Mtr.

Value for information only

Nominal Pipe size		O/D	Schedule 10		Schedule 20		Schedule 30		Schedule STD		Schedule 40		Schedule 60		Schedule XS		Schedule 80		Schedule 100		Schedule 120		Schedule 140		Schedule 160		Schedule XXS	
MM	INCH	MM	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M	W.T.	KG/M
3	1/8	10.3							1.73	0.37	1.73	0.37			2.41	0.47	2.41	0.47												
6	1/4	13.7							2.24	0.63	2.24	0.63			3.02	0.80	3.02	0.80												
10	3/8	17.1							2.31	0.84	2.31	0.84			3.20	1.10	3.20	1.10												
15	1/2	21.3							2.77	1.27	2.77	1.27			3.73	1.62	3.73	1.62							4.78	1.95	7.5	2.55		
20	3/4	26.7							2.87	1.69	2.87	1.69			3.91	2.20	3.91	2.20							5.56	2.90	7.82	3.64		
25	1	33.4							3.38	2.50	3.38	2.50			4.55	3.24	4.55	3.24							6.35	4.24	9.1	5.45		
32	1¼	42.2							3.56	3.39	3.56	3.39			4.85	4.47	4.85	4.47							6.35	5.61	9.7	7.77		
40	1½	48.3							3.68	4.05	3.68	4.05			5.08	5.41	5.08	5.41							7.14	7.25	10.2	9.56		
50	2	60.3							3.91	5.44	3.91	5.44			5.54	7.48	5.54	7.48							8.74	11.11	11.1	13.4		
65	2½	73.0							5.16	8.63	5.16	8.63			7.01	11.41	7.01	11.41							9.53	14.92	14.0	20.4		
80	3	88.9							5.49	11.3	5.49	11.3			7.62	15.3	7.62	15.3							11.13	21.35	15.24	27.7		
90	3½	101.6							5.74	13.57	5.74	13.57			8.08	18.63	8.08	18.63							-					
100	4	114.3							6.02	16.07	6.02	16.07			8.56	22.3	8.56	22.3			11.13	28.32			13.5	33.5	17.12	41.03		
125	5	141.3							6.55	21.77	6.55	21.77			9.53	30.9	9.53	30.9			12.7	40.2			15.9	49.11	19.0	57.4		
150	6	168.3							7.11	28.26	7.11	28.26			10.97	42.5	10.97	42.5			14.3	54.2			18.3	67.5	21.95	79.22		
200	8	219.1			6.35	33.3	7.0	36.8	8.18	42.5	8.18	42.5	10.31	53.1	12.7	64.6	12.7	64.5	15.1	75.92	18.3	90.4	20.6	100.9	23.0	111.27	22.23	108.0		
250	10	273.0			6.35	41.7	7.8	51.3	9.27	60.3	9.27	60.3	12.7	81.5	12.7	81.5	15.1	96.0	18.3	114.7	21.44	133.0	25.4	155	28.6	172.3	25.4	155.0		
300	12	323.8			6.35	49.7	8.4	65.2	9.53	73.8	10.31	79.7	14.27	109.0	12.7	97.4	17.5	132.0	21.4	160.0	25.4	187.0	28.6	208	33.3	238.7	25.4	187.0		
350	14	355.6	6.35	54.7	7.92	68.1	9.53	81.3	9.53	81.3	11.13	94.6	15.09	126.0	12.7	107.0	19.0	158.0	23.8	195.0	27.8	224.0	31.8	253.5	35.7	281				
400	16	406.4	6.35	62.6	7.92	77.9	9.53	93.3	9.53	93.3	12.7	123.0	16.66	160.0	12.7	123.0	21.44	203.0	26.2	245.0	30.9	286.0	36.53	333	40.5	366.0				
450	18	457.2	6.35	70.6	7.92	87.7	11.13	122.0	9.53	105.0	14.20	156.0	19.05	206.0	12.7	139.0	23.8	254.6	29.36	310.0	34.0	363.0	39.7	408.3	45.2	459.0				
500	20	508.0	6.35	78.5	9.53	117.2	12.7	155.1	9.53	117.2	15.09	183.0	20.62	248.0	12.7	155.1	26.2	311.0	32.5	381.0	38.1	441.0	44.4	508	50.0	564.0				
550	22	558.8	6.35	86.6	9.53	129.0	12.7	171.0	9.53	129.0			22.2	294.0	12.7	171.0	28.6	373.0	34.9	451.0	41.3	527.0	47.6	600	54.0	672.0				
600	24	610.0	6.35	94.5	9.53	141.0	14.3	210.0	9.53	141.0	17.48	255.0	24.61	355.0	12.7	187.0	30.9	442.08	38.8	547.7	46.0	640.0	52.4	720.15	59.5	808.22				
650	26	660.0	7.92	127.3	12.7	203.0			9.53	153.0					12.7	202														
700	28	711.0	7.92	137.4	12.7	218.0	15.88	272.0	9.53	165.0					12.7	218														
750	30	762.0	7.92	147.9	12.7	234.6	15.88	292.2	9.53	176.0					12.7	235														
800	32	812.8	7.92	157.9	12.7	250.6	15.88	312.0	9.53	188.2	17.48	342.0			12.7	251														
850	34	863.6	7.92	167.9	12.7	266.5	15.88	331.7	9.53	200.0	17.48	364.9			12.7	266														
900	36	914.4	7.92	176.9	12.7	282.4	15.88	352.2	9.53	212.0	19.05	420.6			12.7	282														

All dimensions are in millimeters W.T. = Wall thickness. KG/M = Kilograms per Metre

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DIMENSIONAL TOLERANCE OF PIPES AS PER (ANSI B 36.10 / B 36.19)

Specification	Allowable Outside Diameter Variation in mm			Allowable wall Thickness Variation		Exact Length Tolerences in mm		Testing
Specification	Diameter	Over	Under	Over %	Under%	Over	Under	Testing
ASTM A - 213 Seamless Boiler, Superheater and Heat Exchanger Tubes	Upto 25.4 25.4 - 38.1 incl. 38.1 - 50.8 excl. 50.8 - 63.5 encl. 63.5 - 76.2 excl. 76.2 - 101.6 incl.	0.1016 0.1524 0.2032 0.2540 0.3048 0.3810	0.1016 0.1524 0.2032 0.2540 0.3048 0.3810	+20 +20 +22 +22 +22 +22	-0 -0 -0 -0 -0 -0	3.175 3.175 3.176 3.760 4.760 4.760	0 0 0 0 0 0	Tension Test Flattening Test Hardness test 100% Hydrostatic Test Flare Test Refer to ASTM A-450
ASTM A - 249 Welded Boiler, Superheater, Heat Exchanger and Condenser Tubes	Under 25.4 25.4 -38.1 incl. 38.1 - 50.8 excl. 50.8 - 63.5 excl. 63.5 - 76.2 excl. 76.2 - 101.6 incl.	0.1016 0.1524 0.2032 0.2540 0.3048 0.3810	0.1016 0.1524 0.2032 0.2540 0.3048 0.3810	+10 +10 +10 +10 +10 +10	-10 -10 -10 -10 -10 -10	3.175 3.175 3.175 3.76 4.76 4.76	0 0 0 0 0 0	Tension Test, Flattening test Flare Test * Reverse Bend Test Hardness Test 100% Hydrostatic Test *Reverse Flattening Test Refer to ASTM A-450 Whenever applicable
ASTM A - 269 Seamless & Welded Service	Upto 12.7 12.7 -38.1 excl. 38.1 - 88.9 excl. 88.9 - 139.7 excl. 139.7 - 203.2 excl.	0.13 0.13 0.25 0.38 0.76	0.13 0.13 0.25 0.38 0.76	+15 +10 +10 +10 +10	-15 -10 -10 -10 -10	3.2 3.2 4.8 4.8 4.8	0 0 0 0 0	Tension Test Flange Test (Welded only) Hardness Test Reverse Flattening test (Welded only) 100% Hydrostatic Test Refer to ASTM A-269
ASTM A - 312 Seamless & Welded Pipes	13.7 - 48.3 incl. 48.3 - 114.3 incl. 114.3 - 220 incl.	0.40 0.79 1.59	0.79 0.79 0.79	Minimum Wall Thickness 12.5% under nominal wall Specified		6.4 6.4 6.4 (Normally Random lengths ordered)	0 0 0	Tension Test Flattening Test 100% Hydrostatic Test
ASTM - 106 Seamless Pipe For High Temp. A 335 Seamless Ferritic Alloy Steel Pipe for High Temp. Service	3 to 40 Incl. Over 40 to 100 Incl. Over 100 to 200 Incl. Over 200 to 450 Incl. Over 450 to 650 Incl. Over 650 to 850 Incl.	0.4 0.8 1.6 2.4 3.2 4.0	0.8 0.8 0.8 0.8 0.8 0.8	+12.5 +12.5 +12.5 +12.5 +12.5 +12.5	-12.5 -12.5 -12.5 -12.5 -12.5 -12.5	6 6 6 6 6 6	0 0 0 0 0 0	Product Analysis Tension Test, Flattening Test, 100% Hydro test
ASTM A - 268 Seamless & Welded Ferritic Stainless Steel tubes	Upto 12.7 12.7 - 38.1 excl. 38.1 - 88.9 excl. 88.9 - 168.9 excl.	0.13 0.13 0.25 0.38	0.13 0.13 0.25 0.38	+15 +10 +10 +10	-15 -10 -10 -10	3.2 3.2 4.8 4.8	0 0 0 0	Tension Test Flange Test CERW only Hardness Test Reverse Flattering Test 100% Hydrostatic Test
ASTM A - 358 For Welded big Diameter Pipes	For all size	+0.5%	0.5%	No Limit	-0.3 mm	Customer's Specification		

SPECIFICATION (ASTM-2002)	CHEMICAL PROPERTIES								MECHANICAL PROPERTIES					OTHERS
	C%	Mn%	P% (Max)	S% (Max)	Si%	Cr%	Ni%	Mo%	U.T.S. (Min) Mpa	Y.S. (Min) Mpa	ELONG. (Min) %	RED. AREA %	Hardness (Max) BHN	
A 182 Gr. F 304	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-11.0	-	515	205	30	50	-	-
A 182 Gr. F 304L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-13.0	-	485	170	30	50	-	-
A 182 Gr. F 304H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-11.0	-	515	205	30	50	-	-
A 182 Gr. F 304LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-10.5	-	515	205	30	50	-	N%=0.10-0.16
A 182 Gr. F 309H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	22.0-24.0	12.0-15.0	-	515	205	30	50	-	-
A 182 Gr. F 310	0.25 Max	2.00 Max	0.045	0.030	1.00 Max	24.0-26.0	19.0-22.0	-	515	205	30	50	-	-
A 182 Gr. F 316	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	10.0-14.0	2.0-3.0	515	205	30	50	-	-
A 182 Gr. F 316L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	10.0-15.0	2.0-3.0	485	170	30	50	-	-
A 182 Gr. F 316H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	10.0-14.0	2.0-3.0	515	205	30	50	-	-
A 182 Gr. F 316LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	11.0-14.0	2.0-3.0	515	205	30	50	-	N%=0.10-0.16
A 182 Gr. F 317	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	11.0-15.0	3.0-4.0	515	205	30	50	-	-
A 182 Gr. F 317L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	11.0-15.0	3.0-4.0	485	170	30	50	-	-
A 182 Gr. F 321	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-12.0	-	515	205	30	50	-	Ti%=(5xC)-0.70
A 182 Gr. F 321H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-12.0	-	515	205	30	50	-	Ti%=(4xC)-0.70
A 182 Gr. F 347	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-20.0	9.0-13.0	-	515	205	30	50	-	Cb%=(10xC)-1.10
A 182 Gr. F 347H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-20.0	9.0-13.0	-	515	205	30	50	-	Cb%=(8xC)-1.10
CARBON STEEL														
A 105	0.35 Max	0.60-1.05	0.035	0.040	0.10-0.35	0.30 Max	0.40 Max	0.12 Max	485	250	22	30	187	Cu%=0.40 Max, Va %= 0.08 Max
LOW TEMPERATURE CARBON STEEL														
A 350 Gr. LF 1	0.35 Max	0.60-1.35	0.035	0.040	0.15-0.30	0.30 Max	0.40 Max	0.12 Max	415-585	205	25	38	197	Cu%=0.40Max, Cb%=0.02 Max, Va %= 0.05 Max, Impact Test =-28.9°C, J=18 Min
A 350 Gr. LF 2	0.30 Max	0.60-1.35	0.035	0.040	0.15-0.30	0.30 Max	0.40 Max	0.12 Max	485-655	250	22	30	197	Cu%=0.40Max, Cb%=0.02 Max, Va %= 0.05 Max, Impact Test =-45.6°C, J=18 Min
A 350 Gr. LF 3	0.20 Max	0.90 Max	0.035	0.040	0.20-0.35	0.30 Max	3.30-3.70	0.12 Max	485-655	260	22	35	197	Cu%=0.40Max, Cb%=0.02 Max, Va %= 0.03 Max, Impact Test =-101°C, J=20 Min
ALLOY STEEL														
A 182 Gr. F 1	0.28 max	0.60-0.90	0.045	0.045	0.15-0.35	-	-	0.44-0.65	485	275	20	30	143-192	-
A 182 Gr. F 2	0.05-0.21	0.30-080	0.040	0.040	0.10-0.60	0.50-0.81	-	0.44-.65	485	275	20	30	143-192	-
A 182 Gr. F 5	0.15 max	0.30-0.60	0.030	0.030	0.50 Max	4.0-6.0	0.5 Max	0.44-0.65	485	275	20	35	143-217	-
A 182 Gr. F 9	0.15 max	0.30-0.60	0.030	0.030	0.50-1.00	8.0-10.0	-	0.90-1.10	585	380	20	40	179-217	-
A 182 Gr. F 11 CL1	0.05-0.15	0.30-0.60	0.030	0.030	0.50-1.00	1.0-1.50	-	0.44-0.65	415	205	20	45	121-174	-
A 182 Gr. F 11 CL2	0.10-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.50	-	0.40-0.65	485	275	20	30	143-207	-
A 182 Gr. F 11 CL3	0.10-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.50	-	0.44-0.65	515	310	20	30	156-207	-
A 182 Gr. F 12 CL1	0.05-0.15	0.30-0.60	0.045	0.045	0.50 Max	0.80-1.25	-	0.44-0.65	415	220	20	45	121-174	-
A 182 Gr. F 12 CL2	0.10-0.20	0.30-0.80	0.040	0.040	0.10-0.60	0.80-1.25	-	0.44-0.65	485	275	20	30	143-207	-
A 182 Gr. F 22 CL1	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	2.0-2.5	-	0.87-1.13	415	205	20	35	170	-
A 182 Gr. F 22 CL3	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	2.0-2.50	-	0.87-1.13	515	310	20	30	156-207	-
A 182 Gr. F 91	0.08-0.12	0.30-0.60	0.020	0.010	0.20-0.50	8.0-9.5	0.40 Max	0.85-1.05	585	415	20	40	248	Cb%=0.06-0.10, N%=0.03-0.07, Va %= 0.18-0.25

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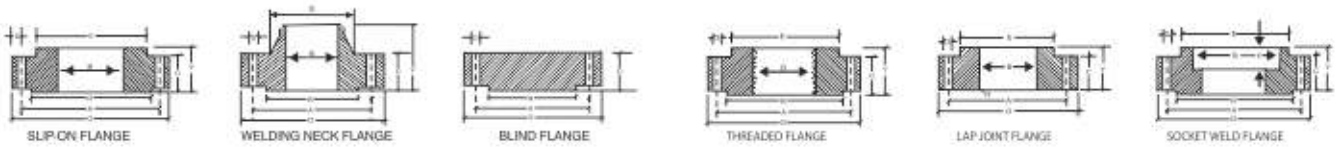

DIMENSIONS OF FORGED FLANGES AS PER (ANSI B 16.5)

150 LBS

Nominal Pipe Size		Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk. of Flange	Dia of Hub	Length through Hub			Dia of Bore		Dia of R/F	Depth of Socket
(MM)	(INCH.)	O	A	D		C	E	S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B	R	F
15	1/2	88.9	60.3	15.9	4	11.1	30.2	15.9	47.6	15.9	22.3	22.9	34.9	9.5
20	3/4	98.4	69.8	15.9	4	12.7	38.1	15.9	52.4	15.9	27.7	28.2	42.9	11.1
25	1	107.9	79.4	15.9	4	14.3	49.2	17.5	55.6	17.5	34.5	35.0	50.8	12.7
32	1¼	117.5	88.9	15.9	4	15.9	58.7	20.6	57.1	20.6	43.2	43.7	63.5	14.3
40	1½	127.0	98.4	15.9	4	17.5	65.1	22.2	61.9	22.2	49.5	50.0	73.0	15.9
50	2	152.4	120.6	19.0	4	19.0	77.8	25.4	63.5	25.4	62.0	62.5	92.1	17.5
65	2½	177.8	139.7	19.0	4	22.2	90.5	28.6	69.8	28.6	74.7	75.4	104.8	19.0
80	3	190.5	152.4	19.0	4	23.8	107.9	30.2	69.8	30.2	90.7	91.4	127.0	20.6
100	4	228.6	190.5	19.0	8	23.8	134.9	33.3	76.2	33.3	116.1	116.8	157.2	23.8
125	5	254.0	215.9	22.2	8	23.8	163.5	36.5	88.9	36.5	143.8	144.5	185.7	23.8
150	6	279.4	241.3	22.2	8	25.4	192.1	39.7	88.9	39.7	170.7	171.4	215.9	27.0
200	8	342.9	298.4	22.2	8	28.6	246.1	44.4	101.6	44.4	221.5	222.2	269.9	31.7
250	10	406.4	361.9	25.4	12	30.2	304.8	49.2	101.6	49.2	276.3	277.4	323.8	33.3
300	12	482.6	431.8	25.4	12	31.8	365.1	55.6	114.3	55.6	327.1	328.2	381.0	39.7
350	14	533.4	476.2	28.6	12	34.9	400.0	57.1	127.0	79.4	359.1	360.2	412.7	41.3
400	16	596.9	539.7	28.6	16	36.5	457.2	63.5	127.0	87.3	410.5	411.2	469.9	44.4
450	18	635.0	577.8	31.7	16	39.7	504.8	68.3	139.7	96.8	461.8	462.3	533.4	49.2
500	20	698.5	635.0	31.7	20	42.9	558.8	73.0	144.5	103.2	513.1	514.3	584.2	54.0
600	24	812.8	749.3	34.9	20	47.6	663.6	82.5	152.4	111.1	615.9	615.9	692.1	63.5

300 LBS

Nominal Pipe Size		Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk. of Flange	Dia of Hub	Length through Hub			Dia of Bore		Dia of R/F	Depth of Socket
(MM)	(INCH.)	O	A	D		C	E	S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B	R	F
15	1/2	95.2	66.7	15.9	4	14.3	38.1	22.2	52.4	22.2	22.3	22.9	34.9	9.5
20	3/4	117.5	82.5	19.0	4	15.9	47.6	25.4	57.1	25.4	27.7	28.2	42.9	11.1
25	1	123.8	88.9	19.0	4	17.5	54.0	27.0	61.9	27.0	34.5	35.0	50.8	12.7
32	1¼	133.3	98.4	19.0	4	19.0	63.5	27.0	65.1	27.0	43.2	43.7	63.5	14.3
40	1½	155.6	114.3	22.2	4	20.6	69.8	30.2	68.3	30.2	49.5	50.0	73.0	15.9
50	2	165.1	127.0	19.0	8	22.2	84.1	33.3	69.8	33.3	62.0	62.5	92.1	17.5
65	2½	190.5	149.2	22.2	8	25.4	100.0	38.1	76.2	38.1	74.7	75.4	104.8	19.0
80	3	209.5	168.3	22.2	8	28.6	117.5	42.9	79.4	42.9	90.7	91.4	127.0	20.6
100	4	254.0	200.0	22.2	8	31.8	146.0	47.6	85.7	47.6	116.1	116.8	157.2	23.8
125	5	279.4	234.9	22.2	8	34.9	177.8	50.8	98.4	50.8	143.8	144.5	185.7	-
150	6	317.5	269.9	22.2	12	36.5	206.4	52.4	98.4	52.4	170.7	171.4	215.9	-
200	8	381.0	330.2	25.4	12	41.3	260.3	61.9	111.1	61.9	221.5	222.2	269.9	-
250	10	444.5	387.3	28.6	16	47.6	320.7	66.7	117.5	95.2	276.3	277.4	323.8	-
300	12	520.7	450.8	31.7	16	50.8	374.6	73.0	130.2	101.6	327.1	328.2	381.0	-
350	14	584.2	514.3	31.7	20	54.0	425.4	76.2	142.9	111.1	359.1	360.2	412.7	-
400	16	647.7	571.5	34.9	20	57.2	482.6	82.5	146.0	120.6	410.5	411.2	469.9	-
450	18	711.2	628.5	34.9	24	60.3	533.4	88.9	158.7	130.2	461.8	462.3	533.4	-
500	20	774.7	685.8	34.9	24	63.5	587.4	95.2	161.9	139.7	513.1	514.3	584.2	-
600	24	914.4	812.8	41.3	24	69.8	701.7	106.4	168.3	152.4	615.9	615.9	692.1	-

All dimensions are in Millimeters. Flanges except Lap joint will be furnished with (6.35 mm) raised face, which is included in "thickness(C)"and "length through hub(Y)"

Flanges available upto size 100" in 150# & 300#, up to 48" in 600# & 900# and upto 24" in 1500# & 2500#

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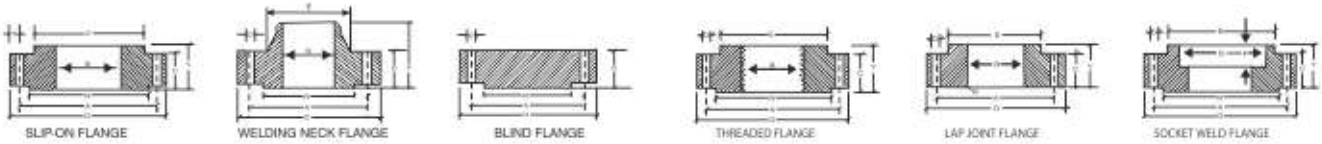

DIMENSIONS OF FORGED FLANGES AS PER (ANSI B 16.5)

600 LBS

Nominal Pipe Size		Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Lenght through Hub			Dia of Bore		Dia of R/F	Depth of Socket	Pipe Dia
								S/O & S/W	W/N	L/J	S/O & S/W	L/J			
(MM)	(INCH.)	O	A	D		C	E	Y	Y	Y	B	B	R	F	X
15	1/2	95.2	66.7	15.9	4	14.3	38.1	22.2	52.4	22.3	22.3	22.8	34.9	9.5	21.33
20	3/4	117.5	82.5	19.0	4	15.9	47.6	25.4	57.1	25.4	27.7	28.1	42.9	11.1	26.67
25	1	123.8	88.9	19.0	4	17.5	54.0	27.0	61.9	26.9	34.5	35.0	50.8	12.7	33.40
32	1¼	133.3	98.4	19.0	4	20.6	63.5	28.6	66.7	28.4	43.2	43.6	63.5	14.2	42.16
40	1½	155.6	114.3	22.2	4	22.2	69.8	31.7	69.8	31.7	49.5	50.0	73.0	15.8	48.26
50	2	165.1	127.0	19.0	8	25.4	84.1	36.5	73.0	36.5	62.0	62.4	92.1	17.4	60.31
65	2½	190.5	149.2	22.2	8	28.6	100.0	41.3	79.4	41.1	74.7	75.4	104.8	19.0	73.02
80	3	209.5	168.3	22.2	8	31.8	117.5	46.0	82.5	45.9	90.7	91.4	127.0	-	88.90
100	4	273.0	215.9	25.4	8	38.1	152.4	54.0	101.6	53.8	116.1	116.8	157.2	-	114.30
125	5	330.2	266.7	28.6	8	44.4	188.9	60.3	114.3	60.4	143.8	144.5	185.7	-	141.30
150	6	355.6	292.1	28.6	12	47.6	222.2	66.7	117.5	66.5	170.7	171.4	215.9	-	168.27
200	8	419.1	349.2	31.7	12	55.6	273.0	76.2	133.3	76.2	221.5	222.2	269.9	-	219.07
250	10	508.0	431.8	34.9	16	63.5	342.9	85.7	152.4	111.2	276.3	277.4	323.8	-	273.05
300	12	558.8	488.9	34.9	20	66.7	400.0	92.1	155.6	117.3	327.1	328.2	381.0	-	323.85
350	14	603.2	527.0	38.1	20	69.9	431.8	93.7	165.1	127.0	359.1	360.1	412.7	-	355.60
400	16	685.8	603.2	41.3	20	76.2	495.3	106.4	177.8	139.7	410.5	411.2	469.9	-	406.40
450	18	742.9	654.0	44.4	20	82.6	546.1	117.5	184.1	152.4	461.8	462.3	533.4	-	457.20
500	20	812.8	723.9	44.4	24	88.9	609.9	127.0	190.5	165.1	513.1	514.3	584.2	-	508.00
600	24	939.8	838.2	50.8	24	101.6	717.5	139.7	203.2	184.1	615.9	615.9	692.1	-	609.60

900 LBS

Nominal Pipe Size		Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Lenght through Hub			Dia of Bore		Dia of R/F	Depth of Socket	Pipe Dia
								S/O & S/W	W/N	L/J	S/O & S/W	L/J			
(MM)	(INCH.)	O	A	D		C	E	Y	Y	Y	B	B	R	F	X
15	1/2	120.6	82.5	22.2	4	22.2	38.1	31.7	60.3	31.7	22.3	22.8	34.9	9.5	21.33
20	3/4	130.2	88.9	22.2	4	25.4	44.4	34.9	69.8	35.0	27.7	28.1	42.9	11.1	26.67
25	1	149.2	101.6	25.4	4	28.6	52.4	41.3	73.0	41.1	34.5	35.0	50.8	12.7	33.40
32	1¼	158.7	111.1	25.4	4	28.6	63.5	41.3	73.0	41.1	43.2	43.6	63.5	14.2	42.16
40	1½	177.8	123.8	28.6	4	31.8	69.8	44.4	82.5	44.4	49.5	50.0	73.0	15.8	48.26
50	2	215.9	165.1	25.4	8	38.1	104.8	57.1	101.6	57.1	62.0	62.4	92.1	17.4	60.31
65	2½	244.5	190.5	28.6	8	41.3	123.8	63.5	104.8	63.5	74.7	75.4	104.8	19.0	73.02
80	3	241.3	190.5	25.4	8	38.1	127.0	53.9	101.6	53.8	90.7	91.4	127.0	-	88.90
100	4	292.1	234.9	31.7	8	44.4	158.7	69.8	114.3	69.8	116.0	116.8	157.2	-	114.30
125	5	349.2	279.4	35.0	8	50.8	190.5	79.3	127.0	79.2	143.7	144.5	185.7	-	141.30
150	6	381.0	317.5	31.7	12	55.6	234.9	85.8	139.7	85.8	170.6	171.4	215.9	-	168.27
200	8	469.9	393.7	38.1	12	63.5	298.4	101.6	162.0	114.3	221.4	222.2	269.9	-	219.07
250	10	546.1	469.9	38.1	16	69.8	368.3	107.9	184.1	127.0	276.3	277.3	323.8	-	273.05
300	12	609.6	533.4	38.1	20	79.3	419.1	117.4	200.0	142.7	327.1	328.1	381.0	-	323.85

All dimensions are in Millimeters. Flanges except Lap joint will be furnished with (6.35 mm) raised face, which is included in "thickness(C)"and "length through hub(Y)"

Flanges available upto size 100" in 150# & 300#, up to 48" in 600# & 900# and upto 24" in 1500# & 2500#

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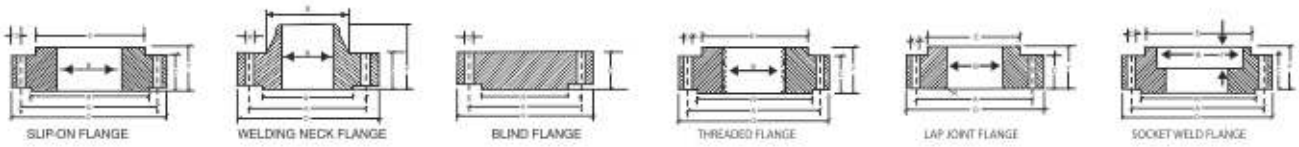

DIMENSIONS OF FORGED FLANGES AS PER (ANSI B 16.5)

1500

Nominal Pipe Size		Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Lenght through Hub			Dia of Bore		Dia of R/F	Depth of Socket	Pipe Dia
(MM)	(INCH.)	O	A	D		C	E	S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B	R	F	X
15	1/2	120.6	82.5	22.2	4	22.2	38.1	31.7	60.3	31.7	22.3	22.8	34.9	9.5	21.33
20	3/4	130.2	88.9	22.2	4	25.4	44.4	34.9	69.8	34.9	27.7	28.1	42.9	11.1	26.67
25	1	149.2	101.6	25.4	4	28.6	52.4	41.3	73.0	41.3	34.5	35.0	50.8	12.7	33.40
32	1¼	158.7	111.1	25.4	4	28.6	63.5	41.3	73.0	41.3	43.2	43.6	63.5	14.2	42.16
40	1½	177.8	123.8	28.6	4	31.8	69.8	44.4	82.5	44.4	49.5	50.0	73.0	15.8	48.26
50	2	215.9	165.1	25.4	8	38.1	104.8	57.1	101.6	57.1	62.0	62.0	92.1	17.4	60.31
65	2½	244.5	190.5	28.6	8	41.3	123.8	63.5	104.8	63.5	74.7	75.4	104.8	19.0	73.02
80	3	266.7	203.2	31.7	8	47.6	133.3	73.0	117.5	73.0	90.7	91.4	127.0	-	88.90
100	4	311.1	241.3	34.9	8	54.0	161.9	90.5	123.0	90.4	116.1	116.8	157.2	-	114.30
125	5	374.6	292.1	41.3	8	73.0	196.8	104.8	155.6	104.8	143.8	144.5	185.7	-	141.30
150	6	393.7	317.5	38.1	12	82.6	228.6	119.1	171.4	119.1	170.7	171.4	215.9	-	168.27
200	8	482.6	393.7	44.4	12	92.1	292.1	142.9	212.7	142.8	221.5	222.2	269.9	-	219.07
250	10	584.2	482.6	50.8	12	107.9	368.3	158.7	254.0	177.8	276.3	277.3	323.8	-	273.05
300	12	673.1	571.5	54.0	16	123.8	450.8	181.0	282.5	218.9	327.1	328.1	381.0	-	323.85

2500

Nominal Pipe Size		Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Lenght through Hub			Dia of Bore		Dia of R/F	Depth of Socket	Pipe Dia
(MM)	(INCH.)	O	A	D		C	E	S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B	R	F	X
15	1/2	133.3	88.9	22.2	4	30.2	42.9	39.7	73.0	39.7	22.3	22.3	34.9	-	21.33
20	3/4	139.7	95.3	22.2	4	31.7	50.8	42.9	79.4	42.9	27.7	27.7	42.9	-	26.67
25	1	158.7	107.9	25.4	4	34.9	57.1	47.7	88.9	47.7	34.5	34.5	50.8	-	33.40
32	1¼	184.1	130.2	28.6	4	38.1	73.0	52.4	95.2	52.4	43.2	43.2	63.5	-	42.16
40	1½	203.2	146.0	31.7	4	44.4	79.4	60.3	111.1	60.3	49.5	49.5	73.0	-	48.26
50	2	234.9	171.4	28.6	8	50.8	95.2	69.8	127.0	69.8	62.4	62.0	92.1	-	60.31
65	2½	266.7	196.8	31.7	8	57.1	114.3	79.4	142.9	79.4	74.7	74.7	104.8	-	73.02
80	3	304.8	228.6	34.9	8	66.7	133.3	92.1	168.3	92.1	90.7	90.7	127.0	-	88.90
100	4	355.6	273.0	41.2	8	76.2	165.1	107.9	190.5	107.9	116.1	116.1	157.2	-	114.30
125	5	419.1	323.8	47.6	8	92.1	203.2	130.0	228.6	130.0	143.8	143.8	185.7	-	141.30
150	6	482.6	368.3	54.0	8	107.9	234.9	152.4	273.0	152.4	170.7	170.7	215.9	-	168.27
200	8	552.4	438.1	54.0	12	127.0	304.8	177.8	317.5	177.8	221.5	221.5	269.9	-	129.07
250	10	673.1	539.7	66.7	12	165.1	374.6	228.6	419.1	228.6	276.3	276.3	323.8	-	273.05
300	12	762.0	619.1	73.0	12	184.1	441.3	254.0	463.5	254.0	327.1	327.1	381.0	-	323.85

All dimensions are in Millimeters. Flanges except Lap joint will be furnished with (6.35 mm) raised face, which is included in "thickness(C)"and "length through hub(Y)"

Flanges available upto size 100" in 150# & 300#, up to 48" in 600# & 900# and upto 24" in 1500# & 2500#

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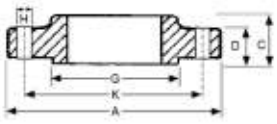
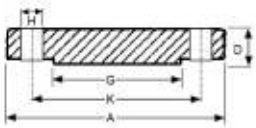
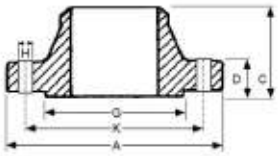


SLIP-ON FLANGE



BLIND FLANGE



WELDING NECK (WN) FLANGE

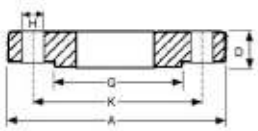


PLATE FLANGE

DIMENSIONS & WEIGHT OF STEEL FLANGES AS PER (AS 2129)

Table D Flanges to AS 2129

Nominal Size DN INCH	Nominal Size DN MM	Dimensions (mm) OD A	Thickness D	Raised Face Diam G	Drilling Bolt Circle Diam K	Drilling Bolt Hole Diam H	Drilling Number of Bolts	Bolt Size & Thread	Weight (kg) SOW	Weight (kg) Blind
½	15	95	*5	47	67	14	4	M12	0.6	0.6
3/4	20	100	*5	53	73	14	4	M12	0.7	0.7
1	25	115	*5	65	83	14	4	M12	0.9	1.0
1½	32	120	*6	67	87	14	4	M12	0.9	1.1
1½	40	135	*6	78	98	14	4	M12	1.2	1.4
2	50	150	*8	90	114	18	4	M16	1.4	1.7
2½	65	165	*8	103	127	18	4	M16	1.6	2.1
3	80	185	*10	122	146	18	4	M16	2.0	2.7
3½	90	205	*10	141	165	18	4	M16	2.2	3.2
4	100	215	*10	154	178	18	4	M16	2.5	3.6
5	125	255	13	186	210	18	8	M16	3.3	4.9
6	150	280	13	211	135	18	8	M16	4.0	6.1
8	200	335	13	268	292	18	8	M16	5.0	8.8
10	250	405	16	328	256	22	8	M20	8.7	15.8
12	300	455	19	378	406	22	12	M20	11.3	23.6
14	350	525	22	438	470	26	12	M24	19.6	38.6
16	400	580	22	489	521	26	12	M24	22.3	44.9
18	450	640	25	532	584	26	12	M24	29.0	63.0
20	500	705	29	609	641	26	16	M24	39.9	86.0
22	550	760	29	637	699	30	16	M27	50.0	107.0
24	600	825	32	720	756	30	16	M27	58.0	125.0
28	700	910	35	809	845	30	20	M27		
30	750	995	41	888	972	33	20	M30		
32	800	1060	41	942	984	36	20	M33		
34	850	1090	44	974	1016	36	20	M33		
36	900	1175	48	1050	1092	36	24	M33		
40	1000	1255	51	1133	1175	36	24	M33		
48	1200	1490	60	1368	1410	36	32	M33		

Table F Flanges to AS 2129

Nominal Size DN	Dimensions (mm) Flange OD A	Flange Thickness D	Raised Face Diam G	Drilling Bolt Circle Diam K	Drilling Bolt Hole Diam H	Drilling Number of Bolts	Bolt Size & Thread	Weight (kg) SOW	Weight (kg) Blind
15	95	10	47	67	14	4	M12	0.6	0.7
20	100	10	53	73	14	4	M12	0.7	0.8
25	120	10	63	87	18	4	M16	0.9	1.0
32	135	13	74	98	18	4	M16	1.1	1.3
40	140	13	81	105	18	4	M16	1.2	1.4
50	165	16	103	127	18	4	M16	2.2	2.6
65	185	16	122	146	18	4	M16	2.5	3.0
80	205	16	141	165	18	8	M16	3.0	3.8
90	215	19	154	178	18	8	M16		
100	230	19	167	191	18	8	M16	4.3	5.9
125	280	22	207	235	22	8	M20	7.4	10.1
150	305	22	232	260	22	12	M20	8.1	11.9
200	370	35	296	324	22	12	M20	12.7	20.3
250	430	29	349	381	26	12	M24	18.1	31.4
300	490	32	406	438	26	16	M24	23.9	44.7
350	550	35	459	495	30	16	M27	35.9	63.0
400	610	41	516	552	30	20	M27	47.6	90.0
450	675	44	571	610	33	20	M30	62.0	120.0
500	735	51	634	673	33	24	M30	80.0	162.0
550	785	54	685	724	33	24	M30		
600	850	57	739	781	36	24	M33	112.0	
700	935	60	815	857	36	24	M33		
750	1015	67	898	940	36	28	M33		
800	1060	68	942	984	36	28	M33		
850	1090	70	974	1016	36	32	M33		
900	1185	76	1060	1105	39	32	M36		
1000	1275	83	1149	1194	39	36	M36		
1200	1530	95	1385	1441	40	40	M39		

Table E Flanges to AS 2129

Nominal Size DN INCH	Nominal Size DN MM	Dimensions (mm) OD A	Thickness D	Raised Face Diam G	Drilling Bolt Circle Diam K	Drilling Bolt Hole Diam H	Drilling Number of Bolts	Bolt Size & Thread	Weight (kg) SOW	Weight (kg) Blind
½	15	95	*6	47	67	14	4	M12	0.6	0.7
3/4	20	100	*6	53	73	14	4	M12	0.7	0.7
1	25	115	*7	65	83	14	4	M12	0.9	1.0
1½	32	120	*8	67	87	14	4	M12	1.0	1.1
1½	40	135	*9	78	98	14	4	M12	1.2	1.4
2	50	150	*10	90	114	18	4	M16	1.4	1.7
2½	65	165	*10	103	127	18	4	M16	1.6	2.1
3	80	185	*11	122	146	18	4	M16	2.0	2.7
3½	90	205	12	141	165	18	8	M16		
4	100	215	13	154	178	18	8	M16	2.5	3.6
5	125	255	14	186	210	18	8	M16	3.7	5.5
6	150	280	17	207	235	22	8	M20	5.0	8.3
8	200	335	19	264	292	22	8	M20	7.1	12.9
10	250	405	22	328	356	22	12	M20	11.4	21.9
12	300	455	25	374	406	26	12	M24	15.1	31.8
14	350	525	29	438	470	26	12	M24	25.3	47.6
16	400	580	32	489	521	26	12	M24	31.3	66.0
18	450	640	35	552	584	26	16	M24	40.8	87.0
20	500	705	38	609	641	26	16	M24	53.0	114.0
22	550	760	44	663	699	30	16	M27		
24	600	825	48	717	756	33	16	M30	85.0	195.0
28	700	910	51	806	845	33	20	M30		
30	750	995	54	885	927	36	20	M33		
32	800	1060	54	942	984	36	20	M33		
34	850	1090	57	974	1016	36	20	M33		
36	900	1175	64	1050	1092	36	24	M33		
40	1000	1255	67	1130	1175	39	24	M36		
48	1200	1490	79	1365	1410	39	32	M36		

Table H Flanges to AS 2129

Nominal Size DN	Dimensions (mm) Flange OD A	Flange Thickness D	Raised Face Diam G	Drilling Bolt Circle Diam K	Drilling Bolt Hole Diam H	Drilling Number of Bolts	Bolt Size & Thread	Weight (kg) SOW	Weight (kg) Blind
15	115	13	57	83	18	4	M16	0.8	1.0
20	115	13	57	83	18	4	M16	0.9	1.0
25	120	14	64	87	18	4	M16	1.1	1.2
32	135	17	76	98	18	4	M16	1.5	1.8
40	140	17	83	105	18	4	M16	1.7	2.0
50	165	19	102	127	18	4	M16	2.6	3.0
65	185	19	114	146	18	8	M16	3.1	3.8
80	205	22	127	165	18	8	M16	4.3	5.4
90	215	22	140	178	18	8	M16		
100	230	25	152	191	18	8	M16	5.8	7.9
125	280	29	178	235	22	8	M20	9.9	12.6
150	305	29	210	260	22	12	M20	10.8	15.4
200	370	32	260	324	22	12	M20	18.3	28.2
250	430	35	311	381	26	12	M24	22.0	38.0
300	490	41	362	438	26	16	M24	31.0	58.0
350	550	48	419	495	30	16	M27	47.7	85.0
400	610	54	483	552	30	20	M27	62.0	118.0
450	675	60	533	610	33	20	M30	105.0	196.0
500	735	67	597	673	33	24	M30		
550	785	70	648	724	33	24	M30		
600	850	76	699	781	36	24	M33		

Note 1 : All weights are approximate
Note 2 : A diametrical clearance of 4mm maximum applies to pipe or tube OD for plate flanges
Note 3 : The Flange thickness "D" dimension includes the raised face height
Note 4 : Welding Neck bore is derived from the pipe schedule

WEIGHT OF FLANGES IN KGS (ANSI B 16.5)

Nom Pipe Size	150#			300#			600#			900#			1500#			2500#		
	WN	S/O	B/K	WN	S/O	B/L	WN	S/O	B/L	WN	S/O	B/L	WN	S/O	B/L	WN	S/O	B/L
1/2"	0.7	0.4	0.5	0.8	0.7	0.8	0.9	0.8	0.8	2.1	1.8	1.9	2.1	1.8	1.9	3.2	3	3
3/4"	0.8	0.7	0.8	1.4	1.2	1.2	1.6	1.4	1.4	2.7	2.4	2.7	2.7	2.4	2.7	3.6	4	4.5
1"	1.1	0.8	0.9	1.7	1.4	1.5	1.9	1.7	1.7	3.9	3.6	3.7	3.9	3.6	3.7	5.4	5	5
1¼	1.5	1.2	1.3	2.2	1.8	2	2.6	2.1	2.4	4.5	4.1	4.3	4.5	4.1	4.3	7.8	8	8
1½	1.8	1.4	1.6	3.2	2.7	2.9	3.6	3.1	3.4	6.2	5.4	5.9	6.2	5.4	5.9	11.5	11	11
2"	2.7	2.2	2.6	3.6	3.2	3.5	4.7	3.9	4.4	11.3	10.5	11.3	11.3	10.5	11.3	19	17	17
2½	4.4	3.5	4.1	5.4	4.5	5.3	4.8	5.4	6.8	16.3	15.8	16	16.3	15.8	16	24	25	25
3"	5.2	3.8	5.1	7.3	5.9	7.2	8.7	7.3	8.9	15	12.3	16.8	21	21.5	19.5	42.6	38	39
3½	6.4	5	6.5	8.9	7.5	9.2	11.6	9	12.7	-	-	-	-	-	-	-	-	-
4"	7.5	5.6	7.5	11.8	10	12.2	18.4	16.5	18.6	24	23.2	24.5	31.8	31	33	64	58	60
5"	9.2	6.5	9.2	16	12.5	16	31	28.5	30.8	38.5	37.5	39.5	59	58.8	60	111	95	101
6"	11.0	8.1	11.8	20.2	16.5	22	37	36.2	38	50	48.3	51.5	72	74	75	171	146	156
8"	18.4	13	20.4	31.2	25.5	36	54.5	51.5	62.2	85	75	89	124	112	125	261	220	242
10"	25.5	18.4	31	44.3	35	55	98.5	76.2	102	123	110	131	207	184	215	485	420	465
12"	37	28.5	47	63.5	52	82.5	105	89.5	132	168	146	187	306	264	316	698	590	665
14"	51	37.5	60	86	73	108	150	102	158	198	172	224	416	-	-	-	-	-
16"	61.5	44.5	61	112	88	139	177	150	225	225	192	259	567	-	-	-	-	-
18"	71.5	54	93	141	115	178	228	180	285	318	272	383	736	-	-	-	-	-
20"	85	72	127	173	139	228	285	231	365	376	330	482	929	-	-	-	-	-
24"	119	95	190	248	212	350	372	330	532	680	632	905	1504	-	-	-	-	-

TOLERANCE OF WELDING NECK, THREADED, SLIP-ON, LAPJOINT, SOCKET WELD & BLIND FLANGES

Outside Diameter	O.D.is 600 or smaller O.D. over 600	± 16 ± 3.1	Outside Diameter	O.D.is 50 or smaller O.D. over 600	± 16 ± 3.1
Inside Diameter (bore)	250 and smaller 12 through 450 500 and larger	± 0.7 ±1.6 ±3.1 -1.6	Inside Diameter slip lap joint:	threaded: to standard gauge limits socket-welding: 250 and larger 300 and larger	(bore) +0.7 -0.0 +1.6 -0.0
Diameter of contact face	1.6 raise face 6.3 raised face: tongue & grooved male & female	±0.7 ±0.4	Diameter of counter bore	threaded 250 and smaller 300 and larger	 +0.7 -0.0 +1.6 -0.0
Diameter of hub at base	When E is 600 or smaller When E is over 600	±1.6 ±3.1	Outside diameter hub	300 and smaller 350 and larger	+2.3 -1.6 ±3.1
Diameter hub at point of welding	125 and smaller 150 and larger	+0.7 ±0.7 +4.0 ±0.0	Diameter of contact face	1.6 raised face 6.3 raised: tongue & grooved male & female	±0.7 ±0.4
Thickness	450 and smaller 500 and larger	+3.1 ±0.0 +4.7 ±0.0	Thickness	450 and smaller 500 and larger	+3.1 -0.0 +4.7 -0.0
Length through hub	250 and smaller 300 and larger	±1.6 ±3.1	Length through hub	250 and smaller 300 and larger	±1.6 ±3.1
Drilling	bolt circle bolt hole spacing	±1.6 ±0.7	Drilling	bolt circle bolt hole spacing	±1.6 ±0.7
	essentriecity with respect to bore	0.7 max		essentriecity with respect to bore	0.7 max

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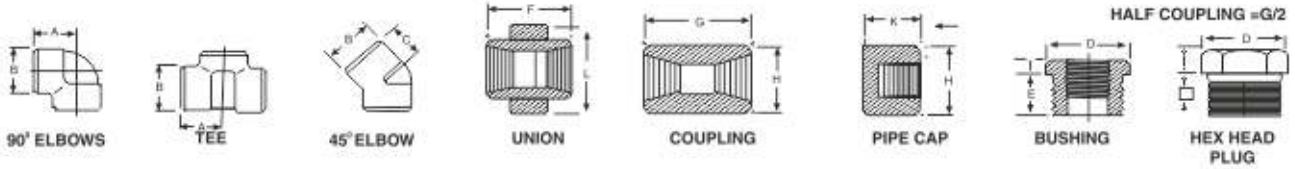
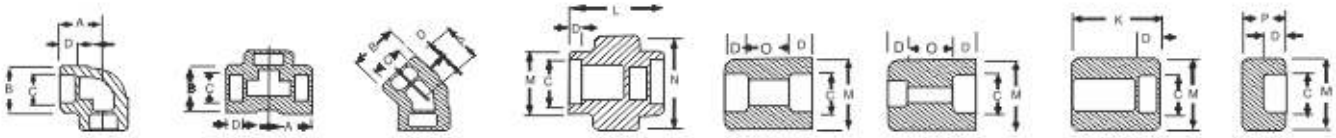
DIMENSIONS OF FORGED / SCREWED FITTINGS AS PER (ANSI B-16.11) THREADED TO (ASA B 2.1)



NOM	PIPE	3000 L.B.S.						COMMON FACTORS						6000 L.B.S					
BORE	O.D.	A	B	C	G	H	K	D	E	F	I	J	L	A	B	C	G	H	K
1/8"	10.3	21	22	17	32	16	19	11	10	40	-	6	-	25	25	19	32	22	-
1/4"	13.7	25	25	19	35	19	25	16	11	43	3	6	32	29	33	22	35	25	27
3/8"	17.2	29	33	22	38	22	25	17.5	13	48	4	8	38	33	38	25	38	32	27
1/2"	21.3	33	38	25	48	29	32	22	15	51	5	8	46	38	46	29	48	38	33
3/4"	26.7	38	46	29	51	35	37	27	16	57	6	10	51	44	56	33	51	44	38
1"	33.4	44	56	33	60	44	41	35	19	64	6	10	60	51	62	35	60	57	43
1¼"	42.2	51	62	35	67	57	44	44.5	21	70	7	14	72	60	75	43	67	64	46
1½"	48.3	60	75	43	79	64	44	51	21	79	8	16	80	64	84	44	79	76	48
2"	60.3	64	84	45	86	76	48	63.5	22	88	9	17	94	83	102	52	86	92	51
2½"	73.02	83	102	52	92	92	60	76	27	118	10	21	122	95	121	64	92	108	64
3"	89.0	95	121	64	108	108	65	89	29	121	10	25	140	106	146	79	108	127	68
4"	114.5	114	152	79	121	140	68	117.5	32	150	13	25	180	114	152	79	121	159	75



DIMENSIONS OF SOCKETWELD FITTINGS AS PER (ANSI B-16.11)

NOM	PIPE	3000 L.B.S.						COMMON FACTORS						6000 L.B.S					
BORE	O.D.	A	B	K	J	L	M	N	P	Q	C	D	O	O	A	B	M	K	N
1/8"	10.3	22	18.5	26	16	40	17.3	32	17.5	10	10.7	10	5	8	22	22	20	25	46
1/4"	13.7	22	22	26	18	43	21.2	32	17.5	10	14.1	10	5	8	27	25	24	25	51
3/8"	17.2	25	25	26	19	48	25.4	36	19	10	17.6	10	3	9	27	28	28	26	60
1/2"	21.3	27	32	30	21	51	31	43	22	10	21.7	10	6	13	31	34	34	31	72
3/4"	26.7	34	38	36	24	57	37	50	25	13	27	13	6	13	37	42	41	35	80
1"	33.4	37	46	40	25	64	45.2	60	27	13	33.8	13	9	17	42	50	50	40	94
1¼"	42.2	42	56	40	29	70	55	70	30	13	42.6	13	9	17	47	59	58	41	100
1½"	48.3	47	62	40	30	79	61.4	78	32	13	48.7	13	9	17	53	67	66	43	122
2"	60.3	56	75	52	37	89	75	95	38	13	61.2	16	15	23	59	84	83	55	
2½"	73.02	60	92	52	48	114	91.3	125	38	16	73.8	16	14	24		102		56	
3"	89.00	76	110	52	51	127	108.8	140	44	16	89.8	16	14	24		121		58	
4"	114.50	88	137	58		150	136.9		48	19	115.5	19	14	24		152		64	

All dimensions are in Millimeters. Dimensions and other specifications as per customers requirements are available on request

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DIMENSIONAL TOLERANCE OF FORGED, SCREWED & SOCKETWELD FITTINGS AS PER (ANSI B 16.11)

CENTRE TO BOTTOM OF SOCKET

For Sizes 6 NPS and 8 NPS	± 0.8
For Sizes 10 NPS, 15 NPS and 20 NPS	± 1.5
For Sizes 25 NPS, 32 NPS, 40 NPS and 50 NPS	± 2
For Sizes 65 NPS and larger	± 2.5

BOTTOM TO BOTTOM OF SOCKETS COUPLINGS

For Sizes 6 NPS and 8 NPS	± 1.5
For Sizes 10 NPS, 15 NPS and 20 NPS	± 3
For Sizes 25 NPS, 40 NPS and 50 NPS	± 4
Fpr Sizes 65 and larger	± 5

BOTTOM TO SOCKET TO OPPOSITE FACE HALF COUPLINGS

For Sizes 6 NPS and NPS	± 0.8
For Sizes 10 NPS, 15 NPS and 20 NPS	± 1.5
For Sizes 25 NPS, 32 nps, 40 NPS and 50 NPS	± 2
For Sizes 65 NPS and Larger	± 2.5

AMERICAN STANDARD B 16.11

This standard covers the following range of sizes for use with Schedules 40 and 80 pipe as of the publication date of this catalogue.

90° and 45° Elbows	6 NPS through 100 NPS
Tees	6 NPS through 100 NPS
Crosses	6 NPS throught 100 NPS
Couplings	6 NPS through 100 NPS

Sizes 15 NPS through 80 NPS are included for use with Schedule 160 pipe, Fittings for use with Double Extra Strong pipe are not included in this standard.

BORE DIAMETER OF SOCKET

For Sizes 50 NPS and Smaller	+ 0.25 - 0.00
For Sizes 65 NPS and larger	+ 0.35 - 0.00

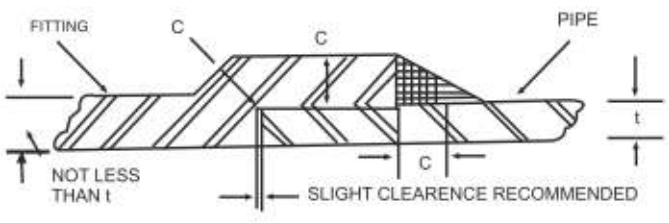
CONCENTRICITY OF BORES

The socket and fitting bores shall be conentric within a tolerance of ± 0.8 for all Sizes.

COINCIDENCE OF AXES

The maximum allowable variation in the alignment of the Socket and fitting bore axes shall be 1.5 mm in 304.8 mm

FILLET WELD DIMENSIONS



C-Minimum = 1.25t (but not less than 4.0 mm.)

t = Minimum Pipe Wall Thickness

Minimum requirements for socket and fillet weld dimensions as prescribed in the American Standard Code for Pressure Piping, ASA B 31.1

SPECIFICATION (ASTM-2002)	CHEMICAL PROPERTIES								MECHANICAL PROPERTIES					OTHERS
	C%	Mn%	P% (Max)	S% (Max)	Si%	Cr%	Mo%	Ni%	U.T.S. (Min) Mpa	Y.S. (Min) Mpa	ELONG. (Min) L	ELONG. (Min) T	Hardness (Max) BHN	
STAINLESS STEEL														
A 403 Gr. WP 304	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-11.0	515	205	28	20	-	
A 403 Gr. WP 304L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-12.0	485	170	28	20	-	
A 403 Gr. WP 304H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-11.0	515	205	28	20	-	
A 403 Gr. WP 304LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-11.0	515	205	28	20	-	N%=0.10-0.16
A 403 Gr. WP 309	0.20 Max	2.00 Max	0.045	0.030	1.00 Max	22.0-24.0	-	12.0-15.0	515	205	28	20	-	
A 403 Gr. WP 310S	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	24.0-26.0	-	19.0-22.0	515	205	28	20	-	
A 403 Gr. WP 316	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-14.0	515	205	28	20	-	
A 403 Gr. WP 316L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-14.0	485	170	28	20	-	
A 403 Gr. WP 316H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-14.0	515	205	28	20	-	
A 403 Gr. WP 316LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-13.0	515	205	28	20	-	N%=0.10-0.16
A 403 Gr. WP 317	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	3.0-4.0	11.0-15.0	515	205	28	20	-	
A 403 Gr. WP 317L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	3.0-4.0	11.0-15.0	515	205	28	20	-	
A 403 Gr. WP 321	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20	-	Ti%=(5XC)-0.70
A 403 Gr. WP 321H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20	-	Ti%=(4XC)-0.70
A 403 Gr. WP 347	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20	-	Cb%=(10XC)-1.10
A 403 Gr. WP 347H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20	-	Cb%=(8XC)-1.10
CARBON STEEL														
A 234 Gr. WPB	0.30 Max	0.29-1.06	0.050	0.058	0.10 Min	0.40 Max	0.15 Max	0.40 Max	415-655	240	30	20	197	Cu%=0.40 Max, Va%=0.08 Max, Cb%=0.02 Max
A 234 Gr. WPC	0.35 Max	0.29-1.06	0.050	0.058	0.10 Min	0.40 Max	0.15 Max	0.40 Max	485-655	275	30	20	197	Cu%=0.40 Max, Va%=0.08 Max, Cb%=0.02 Max
LOW TEMPERATURE CARBON STEEL														
A 420 Gr. WPL6	0.30 Max	0.50-1.35	0.035	0.040	0.15-0.40	0.30 Max	0.12 Max	0.40 Max	415-655	240	30	16.5	197	Cu%=0.40 Max, Va%=0.08 Max, Cb%=0.02 Max Impact Test=-45°C, J=17.3-13-6
A 420 Gr. WPL 3	0.20 Max	0.31-0.64	0.050	0.050	0.13-0.37	-	-	3.20-3.80	450-620	240	30	20	197	Impact Test=-45°C, J=17.3-13-6
ALLOY STEEL														
A 234 Gr. WP 1	0.28 Max	0.30-0.90	0.045	0.045	0.10-0.50	-	0.44-0.65	-	380-550	205	30	20	197	
A 234 Gr. WP 5	0.15 Max	0.30-0.60	0.040	0.030	0.50 Max	4.0-6.0	0.44-0.65	-	415-585	205	30	20	217	
A 234 Gr. WP 9	0.15 Max	0.30-0.60	0.030	0.030	1.00 Max	8.0-10.0	0.90-1.10	-	415-585	205	30	20	217	
A 234 Gr. WP 11 CL1	0.05-0.15	0.30-0.60	0.030	0.030	0.50-1.0	1.0-1.5	0.44-0.65	-	415-585	205	30	20	197	
A 234 Gr. WP 11 CL2	0.05-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.5	0.44-0.65	-	485-655	275	30	20	197	
A 234 Gr. WP 11 CL3	0.05-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.5	0.44-0.65	-	520-690	310	30	20	197	
A 234 Gr. WP 12 CL1	0.05-0.20	0.30-0.80	0.045	0.045	0.60 Max	0.80-1.25	0.44-0.65	-	415-585	220	30	20	197	
A 234 Gr. WP 12 CL2	0.05-0.20	0.30-0.80	0.045	0.045	0.60 Max	0.80-1.25	0.44-0.65	-	485-655	275	30	20	197	
A 234 Gr. WP 22 CL1	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	1.90-2.60	0.87-1.13	-	415-585	205	30	20	197	
A 234 Gr. WP 22 CL3	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	1.90-2.60	0.87-1.13	-	520-690	310	30	20	197	
A 234 Gr. WP 91	0.08-0.12	0.30-0.60	0.020	0.010	0.20-0.50	8.0-9.5	0.85-1.05	0.40 Max	585-760	415	20	-	248	Va%=0.18-0.25, Cb%=0.06-0.10, N%=0.03-0.07, Al%=0.04 Max

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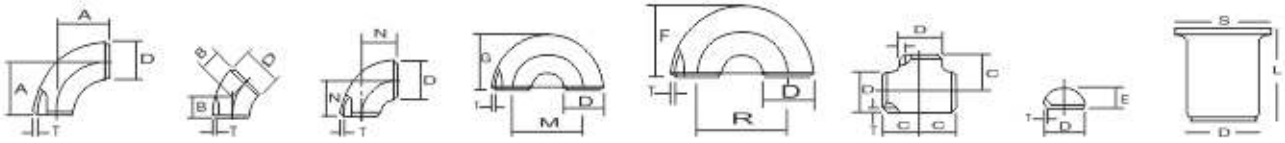
DIMENSIONS OF BUTTWELD FITTINGS AS PER (ANSI B 16.9/ B 16.28 / MSS SP - 43)



90° Elbow long radius | 45° Elbow | 90° Elbow short radius | 180° Return Bend short radius | 180° Return Bend long radius | Tee equal | Caps | Stub-End

Nominal Pipe Size		Outside Diameter	Center to Face				Back to Face			Center to Center			Length 'L'	
Inch.	mm	D	A	B	C	N	E	F	G	R	M	S	MSS SP43	ANSI B 16.9
1/2	15	21.3	19	16	25	_	25	48	_	38	_	34.9	50.8	76.2
3/4	20	26.7	29	11	29	_	25	43	_	57	_	42.8	50.8	76.2
1	25	33.4	38	22	38	25	38	56	41	76	51	50.8	50.8	101.6
1¼	32	42.2	48	25	48	32	38	70	52	95	64	63.5	50.8	101.6
1½	40	48.3	57	29	57	38	38	83	62	114	76	73	50.8	101.6
2	50	60.3	76	35	64	51	38	106	81	152	102	92	63.5	152.4
2½	65	73.0	95	44	76	64	38	132	100	191	127	104.8	63.5	152.4
3	80	88.9	114	51	86	76	51	159	121	229	152	127	63.5	152.4
3½	90	101.6	133	57	95	89	64	184	140	267	178	139.7	76.2	152.4
4	100	114.3	152	64	105	102	64	210	159	305	203	157.2	76.2	152.4
5	125	141.3	190	79	124	127	76	262	197	381	254	185.7	76.2	203.2
6	150	168.3	229	95	143	152	89	313	237	457	305	215.9	88.9	203.2
8	200	219.1	305	127	178	203	102	414	313	610	406	270	101.6	203.2
10	250	273.1	381	159	216	254	127	518	391	762	508	324	127.0	254.0
12	300	323.9	457	190	254	305	152	619	467	914	610	381	152.4	254.0
14	350	355.6	533	222	279	356	165	711	533	1067	711	412.8	152.4	305.0
16	400	406.4	610	254	305	406	178	813	610	1219	813	470	152.4	305.0
18	450	457.2	686	286	343	457	203	914	686	1372	914	533.4	152.4	305.0
20	500	508.0	762	318	381	508	229	1016	762	1524	1016	584.2	152.4	305.0
22	550	559.0	838	343	419	559	254	1118	838	1676	1118	614.4	152.4	305.0
24	600	610.0	914	381	432	610	267	1219	914	1829	1219	692.2	152.4	305.0
26	650	660.0	991	406	495	660	267	_	_	_	_	_	_	_
28	700	711.0	1067	438	521	711	267	_	_	_	_	_	_	_
30	750	762.0	1143	470	559	762	267	_	_	_	_	_	_	_
32	800	813.0	1219	502	597	813	267	_	_	_	_	_	_	_
34	850	864.0	1295	533	635	864	267	_	_	_	_	_	_	_
36	900	914.0	1372	565	673	914	267							
38	950	965.0	1448	600	711	965	305							
40	1000	1016.0	1524	632	749	1016	305							
42	1050	1067.0	1600	660	762	1067	305							
44	1100	1118.0	1676	695	813	1118	343							
46	1150	1168.0	1753	727	851	1168	343							
48	1200	1219.0	1829	759	889	1219	343							

All dimensions are in Millimeters. Dimensions and other specifications as per customers requirements are available on request

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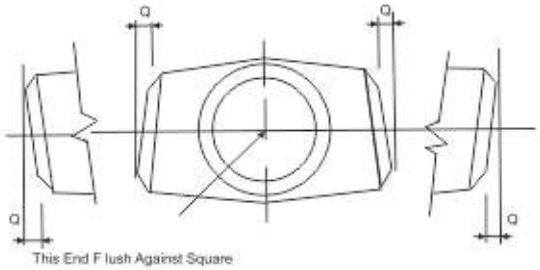
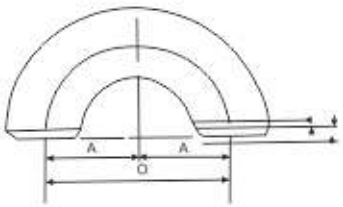
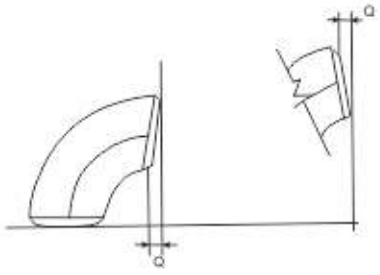
DIMENSIONAL TOLERANCE OF BUTTWELD FITTINGS AS PER (ANSI B 16.9 / B 16.28 / MSS SP - 43)

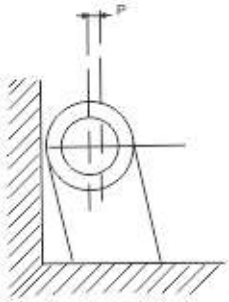
ALL FITTINGS						90°/60°/45° 30° ELBOWS &TEES		REDUC-ERS		180° RETURNS						CAPS		ANGULARITY TOLERANCE			
Nominal Pipe size INCH/MM	Outside Diameter at Bevel		Inside Dia Meter	Wall Thickness at End		Center to End		Overall Length Dimension		Center to End		Back to Face Dimension		Alingnment of End Dimentions		Overall Lengh		Nominal Pipe Size	Off Angel Inch/mm		Off Plane
	D			T		A,B,C,M		H		O		K		U		E			Q		P
	(1) B16.9	MSS Sp43	(2) B16.9	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43		B16.9	MSS SP75	B16.9
½" - 2½" 15 - 65	±1.6 - 0.8	±0.80	±0.8	Not Less Than 87.5% Nominal Thk	Not Less Than 87.5% Nominal Thk	FROM ½" TO 18 15 TO 600	FROM 3/4"	FROM 1/2" - 24" 15 - 600	FROM 1/2" - 8" 15 - 200	±6	±6.35	±6.0	±6.4	±1	±0.8	±3	±3.17	½" - 4" 15 - 100	±1	16" - 24" 400 - 600 1.6	±2
3" - 3½" 80 - 90	±1.6		±1.6			±2	±1.60	±2	±1.60									5" - 8" 125 - 200	±2		±4
4" 100																		10" - 12" 250 - 300	±3		±5
5" - 6" 125 - 150	±2.4 -1.6	±1.60 -0.80														±6	±6.35	14" - 16" 350 - 400	±3		±7
8" 200																		18" - 24" 450 - 600	±4		±10
10" - 18" 250 - 450	+4 -3.2	+2.38 -0.80	±3.2				±2.40		10" - 24" +2.38 250 - 600	±10	±10			±2.0"	±1.60			26" - 30" 650 - 750	±5	26" - 36" 650 - 900 2.4	±10
20" - 24" 500 - 600	+6.4 -4.8	3.17 0.79	±4.8															32" - 42" 800 - 1050	±5		±13
26" - 30" 650 - 750	+6.4 -4.8	±4.8				±3		FROM 26" - 48" 650NB - 1200 NB ±5								±10		44" - 48" 1100 - 1200	±5	32" - 48" 950 - 1200 3.2	±20
32" - 48" 800 - 1200	+6.4 -4.8					±5												42 - 48" 1050 - 1200	±5		±20

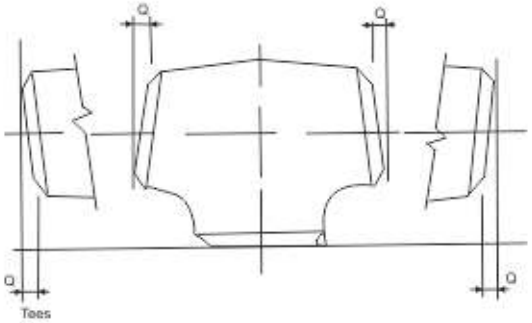
All dimensions are in Millimeters.

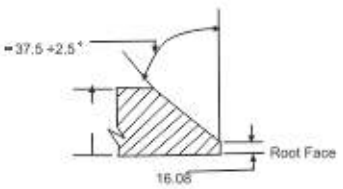


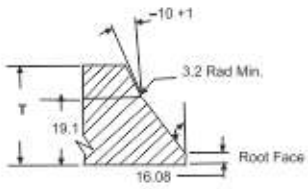












NICKEL ALLOYS DESCRIPTION

Nickel 200 - UNS N02200

Nickel 200, Nickel 99.2

Nickel 200 is 99.6% pure nickel, one of the toughest metals. The Nickel 200's characteristics include excellent mechanical properties, a low gas content, low vapor- pressure, magnetic properties, high thermal and electrical conductivity. These properties and its chemical composition make Nickel 200 fabricatable and highly resistant to corrosive environment. Nickel 200 is useful in any environment below 600°F. It is highly resistant to corrosion by neutral and alkaline salt solutions. Nickel 200 also has low corrosion rates in neutral and distilled water.

Applications :Gas Turbine Engine Components, Missile Systems, Shafts, Spacers, Seals, Rings, Casings, Fasteners , Engine Hardware, Airframe Assemblies.

ALLOY 400 - UNS N04400

Monel 400®, Nickelvac® 400, Nicorros®400

Monel 400® is a nickel-copper alloy that is hardened by cold working only. Monel 400® has low corrosion rate in flowing seawater, therefore it is widely used in marine applications. Monel 400® also has excellent resistance to stress corrosion cracking in most freshwaters. Monel 400® can be used in temperatures up to 1000°F. The alloy has great mechanical properties at sub zero temperatures.

Applications : Marine Engineering, Chemical And Hydrocarbon industry, Processing Equipment, Crude Petroleum Stills, Boiler Feed Water Heaters, Valves, Pumps, Shafts, Fittings & Fasteners, Industrial Heat Exchangers.

ALLOY 600 - UNS N06600

Inconel 600®, Nickelvac® 600, Ferrochronin® 600

Inconel 600® is a standard engineering material and has a great resistance to heat and corrosion. Inconel 600® also has high strength and can be easily formed. Inconel 600® can be hardened and strengthened only by cold work. Inconel 600® can be used in the heat-treating industry for muffles, furnace components, and for heat-treating baskets and trays.

Applications : Chemical Industry, Aerospace, Nuclear, Engineering, Gas Turbine Components, Heat Treating Industry, Pulp And Paper Industry, Food Processing etc.

ALLOY 625 - UNS N06625

Inconel 625®, Chronin® 625, Altemp® 625, Haynes® 625, Nickelvac® 625, Nicrofer® 6020

Inconel ® 625 is a nonmagnetic, corrosion and oxidation resistant nickel-base alloy. It has high strength and toughness in the temperature range cryogenic to 2000°F (1093°C) which is derived largely from the solid solution effects of the refractory metals, columbium and molybdenum, in a nickel-chromium matrix. Alloy 625 has excellent fatigue strength and stress-corrosion cracking resistance to chloride ions.

Applications : Nuclear reactors, Gas turbines, Rocket engines, Pressure vessels, Aircraft structures.

ALLOY 800 - UNS N08800

Incoloy 800H®, Ferrochronin® 800, Nickelvac® 800, Nicrofer® 3220

Incoloy 800® is a nickel-chromium alloy with good strength and excellent resistance to oxidation and carburization. The alloy maintains stable structure during exposure to high temperature, therefore incoloy 800® has good corrosion resistance to many acidic environments.

Applications : Heat exchangers, Carburising equipment, Heating elements Sheathing .

NICKEL ALLOYS DESCRIPTION

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ALLOY 825 - UNS N08825

Incoloy 825® is a nickel-iron- chromium alloy with titanium, copper, and molybdenum. Incoloy® 825's chemical composition provides great resistance to many corrosive environments, such as pitting, crevice corrosion, intergranular corrosion, and stress-corrosion cracking. Incoloy 825® has good mechanical properties from moderately to high temperatures. The hot- working range for Incoloy 825® is 1600 to 2150 F. The material has good weldability by all conventional processes.

Applications : Gas turbine engines, Industrial furnaces, Chemical processing, Petrochemical industry.

Alloy C22 - UNS N06022

Hastelloy C22®, Inconel® 22, Nicrofer® 5621

Hastelloy C22® provides resistance to general corrosion, pitting, crevice corrosion, intergranular attack, and stress corrosion cracking. Hastelloy C22® can be used for many applications such as marine, power, chemical processing, pollution control, paper processing, and waste disposal industries. Hastelloy C22® contains chromium, molybdenum, tungsten, and iron which makes the alloy resistant to corrosion in stagnant or flowing seawater. The alloy is formed by gas tungsten-arc, gas metal-arc, and shielded metal-arc processes.

Applications : Flue Gas Desulfurization, Scrubbers, Gas turbine engines, Industrial furnaces, Chemical processing, Petrochemical industry, Dampers And Ducts etc.

Alloy C276 - UNS N10276

Hastelloy C276®, Nickelvac® HC-276, Inconel® C276, Nicrofer® 5716

Hastelloy C-276® is a nickel-molybdenum-chromium alloy with excellent corrosion resistance in severe environments. Hastelloy C-276® is used in pollution control, chemical processing, pulp and paper production, and waste treatment.

Applications : Flue Gas Desulfurization, Scrubbers, Gas turbine engines, Industrial furnaces, Chemical processing, Petrochemical industry, Dampers And Ducts etc.

CP Titanium Grade 2

Ti Grade 2 has moderate strength with excellent cold formability, weldability. This titanium also has excellent resistance to high oxidization.

Applications : Chemical industry, Heat exchangers, Aircraft turbines, Engine components, Aircraft structural components, Aerospace fasteners, Medical Implants, High-performance automatic parts, Sports equipments etc.

Available forms are seamless & welded pipes, seamless & welded tubes, flanges, pipe fittings, sheets, plates, etc.

CHEMICAL COMPOSITION OF NICKEL BASED ALLOYS

U.S.A. / GROSSBRITAINNIE U.S.A. / GRANDE-BRETAGNE U.S.A. / GREAT BRITAIN													
Analyses	Analyses Composition												
Handelsbezeichung Designation Commercial Commercial designation	C%	Co%	Cr%	Mo%	Ni%	V%	W%	Ai%	Cu%	Nb/Cb Ta%	Ti%	Fe%	Sonstige Autres -Other %
Monel 400	0.12	-	-	-	65.0	-	-	-	32.0	-	-	1.5	Mn 1.
Monel 401	0.10	-	-	-	43.0	-	-	-	53.0	-	-	0.75	Si 0.25;Mn z25
Monel 404	0.15	-			52.0-57.0	-	-	0.05	rest/bal	-	-	0.50	Mn 0.10; Si 0.10;So.024
Monel 502	0.10	-	-	-	63.0-17.0	-	-	2.5-3.5	rest/bal	-	0.50	2.0	Mn 1.5;Si:So.010
Monel k 500	0.13	-	-	-	64.0	-	-	2.8	30.0	-	0.60	1.0	Mn 0.8
Monel B	0.10	1.25	0.60	28.0	rest/bal	0.30	-	-	31.0	-	-	1.2	Mn1.0;So.0.04
Hastelloy B2	0.02	1.0	1.0	26.0-30.0	rest/bal	-	-	-	-	-	-	2.0	Mn1.0:Si 0.10
Hastelloy C	0.07	1.25	16.0	17.0	rest/bal	0.30	40	-	-	-	-	5.75	Mn 1.0:Si 0.70
Hadseiloy C4	0.015	2.0	14.0-17.0	14.0-17.0	rest/bal	-	-	-	-	-	0.70	3.0	Mn1.0;Si 0.70
Hastelloy C276	0.02	2.5	140-16.5	15.0-17.0	rest/bal	0.35	3.0-4.5	-	-	-	-	4.0-7.0	Mn 1.0;Si 0.05
Incoloy 800	0.04	-	21.0	-	32.0	-	-	0.3	-	-	0.4	45.0	-
Incoloy 801	0.05	-	20.5	-	32.0	-	-	-	-	-	1.1	45.0	-
Incoloy 802	0.35	-	21.0	-	32.0	-	-	0.6	-	-	0.7	45.0	-
Incoloy 804	0.05	-	29.5		41.0	-	-	0.3	-	-	0.6	25.4	-
Incoloy 805	0.12	-	7.5	0.50	36.0	-	-	-	0.10	-	-	rest/bal	Mn 0.60;Si 0.50
Incoloy 810	0.25	-	21.0	-	32.0	-	-	-	0.50	-	-	rest/bal	Mn 0.90; Si 0.80
Incoloy 825	0.04	-	21.0	3.0	42.0	-	-	-	2.0	-	1.0	30.0	-
Incoloy 901	0.05	-	12.5	6.0	rest/bal	-	-	-	-	-	2.9	34.0	Mn 0.24;0.12;00.015
Incoloy 903	0.02	15.0	-	-	38.0	-	-	0.7	-	Nb 3.0	1.4	41.0	-
Incoloy 904	0.02	14.0	-	-	33.0	-	-	-	-	-	1.7	50.0	-
Incoloy 600	0.05	-	15.5	-	75.0	-	-	-		-	-	8.0	-
Incoloy 601	0.05	-	23.0	-	60	-	-	1.4	-	-	-	14.0	-
Incoloy 610	0.20	-	15.5	-	rest/bal	-	-	-	0.50	Nb 1.0	-	9.0	Mn0.90;Si 2.0
Incoloy 617	0.07	12.5	22.5	9.0	54.0	-	-	1.0	-	-	-	-	-
Incoloy 625	0.05	-	21.5	9.0	61.0	-	-	0.60	-	Nb 3.65	0.60	2.5	Mn 05;Si 0.50
Incoloy671	0.07	12.5	22.5	9.0	51.0	-	-	-	-	-	0.35	-	-
Incoloy 700	0.12	28.5	15.0	3.75	46.0	-	-	3.0	0.05	-	2.20	0.70	Mn 0.10;Si 0.30
Incoloy 702	0.04	-	15.6	-	rest/bal	-	-	3.4	0.10	-	0.70	0.35	Mn 0.05; Si 0.20
Incoloy 705	0.30	-	15.5	-	rest/bal	-	-	-	0.50	-	-	8.0	Mn 0.90; Si 5.5

CHEMICAL COMPOSITION OF TITANIUM / NICKEL BASED ALLOYS

Grade	UNS Designation	C % Max	Mn % Max	P % Max	S % Max	Si% -	Ni %	Co %	Cu %	Ag%	Fe %	Pb %	Zn % Max	N %	Ti % Max	H % Max	O %
70/30 Cu-Nu	C 71500	0.05	1.0	0.02	0.02	-	29.0-33.0	-	-	-	0.40-1.0	0.02	0.50	-	-	-	-
90/10 Cu-Ni	C 70600	0.05	1.0	0.02	0.02	-	9.0-11.0	-	-	-	1.0-1.8	0.02	0.50	-	-	-	-
Titanium Gr. 2	R 50400	0.08	0.03	-	-	-	-	-	-	-	0.30	-	-	-	-	-	0.25
Titanium Gr. 1	R 50250	0.08	0.03	-	-	-	-	-	-	-	0.20	-	-	-	-	0.015	0.18
Type 17-4PH	-	0.07	1.00	0.04	0.03	1.00	3.00-5.00	3.00-5.00	0.15-0.45	-	-	-	-	-	-	-	-
Nickel 200	2200	0.15	0.35	-	0.01	0.35	99.0	-	-	-	0.40	-	-	-	-	-	-
Nickel 201	2201	-	0.35	-	0.01	0.35	99.0	-	0.25	-	0.40	-	-	-	-	-	-

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THIRD PARTY INPECTION

DET NORSKE VERITAS | BUREAU VERITAS | NPCIL Nuclear Power Corp. of India Ltd. | TUV INDIA | PDIL | SGS

Toyo Engineering India Ltd. | Uhde India Ltd. | इ·भाइ·एल | TATA Project | Lloyd's Register | HEG Ltd.

FORMULAE OF CALCULATING WEIGHT

Weight of Stainless Steel / Carbon Steel Pipes & Tubes
OD (mm) - W.T. (mm) x W.T. (mm) x 0.02466 = KG/MTR

Weight of Stainless Steel / Carbon Steel Sheets
Length (mtr.) x Width (mtr.) x Thk. (mm) x 8.00 = KG/SHEET

Weight of Stainless Steel Circle & Blanks
O.D. (mm) x O.D (mm) x Thk. (mm) /160/1000 = KG?PCS

Weight of Stainless Steel Rounds
Dia. (mm) x Dia. (mm) x 0.00623 = KG/MTR

Weight of Stainless Steel Hexagonal Rods
Dia. (mm) x Dia. (mm) x 0.00679 = KG/MTR

Weight of Stainless Steel Square Rods
Dia. (mm) x Dia. (mm) x 0.00787 = KG/MTR

Weight of Copper Pipes
O.D. (mm) - W.T (mm) x W.T. (mm) x 0.0285 = KG/MTR

Weight of Aluminium Pipes
O.D. (mm) - W.T (mm) x W.T. (mm) x 0.0082 = KG/MTR

Weight of Aluminium Sheets
Length (mtr.) x Width (mtr.) x Thk. (mm) x 2.66 = KG/MTR

Weight of Lead Pipes
O.D. (mm) - W.T. (mm) x W.T. (mm) x 0.0345 = KG/MTR

Weight of Lead Sheets
Length (mtr.) x Width (mtr.) x Thk. (mm) x 11.2 = KG/SHEET

Sheet Width Required for Rolled & Welded Pipes
O.D. (mm) - Thk. (mm) x 3.14 = Sheet Width (mm)

Weight of Square / Rectangle Pipes
Length from 4 angle (OD) / 3.14 - Thk. (mm) x Thk. (mm) x 0.00756 = KG/Per Feet

APPLICATIONS

Radisson Impex™
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REFINERY & PETROCHEMICALS

OIL& GAS

OFFSHORE

SHIP BUILDING

EPC

CROSS COUNTRY PIPELINE

NUCLEAR & POWER

CHEMICAL & PHARMACEUTICAL

SUGAR INDUSTRY

DEFENSE

CEMENT PLANT

FOOD & BEVERAGE INDUSTRY

Radisson Impex™

AN ISO 9001: 2015 CERTIFIED CO.

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