

**Importers & suppliers of :-  
Ferrous & Non-Ferrous  
Metals**



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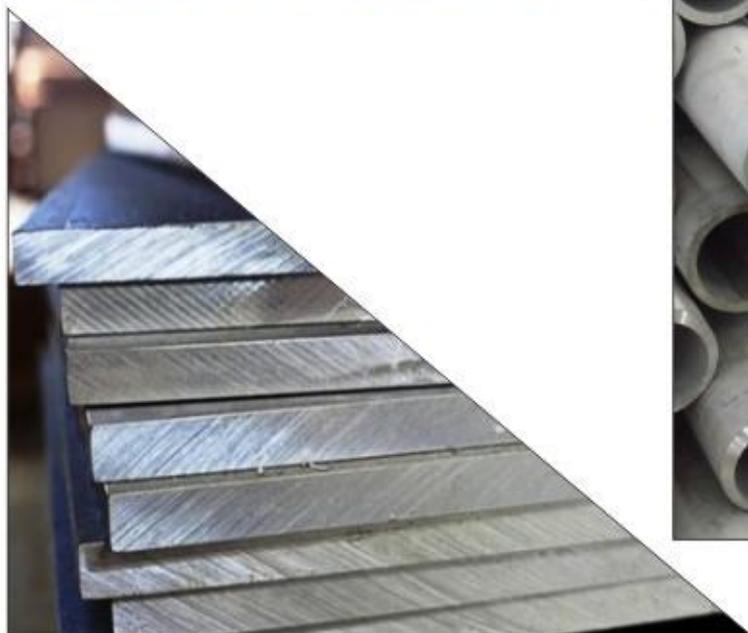


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OFFERING  
COMPLETE SPECTRUM  
OF PRODUCTS

We Almost Deliver Everything In Steel





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## EXPLORING NEW BENCHMARK IN CORPORATE GOVERNANCE

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

Right from inception we have been moved by our philosophy i.e "EXPLORING NEW BENCHMARKS IN CORPORATE GOVERNANCE" where it is always encouraged to think new, fresh and with a determined action to set new benchmarks.

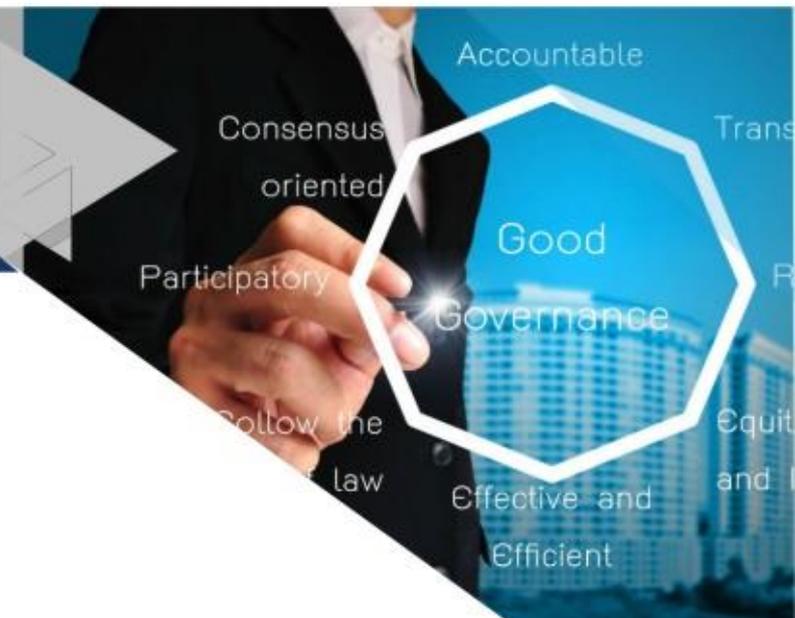
With such focused and committed approach, we have ruffled many feathers in the Indian Stainless Steel industry for our professional approach, ability to understand exact client's requirements, extensive knowledge about various materials & their usage and work ethics which is unparalleled.

### Vision

Putting best of our efforts to out perform 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 Royal Business a professionally managed company within the domain expertise and a respected Indian conglomerate with significant Global presence.



### Our Philosophy

we believe that quality is the lifeline of every business and we are committed to satisfy our customers by supplying quality products. We have proactive approach to uphold integrity in conducting our business and provide conducive environment for individuals to perform and excel in their areas of operation.

### Our Values

We are committed to maintain

- » Integrity
- » Quality
- » Transparency in all sphere of our business.

### Why Us

- » Deliver best quality products for all your need of Fittings, Flanges, Pipes, Plates, Sheets etc on time every time.
- » A leading supplier of Stainless Steel Flanges & Fittings in India
- » Stockist of Pipes
- » Stockist of SS & CS Plates Sheets

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 Client.



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## EXPLORING NEW BENCHMARK IN PROFESSIONALISM

We take the pleasure to introduce ourselves as one of the largest importers, exporters, stockists and suppliers for the following materials: stainless steel pipes, tubes, sheets, plates, fittings, flanges, coils, etc. conforming to Stainless Steel TP-202, 304, 304L, 309, 310, 310s, 316, 316s, 316ti, 321, 410, 430, 904L, Alloy Steel, Carbon Steel, Duplex Steel, Nickel, Monel, Inconel, Titanium & all other high nickel Alloy grades.

We are regularly supplying these products to many leading industrial units consisting of oil & gas companies, chemicals industries, fertilizer companies, petrochemical plants, refineries, paper mills, cement plants, sugar mill, etc.

**Royal Business** adopting an innovative and fresh approach to supply of the industrial ferrous and non ferrous products with 100% focus on Domestic & Overseas markets with a comprehensive range of Pipes, Tubes, Sheets, plate, Flanges & fittings etc. which turned out to be a winning combination. . . Accepting challenges and ensuring customer delight has been the hallmark of our group. In just the last two decades, our group has grown to become a multi-product, multi-location company providing total piping solutions to a diverse range of industries.

We also supply these products especially stainless steel sheets/ plates/ coils/ pipes to engineering industries who are engaged in the manufacture and fabrication of process equipments & aerospace equipments. We can supply these products even under third party inspection viz Bureau Veritas, D.N.V. H&G, Kvaerner Power Gas, Udhe India, Eil, Lloyds, Toyo, Chemtex, Ceil, Tecnimont Icb & Ibr etc.

As we are regularly maintaining bulk stock in every item, we can arrange supplies in time and those too at the most competitive rates.

**Royal Business** has pride in providing a whole range of high-class, customizable and innovative seamless pipes and tubes using state-of-art technology. 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.





## EXPLORING NEW BENCHMARK IN TOTAL QUALITY MANAGEMENT

At Royal Business 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.

The list of Third Party Inspection Agencies [TPIA], with whom we have had privilege to carry our detailed stage- wise inspection & testing, reads like 'Who's Who' in the Directory of TPIA's. Inspection by Customer's own Surveyors can also be offered.

### Inspection & Testing can be offered 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) Tester
- Hydro Testing - Straight as well as U- Tubes

### Non Destructive Testing offered :

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





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## EXPLORING NEW EXCELLENCE IN MANUFACTURING

**Stainless Steel** : ASTM / 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 / ASME SA 790 UNS NO S32205/ S32760/ S31803  
**Carbon Steel** : ASTM ASME A 53 GR. A & B, ASTM A 106 GR. A.B & C. API5L GR.B, API5L X 42, X46, X52, X60, X65 & X 70, ASTM/A671/A672 GR 60 CL 12/22/32  
**Alloy Steel** : ASTM / ASME A 335 GR P1, P5, P9, P11, P12, P22, P91, ASTM / ASME A 691 Gr. 1 cr, 11/4 cr, 21/4 cr, 5 cr , 9 cr

**High Nickel Alloy** : Monel, Nickel, Inconel, Hastelloy, Copper, Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead, etc.

**Types** : Round, Square, Rectangular.

**Size** : 3/8" NB to 24" NB. (Seamless ) ½" NB to 72" NB. ( Welded ) ERW / SAW

**Wall Thickness** : Sch.5S to Sch. XXS





## CHEMICAL COMPOSITION OF STAINLESS STEEL

Stainless Steel is essentially a low carbon steel which contains chromium at 10% or more by weight. It is this addition of chromium that gives the steel its unique stainless corrosion resisting Properties. The corrosion resistance and other useful properties of the steel are enhanced by increased chromium content and the addition of other elements such as molybdenum, nickel and nitrogen

Chemical Composition of Stainless Steel											Nearest Equivalent Specification		
UNS NO.	EN	BS	AISI Grade	C Max	Mn Max	P Max	S Max	Si Max	Cr	Ni	Mo	Cu	I.S.

### Austenitic

S20100	-	-	201	0.15	5.5/7.5	0.06	0.03	1	16.0/18.0	3.5/5.5	-	-	-
S20200	-	-	202	0.15	7.5/10	0.06	0.03	1	17.0/19.0	4.0/6.0	-	-	-
S30100	-	301S21	301	0.15	2.0max	0.045	0.040	1.0	16.0/18.0	6.0/8.0	-	-	10Cr17Ni7
S30200	-	-	302	0.15	2.0	0.045	0.030	1.0	17.0/19.0	8.0/10.0	-	-	07Cr18Ni9
S30300	-	303S31	303	0.15	2.0	0.045	0.15 min	1.0	17.0/19.0	8.0/10.0	-	-	15Cr18Ni9
S30400	1.4301	-	304	0.08	2.0	0.045	0.030	1.0	18.0/20.0	8.0/10.0	-	-	04Cr18Ni10
S30403	1.4307	304S11	304L	0.030	2.0	0.045	0.030	1.0	18.0/20.0	8.0/12.0	-	-	02Cr18Ni11
S30453	1.4306	304S61	304LN	0.030	2.0	0.045	0.030	0.75	18.0/20.0	8.0/11.0	-	-	-
S30409	-	-	304H	0.05	2.0	0.045	0.03	1	18.0/20.0	8.5/9.5	-	-	-
S30900	-	309S16	309	0.20	2.0max	0.045	0.030	1.0	22.0/24.0	12.0/15.0	-	-	20Cr24Ni12
S30908	1.4833	-	309S	0.08	2.0	0.045	0.030	1.0	22.0/24.0	12.0/15.0	-	-	-
S31009	-	-	310H	0.25	2.0	0.045	0.030	1.50	24.0/26.0	19.0/22.0	-	-	10Cr25Ni12
S31008	1.4845	-	310S	0.08	2.0	0.045	0.030	1.50	24.0/26.0	19.0/22.0	-	-	-
S31600	-	316S31	316	0.08	2.0	0.045	0.030	1.0	16.0/18.0	10.0/14.0	2.0/3.0	-	04Cr17Ni12Mo2
S31603	1.4404	316S11	316L	0.030	2.0	0.045	0.030	1.0	16.0/18.0	10.0/14.0	2.0/3.0	-	03Cr17Ni12Mo2
S31653	-	316S61	316LN	0.030	2.0	0.045	0.030	0.75	16.0/18.0	10.0/14.0	2.0/3.0	-	-
S31635	1.4571	320S31	316Ti	0.080	2.0	0.045	0.030	1.0	16.0/18.0	10.0/14.0	2.0/3.0	-	-
S31700	-	-	317	0.08	2.0	0.045	0.030	1.0	18.0/20.0	11.0/15.0	3.0/4.0	-	-
S31703	-	317S12	317L	0.030	2.0	0.045	0.030	1.0	18.0/20.0	11.0/15.0	3.0/4.0	-	-
S31753	-	-	317LN	0.03	2.0	0.045	0.03	1	18.0/20.0	11.0/15.0	3.0/4.0	-	-
S32100	1.4541	321S31	321	0.08	2.0	0.045	0.030	1.0	17.0/19.0	9.0/12.0	-	-	04Cr18Ni10Ti20
S34700	-	347S31	347	0.08	2.0	0.045	0.030	1.0	17.0/19.0	9.0/12.0	-	-	04Cr18Ni10Nb-40
N08904	1.4539	-	904L	0.02	2.0	0.045	0.035	1	19.0/23.0	23.0/28.0	4.0-5.0	-	-

### Ferritic

S41000	-	410S21	410	0.15	1.00	0.040	0.030	1.0	11.50-13.50	0.75	...	...	...
S41008	1.4000	403S17	410S	0.08	1.00	0.040	0.030	1.0	11.50-13.50	0.60	...	...	...
S42900	-	-	429 <sup>+</sup>	0.12	1.00	0.040	0.030	1.0	14.00-16.00	...	...	...	...
S43000	1.4016	430S17	430	0.12	1.00	0.040	0.030	1.0	16.00-18.00	0.75	...	...	...
S43035	-	-	439	0.07	1.00	0.040	0.030	1.0	17.00-19.00	0.050	...	0.04	...
S44400	-	-	444	0.025	1.00	0.040	0.030	1.0	17.5-19.5	1.00	1.75-2.50	0.035	...
-	-	-	409L	≤ 0.030	≤ 1.00	≤ 1.00	-	-	-	10.50-11.75	~	-	-

### Duplex & Super Duplex

S31803	1.4462	-	---	0.030	2.00	0.030	0.020	1.0	21.0-23.0	4.5-6.5	2.5-3.5	---	0.08-0.20
S32550	-	-	255 <sup>+</sup>	0.040	1.50	0.040	0.030	1.0	24.0-27.0	4.5-6.5	2.9-3.9	1.50-2.50	0.10-0.25
S32750	1.441	-	2507	0.030	1.20	0.035	0.020	0.8	24.0-26.0	6.0-8.0	3.0-5.0	0.50	0.24-0.32
S32760	-	-	---	0.030	1.00	0.030	0.010	1.0	24.0-26.0	6.0-8.0	3.0-4.0	0.50-1.00	0.20-0.30



## CHEMICAL COMPOSITION & MECHANICAL PROPERTIES OF STAINLESS STEEL PIPES

CHEMICAL ANALYSIS										MECHANICAL PROPERTIES			
Grade	C%	Si %	Mn%	P %	S%	Ni%	Cr%	Mo%	Other	tensile Strength	yield strenght	elongation %	Hardness
	Max	Max	Max	Max						Min.Ksi (Mpa)	Min. ksi (*Mpa)	GL-50mm MIN	HRB Max
TP304	0.08	1.00	2.00	0.045	0.030	8.0-11.0	18.0-20.0	-	-	75(515)	30(205)	35	90
TP304L	0.04-0.10	1.00	2.00	0.045	0.030	8.0-11.0	18.0-20.0	-	-	75(515)	30(205)	35	90
TP304L	0.035	1.00	2.00	0.045	0.030	8.0-12.0	18.0-20.0	-	-	70(485)	25(170)	35	90
TP316	0.08	1.00	2.00	0.045	0.030	10.0-14.0	16.0-18.0	2.0-3.0	-	75(515)	30(205)	35	90
TP316H	0.04-0.10	1.00	2.00	0.045	0.030	11.0-14.0	16.0-18.0	2.0-3.0	-	75(515)	30(205)	35	90
TP316L	0.035	1.00	2.00	0.045	0.030	10.0-14.0	16.0-18.0	2.0-3.0	-	70(485)	25(170)	35	90
TP309	0.08	1.00	2.00	0.045	0.030	12.0-15.0	20.0-24.0	-	-	75(515)	30(205)	35	90
TP310	0.08	1.00	2.00	0.045	0.030	19.0-22.0	24.0-26.0	-	-	75(515)	30(205)	35	90
TP317	0.08	1.00	2.00	0.045	0.030	11.0-15.0	18.0-20.0	3.0-4.0	-	75(515)	30(205)	34	90
TP321	0.08	1.00	2.00	0.045	0.030	9.0-12.0	17.0-19.0	-	Ti(C+N)-0.70	75(515)	30(205)	35	90
TP347	0.08	1.00	2.00	0.045	0.030	9.0-13.0	17.0-20.0	-	Nb:10(C)-1.0	75(515)	30(205)	35	90
TP409	0.08	1.00	1.00	0.045	0.030	0.50MAX	10.5-11.75	-	Ti:6(C)-0.75	55(380)	30(205)	20	95
TP410	0.15	1.00	1.00	0.040	0.030	0.50MAX	11.5-13.50	-	-	60(415)	30(205)	20	95
TP430	0.12	1.00	1.00	0.040	0.030	0.50MAX	4.0-18.0	-	-	60(415)	35(240)	20	90
DIN1.4571	0.08	1.00	2.00	0.045	0.030	10.5-13.5	16.5-18.5	2.0-2.5	Ti:5(C)-0.08	75(515)	30(205)	35	90



## 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	1.1/4	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	1.1/2	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	2.1/2	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	-	-	-	-



## CARBON STEEL & ALLOY STEEL PIPE DIMENSIONS ANSI B 36.10

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					
	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	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	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	1 1/4	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	1 1/2	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	2 1/2	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	3 1/2	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													
125	5	141.3				6.55	21.77	6.55	21.77					9.53	30.9	9.53	30.9													
150	6	168.3				7.11	28.26	7.11	28.26					10.97	42.5	10.97	42.5													
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 in millimeters. W.T. = Wall Thickness. KG/M = Kilograms per Meter.



## DIMENSIONAL TOLERANCE OF PIPES AS PER ANSI B 36.10 / B 36.19

Tubes Specification ASTM	Nominal Pipe Size (mm)	Permissible variations in Outside Diameter (mm)		Permissible variations in THK	Permissible variations in Length (mm)		Straight tolerance Max. curvature in any meter Length
		Over	Under		Over	Under	
A 106 CS Seamless Pipe for High Temp.	3 to 40 Incl	0.4	0.8	-12.5%			Up to 125 mm O/D and 12 mm THK Pipe -0.76 mm
	Over 40 to 100 Incl.	0.8	0.8				
A 312 Seamless & Welded Austenitic SS Pipes	Over 100 to 200 Incl.	1.6	0.8				Over 125 mm O/D to 200 mm O/D Inclusive -1.15 mm
	Over 200 to 450 Incl.	2.4	0.8				
A 333 Seamless & Welded pipe for LT Service	Over 450 to 650 Incl.	3.2	0.8	Except for Welded pipe will filler Metal Added	6	0	Over 200 mm O/D to 324 mm O/D Inclusive -1.52 mm
A 335 Seamless Ferritic Alloy Steel Pipe for High Temp. Service	Over 650 to 850 Incl.	4.0	0.8				
	Over 850 to 1200 Incl.	4.8	0.8				
A 358 ERW Austenitic Cr-NiAs pipe for High Temp.serv.	All Sizes (upto 200 NB)	+0.5% (Based on Circumferencial Measurement)	-0.5%	-0.3 mm			3 mm /metres
A 409 ERW Large Dia Austenitic Steel Pipes	450 to 750 (SCH 5 S & 10 S)	+0.2% +0.4% Based on Circumferencial Measurement	+0.2% (For T < 4.8 mm) -0.4% (For T 4.8 mm)	-0.46 mm			4.8mm/3 metres





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## OFFERING COMPLETE SPECTRUM OF SHEET & PLATES

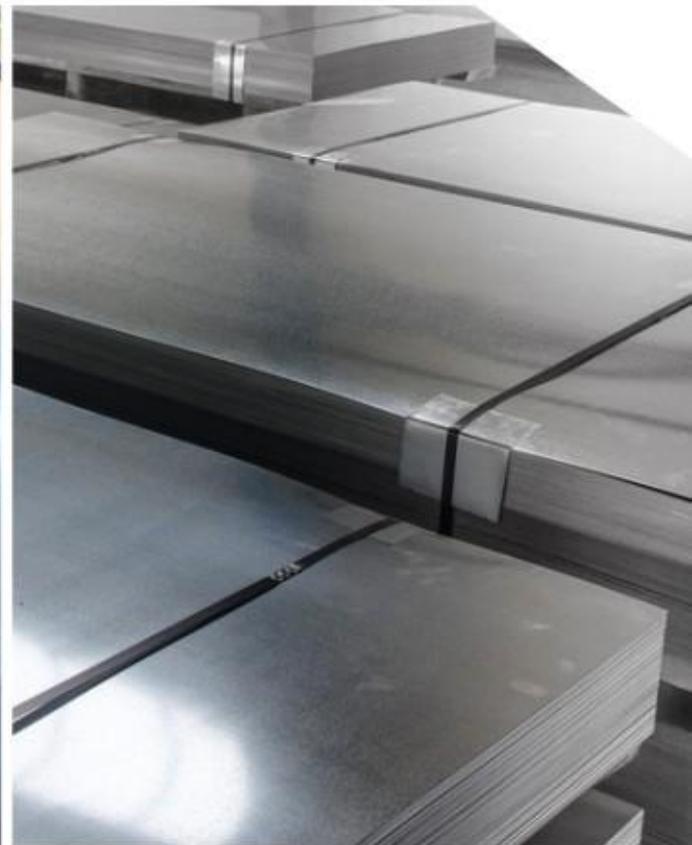
### **Types**

**Stainless Steel**

**Alloy Steel**

**Boiler Quality**

**Nickel Alloys**





## STAINLESS STEEL / ALLOY STEEL BOILER QUALITY PLATES

### Stainless Steel Plates

Royal Business is a leading Stockist of Stainless Steel Plate, Duplex Stainless Steel Plate, Super Duplex Stainless Steel Plate, Duplex Steel Sheet, Duplex Steel Plate, Duplex Steel Coil, Super Duplex Steel Sheet, Super Duplex Steel Plate, Super Duplex Steel Coil Etc. Stainless Steel Sheet Plate Coil

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 you require and can also be cut to your drawings utilising 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



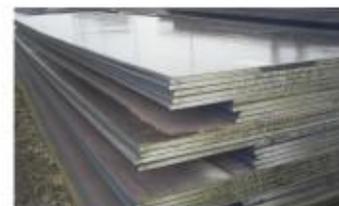
### Alloy Steel Plates

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, Chromium up to 3.99%, Cobalt, Columbium, 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.

ASME SA 387 GRADE 91 Class 2  
ASTM SA387 GRADE 5 Class  
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



### Boiler Quality Steel Plates

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

Produced to a high quality from Western European mills, our boiler plate steel is 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 4m to locations worldwide.

#### Technical Specifications :

ASME/ASTM SA/A 516-60  
ASME/ASTM SA/A 516-65  
EN10028- P265GH  
BS1501-161-430A/B  
En10207 P265S  
EN10028-3 P275NH





## STAINLESS STEEL SHEETS / PLATES

**PRODUCT CHARACTERISTICS & APPLICATIONS**

Series		Grades	Characteristics	Applications
Austenitic Series	Basic	SUS 304	Widely used, corrosion resistant, heat resistant, good mechanical properties in low temperature, no heat treatment hardening, weak magnetism.	Home kitchen utensils, chemical industry, medical apparatus, building material and decoration.
		SUS304L	Better intergranular corrosion resistance, can be heat treated after welding.	Petroleum equipment, chemical equipment, building material, heat resistant parts and the parts that are difficult to heat treatment.
	High Tensile Strength	SUS301	Low content of Cr and Ni than 304 grade, It's strength, hardness and magnetism can be increased by cold working.	Trains, aircrafts, vehicles, springs.
		SUS301L*	Improving, intergranular corrosion resistance by decreasing content and increasing Ni content from 301 grade.	Frame and crust parts of train.
	Deep Drawing	SUS304Cu	Better formability than 304 grade by addition of cu, suitable for deep drawing.	Domestic appliances.
		SUS304Ni8.5	Better formability than 304 grade by increasing Ni content, suitable for deep drawing.	Domestic appliances.
		SUS304Ni9	Better formability than 304 grade by increasing Ni content, suitable for deep drawing.	Domestic appliances.
	High Corrosion Resistance	SUS316*	Better formability than 304 grade in sea water and other corrosive solutions, higher heat-resistance, good cold work hardening and performance, no magnetism.	Chemical industry, food processing equipments, coastal installations.
		SUS316L	Compare with SUS316, has better intergranular corrosion resistance and water heat-resistance, no magnetism.	Chemical industry, food processing equipments used in severe corrosive condition, costal installations used.
		SUS321	Intergranular corrosion resistance, heat resistant, good formability and weldability, anti-oxidizing in high temperature.	Jet engine parts, heat exchanger, boiler cover, chemical devices.
Ferritic Series	Basic	SUS430	Typical ferritic, stainless steel grade, low thermal extensibility, good formability and antioxygenic property.	Heat-resistance utensils, combustion devices, domestic appliance, kitchen utensils category, building decorating material.
	Weldable and Corrosion Resistant	SUS409L	good formability and weldability, antioxygenic property in high temperature.	exhaust system of automobiles
		SUS436L*	good corrosion resistance, formability and weldability, corrosion resistant to condensates in exhaust piping of automobiles.	Automobiles exhaust piping, boiler.
		SUS444*	good corrosion resistance, formability and weldability, compare with 316L, has better stress corrosion resistance and spot corrosion resistance.	Water heater, water tank, automobile, exhaust piping.
Martensitic Series	Basic	SUS420J2*	High post-queenching strength, suitable for wearable parts.	Knife, pipe nozzles, valves, metal rules and cooking utensils.



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## OFFERING COMPLETE SPECTRUM OF BARS / RODS

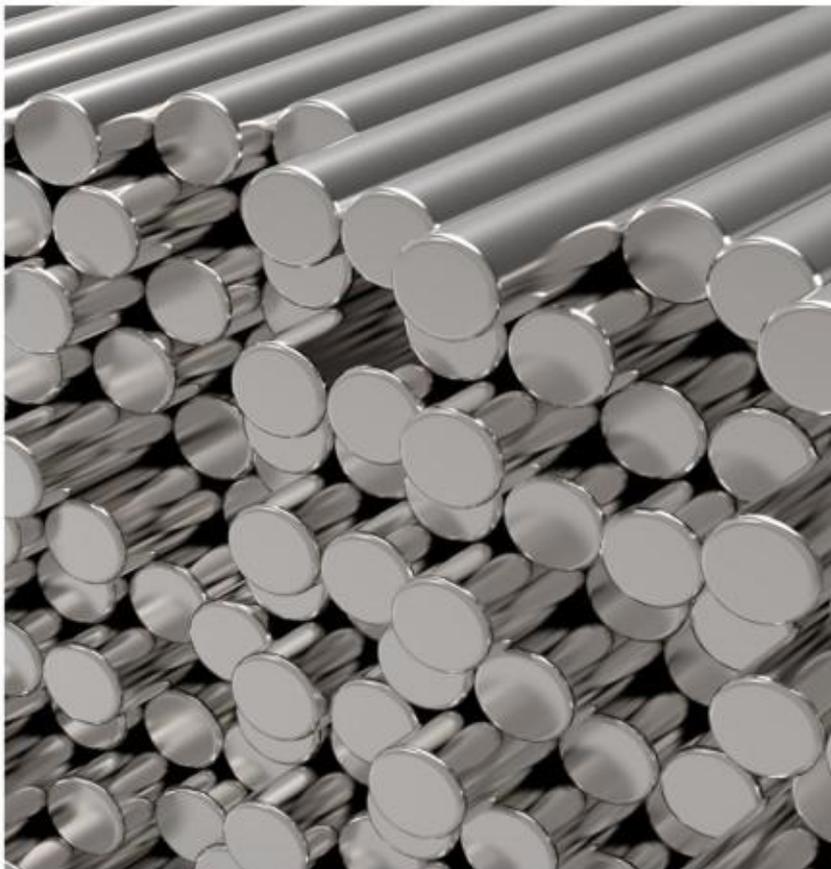
### Types

Round

Square

Hexagonal

Rectangular





We are offering our clients a wide range of Round Bars that are available in varied grades of stainless steel, Duplex / Super duplex, Nickel Alloys, Copper & Brass etc. Our round bars have great utility as machinery equipment in various industries and for diverse architectural purposes. These round bars feature superior polish, excellent finish, sturdy construction and high tolerance level.



- Duplex & Super Duplex** : UNS S31803, UNS S32750, UNS S32760,  
UNS S32550, 254SMO
- Hastelloy Alloy** : Hastelloy C4, Hastelloy B2, Hastelloy G30, Hastelloy B3,  
Hastelloy C276, Hastelloy X, Hastelloy C22
- Incoloy Alloys** : Incoloy Alloy 20, Incoloy Alloy 800, Incoloy Alloy  
800H/800HT, Incoloy Alloy 825, Incoloy Alloy 925, Incoloy  
Alloy A286
- Inconel Alloys** : Inconel Alloy 600, Inconel Alloy 601, Inconel Alloy 625,  
Inconel Alloy 718 Inconel Alloy 725, Inconel Alloy X750
- Monel Alloys** : Monel 400, Monel R405, Monel K500.
- Stainless Steels** : 347, 310, 303, 304/304H, 316/316L, 317/317L, 17/4PH,  
410, 431, Nitronic 50, Nitronic 60, Nimonic 80A
- Type** : Round / Square / Hexagonal / Rectangular



## STRUCTURAL STEEL

We specialize in stainless steel equal & unequal angles, stainless steel cold drawn flats, stainless steel hot rolled flats, stainless steel polished & hairline angles & flats, stainless steel tapered & non tapered channels, stainless steel I Beams and stainless steel Tee Bars in various size range. We offer stainless steel products in various grades.

### Our Grades

ASTM:  
304, 304L, 304H, 310, 316, 316L, 316Ti, 321,

DIN:  
1.4301, 1.4307, 1.4306, 1.4841, 1.4845, 1.4401, 1.4404, 1.4541, 1.4571, 17 4PH





# FLANGES

## Types of Flanges

Weldneck

Slip - On

Blind

Socket Weld

Lap Joint

Ring Joint

Long Weldneck

RTJ

SORF

Deck Flange

Spectacle Blind

Oriface

**High Nickel Alloy** : Monel, Nickel, Inconel, Hastelloy  
Copper, Brass, Bronze, Titanium, Tantalum, Aluminium,  
High speed Steel, Zinc, Lead etc.

**Stainless Steel** : ASTM A182 F304/304L/304H/316/316L  
317/317L/321/310/347/904L & many others.

**Carbon Steel** : Astm A105/A694 F42/46/52/56/60/65  
A516 Gr. 60/70,A350 LF2/LF3, IS 2062 ( Plate flange)

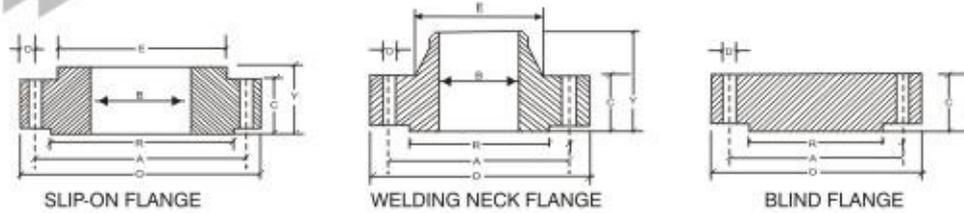
**Alloy Steel** : ASTM A182 F1/F5/F9/F11/F12/F22/F91/F92

**Size** : ½"NB to 24" NB

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



FORGED FLANGES TO  
ANSI B 16.5 (ASA 150 / 300 LBS)



**150 LBS**

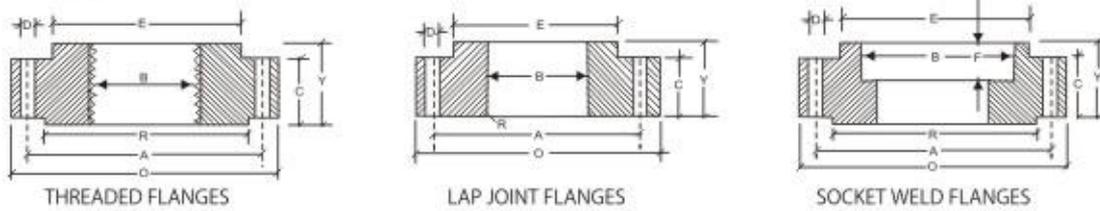
Nominal Pipe Size		Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. of Holes	Thk. of Flange C	Dia of Hub E	Length through Hub			Dia of Bore		Dia of R/F R	Depth of Socket F
(MM)	(INCH.)							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B		
15	1/2	88.9	60.3	15.9	4	11.1	30.2	15.9	47.6	15.9	22.3	22.9	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	1 1/4	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	1 1/2	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	2 1/2	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 O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. of Holes	Thk. of Flange C	Dia of Hub E	Length through Hub			Dia of Bore		Dia of R/F R	Depth of Socket F
(MM)	(INCH.)							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B		
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	1 1/4	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	1 1/2	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	2 1/2	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 (1.6) Raised Face, which is included in "Thickness(C)" and "Length through Hub(Y)"  
• 600, 900, 1500, 2500 class flange are also available on request.

**DIMENSION OF FORGED FLANGES ANSI B 16.5**



**DIMENSION OF CLASS 600 FLANGES AS PER ANSI B 16.5**

**600**

Nominal Pipe Size (MM)	Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia of Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W	W/N	LJ	S/O & S/W	LJ			
							Y	Y	Y	B	B			
15	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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

All Dimensions are in Millimeters, Flanges except Lap Joint will be furnished with (6.35mm) Raised Face, which is not included in Thickness (C) and Length through Hub (Y).

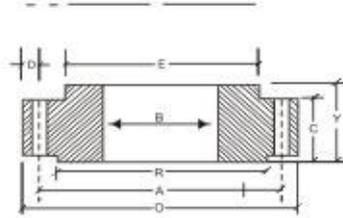
**DIMENSION OF CLASS 900 FLANGES AS PER ANSI B 16.5**

**900**

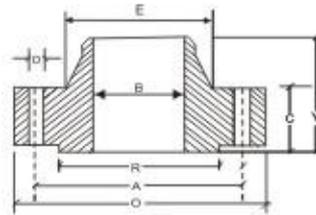
Nominal Pipe Size (MM)	Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia of Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W	W/N	LJ	S/O & S/W	LJ			
							Y	Y	Y	B	B			
15	120.6	82.5	22.2	4	22.2	38.1	31.7	60.3	31.7	22.3	22.8	34.9	9.5	21.33
20	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	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	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	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	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	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	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	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	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	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	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	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	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 (6.35mm) Raised Face, which is not included in Thickness (C) and Length Hub (Y). Class 1500 & 2500 also available as per customers requirement.

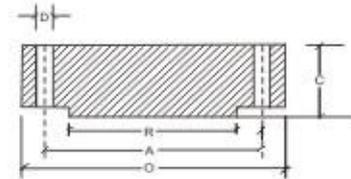
**DIMENSION OF FORGED FLANGES AS PER ANSI B 16.5**



SLIP-ON FLANGE



WELDING NECK FLANGE



BLIND FLANGE

**DIMENSION OF CLASS 1500 FLANGES AS PER ANSI B 16.5**

Nominal Pipe Size		Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Lenght through Hub			Dia of Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
(MM)	(INCH.)							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
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	1 1/4	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	1 1/2	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	2 1/2	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

All Dimensions are in Millimeters • Flanges except Lap Joint will be furnished with(6.35mm) Raised Face, which is not included in Thickness(C) and Lenght through Hub(Y).

**DIMENSION OF CLASS 2500 FLANGES AS PER ANSI B 16.5**

Nominal Pipe Size		Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Lenght through Hub			Dia of Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
(MM)	(INCH.)							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
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	1 1/4	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	1 1/2	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	2 1/2	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	-	219.07
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(6.35mm) Raised Face, which is not included in Thickness(C) and Lenght through Hub(Y).



**DIMENSIONAL TOLERANCE OF FORGED FLANGES ANSI B 16.5**

**Welding Neck Threaded, Slipon, Lapjoint, Socket Welding & Blind**

Outside Diameter	O.D. is 600 or smaller O. D. over 600	$\pm 1.6$ $\pm 3.1$	Outside Diameter	O.D. is 50 or smaller O. D. over 600	$\pm 1.6$ $\pm 3.1$
Inside Diameter (bore)	250 and smaller 12 through 450 500 and larger	$\pm 0.7$ $\pm 1.6$ $\pm 3.1$ -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	$\pm 0.7$ $\pm 0.4$	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	$\pm 1.6$ $\pm 3.1$	Outside diameter hub	300 and smaller 350 and larger	+2.3 -1.6 $\pm 3.1$
Diameter hub at point of welding	125 and smaller 150 and larger	+0.7 $\pm 0.7$ +4.0 $\pm 0.0$	Diameter of contact face	1.6 raised face 6.3 raised: tongue & grooved male & female	$\pm 0.7$ $\pm 0.4$
Thickness	450 and smaller 500 and larger	+3.1 $\pm 0.0$ +4.7 $\pm 0.0$	Thickness	450 and smaller 500 and larger	+3.1 -0.0 +4.7 -0.0
Length through hub	250 and smaller 300 and larger	$\pm 1.6$ $\pm 3.1$	Length through hub	250 and smaller 300 and larger	$\pm 1.6$ $\pm 3.1$
Drilling	bolt circle bolt hole spacing	$\pm 1.6$ $\pm 0.7$	Drilling	bolt circle bolt hole spacing	$\pm 1.6$ $\pm 0.7$
	essentricity with respect to bore	0.7 max		essentricity with respect to bore	0.7 max





**ROYAL BUSINESS**

Opportunity • Growth • Success

## BUTTWELD FITTINGS

<b>Types</b>	<b>Stainless Steel</b> : ASTM A403 WP 304 / 304L / 304H 316 / 316L / 317 / 317L / 321 / 310 / 347 / 904L etc.
<b>Tee</b>	
<b>Elbow</b>	<b>Carbon Steel</b> : ASTM A234 WPB / A420 WPL3 / WPL6 / MSS-SP-75 WPHY42/46/52/56/60/65/70/A53 Gr. B / A106 Gr. B / ASTM A192 / A179 etc.
<b>Coupling</b>	
<b>Stubend</b>	
<b>Reducer</b>	<b>Alloy Steel</b> : ASTM A234 WP1/ WP5 / WP11 / Wp12 / WP 22 / WP 91 / WP 92 etc.
<b>Return Bends</b>	
<b>Plug &amp; union</b>	<b>Size</b> : 1/4" NB TO 32"NB. (Seamless & Welded)
<b>Cap</b>	
<b>Collar</b>	<b>Wall Thickness</b> : Sch. 5S To Sch. XXS.
<b>Cross</b>	<b>High Nickel Alloy</b> : Monel, Nickel, Inconel, Hastelloy, Copper, Brass, Bronze, Titanium, Tantalum, Lead, Aluminium, High Speed Steel, Zinc, etc.



BUTTWELD FITTINGS  
ASTM SPECIFICATIONS

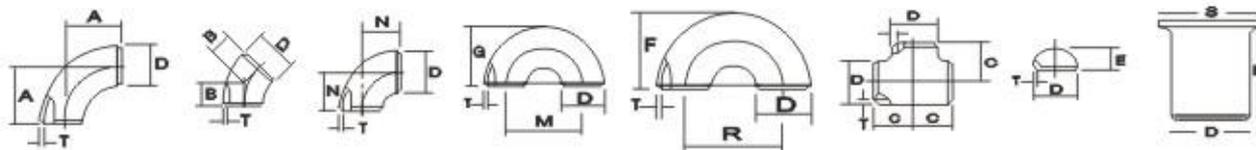
MATERIAL SPECIFICATION FOR SEAMLESS/WELDED BUTT-WELDING PIPE-FITTINGS.

SPECIFICATION (ASTM-2002)	CHEMICAL PROPERTIES					MECHANICAL PROPERTIES					OTHERS	
	C%	Min%	P% (Max)	S% (Max)	Si%	Cr%	Mo%	Ni%	U.T.S. (Min) Mpa	Y.S. (Min) Mpa		ELONG. (Min) L
<b>STAINLESS STEEL</b>												
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
A 403 Gr. WP 309	0.20 Max	2.00 Max	0.045	0.030	1.00 Max	24.0-24.0	-	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
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
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
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
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
<b>CARBON STEEL</b>												
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
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
<b>LOW TEMPERATURE CARBON STEEL</b>												
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
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
<b>ALLOY STEEL</b>												
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
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
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
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
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
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
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
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
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
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
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



**BUTTWELD FITTINGS**

**DIMENSIONS OF BUTTWELD FITTINGS**  
ANSI B 16.9/B 16.28/MSS SP - 43



90° Elbow  
Long Radius

45° Elbow

90° Elbow  
Short Radius

180° Return  
Short Radius

180° Return  
Long Radius

Tee Equal Tee

Caps

Stub-End

Nominal Pipe Size		Outside Diameter D	Center to Face				Back to Face			Center to Center			Length 'L' MSS SP 43 B16.9	
INCH	MM		A R=1.5D	B	C	N R=1D	E	F	G	R	M	S	Short L	Long L
1/2	15	21.3	38.00	16.0	25.0	-	25.0	48.0	-	76.0		35.0	50.8	76.2
3/4	20	26.7	29.00	11.0	29.0	-	25.0	43.0	-	57.0		43.0	50.8	76.2
1	25	33.4	38.00	22.0	38.0	25.0	38.0	56.0	41.0	76.0	51.0	51.0	50.8	101.6
1.1/4	32	42.2	48.00	25.0	48.0	32.0	38.0	70.0	52.0	95.0	64.0	64.0	50.8	101.6
1.1/2	40	48.3	57.15	29.0	57.0	38.0	38.0	83.0	62.0	114.0	76.0	73.0	50.8	101.6
2	50	60.3	76.00	35.0	64.0	51.0	38.0	106.0	81.0	152.0	102.0	93.0	63.5	152.4
2.1/2	65	73.0	95.25	44.0	76.0	64.0	38.0	132.0	100.0	191.0	127.0	105.0	63.5	152.4
3	80	88.9	114.30	51.0	86.0	76.0	51.0	159.0	121.0	229.0	152.0	127.0	63.5	152.4
3.1/2	90	101.6	133.35	57.0	95.0	89.0	64.0	184.0	140.0	267.0	178.0	140.0	76.2	152.4
4	100	114.3	152.0	64.0	105.0	102.0	64.0	210.0	159.0	305.0	203.0	157.0	76.2	152.4
5	125	141.3	190.0	79.0	123.0	127.0	76.0	262.0	197.0	381.0	254.0	186.0	76.2	203.2
6	150	168.3	229.0	95.0	143.0	152.0	102.0	313.0	237.0	457.0	305.0	218.0	88.9	203.2
8	200	219.1	305.0	127.0	178.0	203.0	89.0	414.0	313.0	610.0	406.0	270.0	101.6	203.2
10	250	273.1	381.0	159.0	216.0	254.0	102.0	515.0	391.0	762.0	508.0	324.0	127.0	254.0
12	300	323.8	457.0	190.0	254.0	305.0	127.0	619.0	467.0	914.0	610.0	381.0	152.4	254.0
14	350	355.6	533.0	222.0	279.0	356.0	152.0	711.0	533.0	1067.0	711.0	413.0	152.4	305.0
16	400	406.4	610.0	254.0	305.0	406.0	165.0	813.0	610.0	1219.0	813.0	470.0	152.4	305.0
18	450	457.2	686.0	286.0	343.0	457.0	178.0	914.0	686.0	1372.0	914.0	533.0	152.4	305.0
20	500	508.0	762.0	318.0	381.0	508.0	203.0	1016.0	762.0	1524.0	1016.0	584.0	152.4	305.0
22	550	559.0	838.0	343.0	419.0	559.0	229.0	1118.0	838.0	1676.0	1118.0	614.4	152.4	305.0
24	600	610.0	914.0	381.0	432.0	610.0	254.0	1219.0	914.0	1829.0	1219.0	692.0	152.4	305.0
26	650	660.0	991.0	405.0	495.0	660.0	267.0							
28	700	711.0	1067.0	438.0	521.0	771.0	267.0							
30	750	762.0	1143.0	470.0	559.0	762.0	267.0							
32	800	813.0	1219.0	502.0	597.0	813.0	267.0							
34	850	864.0	1295.0	533.0	635.0	864.0	267.0							
36	900	914.4	1372.0	565.0	673.0	914.0	267.0							

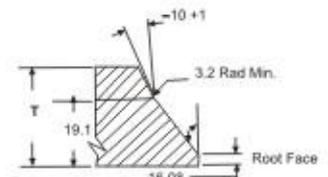
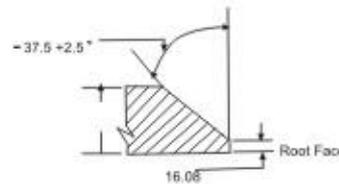
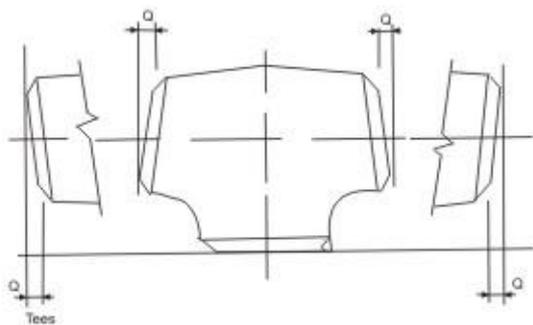
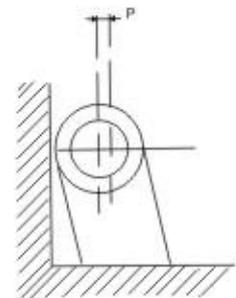
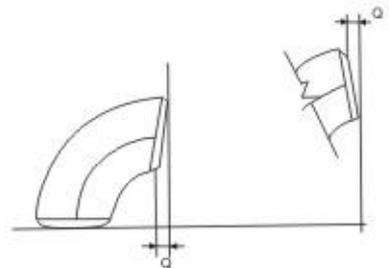
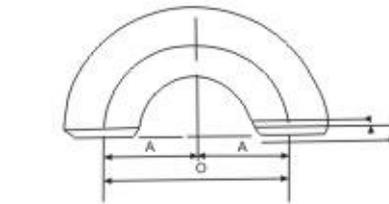
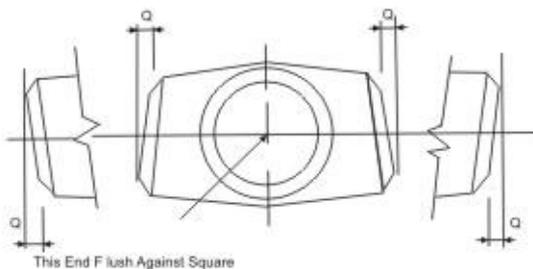


All Dimensions in Millimeters



DIMENSIONAL TOLERANCE 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	Alignment of End Dimensions	Overall Length	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 SP75	B16.9			
½" - 2½" 15 - 65	+1.6 -0.8		±0.8		FROM ½" TO 18 15 TO 600	FROM ¾"	FROM 10" - 24" 15 - 600	FROM 1½" - 8" 15 - 200							±3	±3.17	½" - 4" 15 - 100	±1		±2
3" - 3½" 80 - 90	+1.6	±0.80	±1.6		±2	±1.60	±2	±1.60	±6	±6.35	±6.0	±6.4	±1	±0.8			5" - 8" 125 - 200	±2	16" - 24" 400 - 600 1.6	±4
4" 100																	±3	±5		
5" - 6" 125 - 150	+2.4	+1.60	±3.2	Not Less Than 87.5% Nominal Thk	±2.40		10" - 24" 250 - 600	±2.38	±10	±10			±2.0'	±1.60			14" - 16" 350 - 400	±3		±7
8" 200	-1.6	-0.80															18" - 24" 450 - 600	±4		±10
10" - 18" 250 - 450	+4 -3.2	+2.38 -0.80															26" - 30" 650 - 750	±5	26" - 36" 650 - 900 2.4	±10
20" - 24" 500 - 600	+6.4 -4.8	3.17 0.79															32" - 42" 800 - 1050	±5		±13
26" - 30" 650 - 750	+6.4 -4.8	±4.8	±4.8		±3		FROM 26" - 48" 650NB - 1200 NB								±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





## FORGED / SOCKETWELD FITTINGS

### Types

Tee  
Elbow  
Union  
Coupling/Bushing  
Plug  
Nipples  
Welding Boss  
Street Elbow  
Hexagon Nut  
Bend  
Adaptor  
Insert  
Weldolet  
Sockolet  
Threadolet  
Nipolet

**High Nickel Alloy** : Monel, Nickel, Inconel, Hastelloy, Copper, Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead, etc.

**Stainless Steel** : ASTM A182 F304/ 304L/ 304H/ 316/ 316L/ 317/ 317L/ 321/310/ 347/ 904L etc.

**Carbon Steel** : ASTM A105 / A694/F42/46/52/56/60/65 70/A350 LF3 / A350 LF2

**Alloy Steel** : ASTM A182 F1/ F5/ F9/ F11/ F22/F91 etc.

**Size** : 1/4" NB TO 4" NB. (Socketweld & Threaded)

**Class** : 3000#, 6000#, 9000#.

**Pressure** : 1000# , 2000# , 3000# , 6000# , 9000#



FORGED FITTINGS & FLANGES ASTM

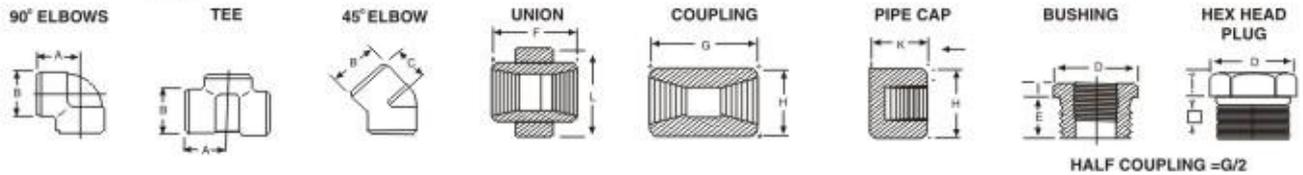
MATERIAL SPECIFICATION FOR FORGED FITTINGS & FLANGES

SPECIFICATION (ASTM-2002)	CHEMICAL PROPERTIES						MECHANICAL PROPERTIES						OTHERS	
	C%	Min%	P% (Max)	S% (Max)	Cr%	Ni%	Mo%	U.T.S. (Min) Mpa	Y.S. (Min) Mpa	ELONG. (Min) %	RED. AREA %	Hardness (Max) BHN		
<b>STAINLESS STEEL</b>														
A 182 Gr. F 304	0.080 Max	2.00 Max	0.045	0.030	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	17.0-20.0	9.0-13.0	-	515	205	30	50	Cb%=(8xC)-1.10		
<b>CARBON STEEL</b>														
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 %= 0.06 Max
<b>LOW TEMPERATURE CARBON STEEL</b>														
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	Cs%=0.01Max, Cr%=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	Cs%=0.01Max, Cr%=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	Cs%=0.40Max, Cr%=0.02 Max, Va %= 0.05 Max, Impact Test =-101°C, J=20 Min
<b>ALLOY STEEL</b>														
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	0.30-0.80	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), Ni%=0.03-0.07, Va %= 0.18-0.25



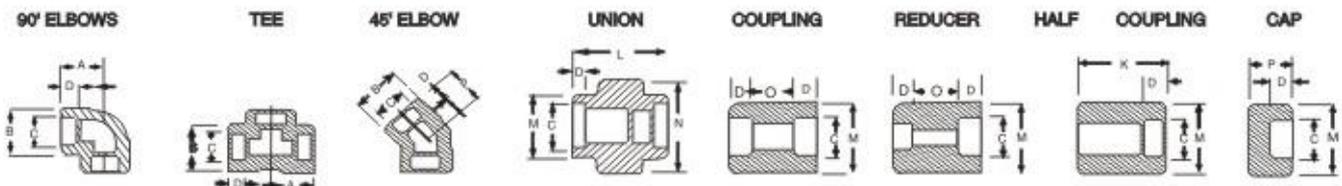
**FORGED FITTINGS**

**DIMENSION OF FORGED/SCREWED & SOCKETWELD FITTINGS**



**Dimension in MM of Forged Screwed Fittings to ANSI B-16.11 Threaded to ASA B 2.1**

NOM BORE	PIPE O.D.	3000 L.B.S.						COMMON FACTORS						6000 L.B.S					
		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
1 1/4"	42.2	51	62	35	67	57	44	44.5	21	70	7	14	72	60	75	43	67	64	46
1 1/2"	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
2 1/2"	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



**Socket Weld Fitting to ANSI B-16.11**

NOM BORE	PIPE O.D.	3000 L.B.S.						COMMON FACTORS						6000 L.B.S					
		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
1 1/4"	42.2	42	56	40	29	70	55	70	30	13	42.6	13	9	17	47	59	58	41	100
1 1/2"	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	
2 1/2"	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	

DIMENSIONS AND OTHERS SPECIFICATIONS AS PER CUSTOMERS REQUIREMENTS ARE AVAILABLE ON REQUEST

## DIMENSIONAL TOLERANCE FOR FORGED STEEL / SCREWED & SOCKETWELD FITTINGS AS PER ANSI 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	
For Sizes 10 NPS, 15 NPS and 20 NPS	± 1.5
For Sizes 25 NPS, 40 NPS and 50 NPS	± 3
For Sizes 65 and larger	± 4
	± 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 through 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

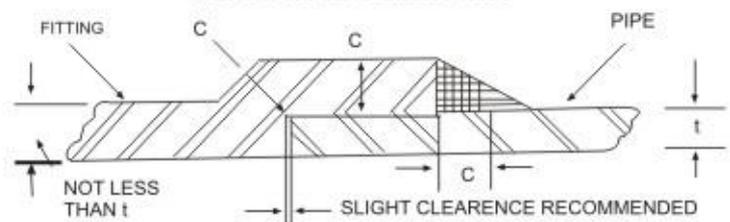
### CONCENTRICITY OF BORES

The socket and fitting bores shall be concentric 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



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**MANIFOLD VALVES**

**INSTRUMENTATION ACCESSORIES**

**FASTENERS**





We are engaged in stocking & supplying of Tube fittings & instrumentation valves & fittings as per International & National standard & customer specifications

Our team of experts and process system makes sure that the right product is supplied to customer on time with proper documentation and traceability

<b>Stainless Steel</b>	: A 182 304, 304L, 304H, 316, 316L, 316H, 316 Ti, 321, 347, 347H, 904L
<b>Duplex</b>	: A182 F51, F60, UNS s31803, UNS S2205
<b>Super Duplex</b>	: A 182 F44, F53, F55, SMO 254 UNS S31254, UNS S32750, UNS 32760
<b>Hastelloy Alloy</b>	: ASTM B564 Hastelloy B2, C276, C22
<b>Incoloy Alloys</b>	: ASTM B564 Alloy 20, Alloy A286 Alloy 800H/800HT, Alloy 825,
<b>Inconel Alloys</b>	: ASTM B564 Alloy 600, Alloy 601, Alloy 625, Alloy 718, Alloy 725,
<b>Monel Alloys</b>	: ASTM B564 Monel 400, Monel K500.
<b>Non-Ferrous</b>	: copper, Brass
<b>Size</b>	: 1/16" TO 2" & above 6mm OD to 50mmOD & above
<b>TYPE</b>	
<b>Tube Fittings</b>	: Port connectors tube to flare 37 degree, Tube to female pipe thread
<b>Weld fitting</b>	: Female elbow, male connector male elbow, pipe union, tube union, reducing adaptor, union cross, union elbow, union tee
<b>Instrumentation Valve</b>	: Ball valve, Check valve, Double block n bleed valve, Gauge valve, Manifold valve, Needle valve, Plug valve, Pressure relief valve.
<b>Instrumentation Accessories</b>	: Condensate pot, Syphon, Gauge snubber Air header

## Instrumentation Fittings





We hold expertise in offering fasteners such as nuts, bolts, washers, anchor, stud bolts, threaded rod to our clients. These are manufactured utilizing high grade materials such as Stainless Steel, Carbon Steel, Duplex Steel, Monel, Inconel, Hastelloy, Titanium and Nickel Alloy, which assure their high tensile strength and corrosion resistance. Our range finds applications in numerous industries and is offered in sizes ranging from M4 to M100, length up to 5 meters or as per the client's requirement.

### Salient Features

- Severe vibration under impulse pressure
- Static Pressure
- High Tolerance
- Dimension Preciseness
- Corrosion resistance
- Perfect installation & application
- Long service life
- Sturdy construction
- Fast performance

**Duplex & Super Duplex** : UNS S31803, UNS S32750, UNS S32760, UNS S32550.

**Hastelloy Alloy** : Hastelloy C4, Hastelloy B2, Hastelloy G30, Hastelloy B3, Hastelloy C276, Hastelloy X, Hastelloy C22

**Incoloy Alloys** : Incoloy Alloy 20, Incoloy Alloy 800, Incoloy Alloy 800H/800HT, Incoloy Alloy 825, Incoloy Alloy 925, Incoloy Alloy A286

**Inconel Alloys** : Inconel Alloy 600, Inconel Alloy 601, Inconel Alloy 625, Inconel Alloy 718 Inconel Alloy 725, Inconel Alloy X750

**Monel Alloys** : Monel 400, Monel R405, Monel K500.

**Stainless Steels** : 347, 310, 303, 304/304H, 316/316L, 317/317L, 17/4PH, 410, 431, Nitronic 50, Nitronic 60, Nimonic 80A

### TYPES

- ANCHOR FASTENERS
- STUD BOLTS
- HEX HEAD BOLTS
- THREADED RODS
- SOCKET CAPS SCREW
- COUNTERSUNK BOLTS
- HEX NUTS
- FLAT / SPRING / LOCK WASHERS
- EYE BOLTS
- FOUNDATION BOLTS

## Fasteners





## HIGH PERFORMANCE NICKEL ALLOYS



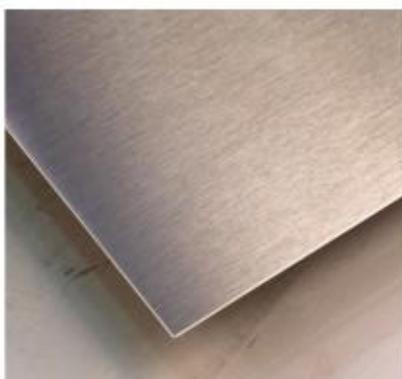
**Flanges**



**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
- SMO-254
- Alloy-904L
- Alloy-20
- Titanium - 1,2, 5, 7, 5ELT



## HIGH PERFORMANCE NICKEL ALLOYS

### **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 600o 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.

Available forms are seamless pipe, welded pipe, tube, welded tube, bar, wire, sheet, plate, forgings, pipe fittings and flanges.

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### **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 oF. The alloy has great mechanical properties at subzero temperatures.

Available forms are seamless pipe, welded pipe, seamless tube, welded tube, bar, wire, sheet, plate, forgings, pipe fittings and flanges.

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### **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.

Available forms are seamless pipe, welded pipe, seamless tube, welded tube, bar, wire, sheet, plate, forgings, pipe fittings and flanges.

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### **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.

Available forms are seamless pipe, welded pipe, seamless tube, welded tube, bar, wire, sheet, plate, forgings, pipe fittings and flanges.

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### **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.

Available forms are seamless pipe, welded pipe, seamless tube, welded tube, bar, wire, sheet, plate, forgings, pipe fittings and flanges.



## HIGH PERFORMANCE NICKEL ALLOYS

### **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 2150o F. The material has good weldability by all conventional processes.

Available forms are seamless pipe, welded pipe, seamless tube, welded tube, bar, wire, sheet, plate, forgings, pipe fittings and flanges.

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### **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. Inconel 22® 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.

Available forms are seamless pipe, welded pipe, seamless tube, welded tube, bar, wire, sheet, plate, forgings, pipe fittings and flanges.

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### **Alloy C276 – UNS N10276**

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

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

Available forms are seamless pipe, welded pipe, seamless tube, welded tube, bar, wire, sheet, plate, forgings, pipe fittings and flanges.

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### **CP Titanium Grade 2**

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

Available forms are seamless pipe, welded pipe, seamless tube, welded tube, bar, wire, sheet, plate, forgings, pipe fittings and flanges.



## Chemical Composition of Nickel Alloys

Material	UNS no	Werkst. Nr.	Ni Min	Co max	Cr	Mo	W	Fe max	Si max	Mn max	C max	Cu max	Al max	Ti max	S max	P max	Density	Bar/ Billet	Forging	Flanges	Tube	Pipe	Plate	
																					SMLS/WLD			
Alloy 200	N02200	2.4066	99.0	---	---	---	---	0.4	0.35	0.35	0.15	0.25	---	---	0.01	---	8.89	B160	B564	B564	B163/ B730	B161/ B725	B162	B366
Alloy 201	N02201	2.4068	99.0	---	---	---	---	0.4	0.35	0.35	0.02	0.25	---	---	0.01	---	8.89	B160	---	---	B163/ B730	B161/ B725	B162	B366
Alloy 400	N04400	2.4360	63.0	---	---	---	---	2.5	0.5	2.0	0.30	28-34	---	---	0.024	---	8.83	B164	B564	B564	B163/ B730	B165/ B725	B127	B366
Alloy K500	N05500	2.4375	63.0	---	---	---	---	2.0	0.5	1.5	0.25	27-33	2.3- 3.2	0.4- 0.9	0.01	---	8.46	B865	B865	B865	---	---	---	---
Alloy 600	N06600	2.4816	72.0	---	14-17	---	---	6-10	0.5	1.0	0.15	0.5	---	---	0.015	---	8.42	B166	B564	B564	B163/ B516	B167/ B517	B168	B366
Alloy 601	N06601	2.4851	58.63	---	21-25	---	---	Rest	0.5	1.0	0.10	1.0	1-1.7	---	0.015	---	8.20	B166	---	---	B167	B167	B168	B366
Alloy 625	N06625	2.4856	58.0	1.0	20-23	8-10	---	5.0	0.5	0.5	0.10	---	0.4	0.4	0.015	0.015	8.44	B446	B564	B564	B444/ B704	B444/ B705	B443	B366
Alloy 800	N08800	1.4876	30-35	---	19- 23.5	---	---	Rest	1.0	1.5	0.10	0.75	0.15- 0.6	0.15- 0.6	0.015	---	8.00	B408	B564	B564	B163/ B515	B407/ B514	B409	B366
Alloy 800H	N08810	1.4876	30-35	---	19- 23.5	---	---	Rest	1.0	1.5	0.05- 0.1	0.75	0.15- 0.6	0.15- 0.6	0.015	---	8.00	B408	B564	B564	B163/ B515	B407/ B514	B409	B366
Alloy 800HT	N08811	1.4876	30-35	---	19- 23	---	---	Rest	1.0	1.5	0.06- 0.1	0.75	0.15- 0.6	0.15- 0.6	0.015	---	8.00	B408	B564	B564	B163/ B515	B407/ B514	B409	B366
Alloy 825	N08825	2.4858	38-46	---	19- 23.5	2.5- 3.5	---	Rest	0.5	1.0	0.05	1.5-3	0.2	0.5- 1.2	0.03	---	8.18	B425	B564	B564	B163/ B704	B423/ B705	B424	B366
Alloy C276	N10276	2.4819	Rest	2.5	14- 16.5	15- 17	3- 4.5	4-7	0.08	1.0	0.01	---	---	---	0.03	0.04	8.87	B574	B564	B564	B622/ B619	B622/ B619	B575	B366
Alloy C22 <sup>2</sup>	N06022	2.4602	Rest	2.5	20- 22.5	12.5- 14.5	2.5- 3.5	2-6	0.08	0.5	0.01	---	---	---	0.2	0.2	8.69	B574	B564	B564	B622/ B619	B622/ B619	B575	B366
Alloy B-2	N10665	2.4617	Rest	1.0	1.0	26.30	---	2.0	0.10	1.0	0.02	---	---	---	0.03	0.04	9.22	B335	B564	B564	B622/ B619	B622/ B619	B575	B366
Alloy 20	N08020	2.4660	32-38	---	19-21	2-3	---	Rest	1.0	2.0	0.07	3-4	---	---	0.035	0.045	8.10	B473	B462	B462	B729/ B468	B729/ B464	B463	B366

\* <sup>1</sup>Nb/Ta 3.15-4.15 \*<sup>2</sup>V 0.35max

## CHEMICAL COMPOSITION OF SPECIAL STAINLESS STEEL

Material	UNS no	Werkst. Nr.	Ni Min	Co max	Cr	Mo	W	Si max	Mn max	C max	Cu max	S max	P max	Density	Bar/ Billet	Forging	Flanges	Tube	Pipe	Plate	Fitting
310S	S31008	1.4845	19-22	---	24-26	---	---	1.50	2.00	0.08	---	0.030	0.045	7.90	A479	A182	A182	A213/ A249	A312	A240	A403
904L	N08904	1.4539	23-28	---	19-23	4-5	---	1.00	2.00	0.02	1-2	0.035	0.045	8.05	B649	B459	---	B677/ B674	B677/ B673	B625	B366
2205 <sup>1</sup>	S31803	1.4462	4.5-6.5	---	21-23	2.5-3	---	1.00	2.00	0.03	---	0.020	0.030	8.00	A479	A473	A182	A789	A790	A240	A815
2507 <sup>2</sup>	S32750	1.4410	6-8	---	24-26	3-5	---	0.80	1.20	0.03	0.50	0.020	0.035	8.00	A479	A473	A182	A789	A790	A240	A815
S. Duplex <sup>3</sup>	S32760	1.4501	6-8	---	24-26	3-4	0.5-1	1.00	1.00	0.03	0.5-1	0.010	0.030	8.00	A479	A473	A182	A789	A790	A240	A815

<sup>1</sup>N 0.08-0.20 <sup>2</sup>N 0.24-0.32 <sup>3</sup>N 0.20-0.30

**List of third party inspection agencies with whom we can supply the materials****FORMULAE OF CALCULATING WEIGHT**

- 1) Weight of Stainless Steel Pipe  
 $O.D. (mm) - W. Thick (mm) \times W. Thick (mm) \times 0.0248 = Wt. Per Mtr$   
 $O.D. (mm) - W. Thick (mm) \times W. Thick (mm) \times 0.00756 = Wt. Per Feet$
- 2) Weight of Stainless Steel Round Bar  
 $Dia (mm) \times Dia (mm) \times 0.00623 = Wt. per Mtr.$   
 $Dia (mm) \times Dia (mm) \times 0.0019 = Wt. per Feet$
- 3) Weight of Stainless Steel Square Bar  
 $Dia (mm) \times Dia (mm) \times 0.00788 = Wt. per Mtr.$   
 $Dia (mm) \times Dia (mm) \times 0.0024 = Wt. per Feet$
- 4) Weight of Stainless Steel Hexagonal Bar  
 $Dia (mm) \times Dia (mm) \times 0.00680 = Wt. per Mtr.$   
 $Dia (mm) \times Dia (mm) \times 0.002072 = Wt. per Feet$
- 5) Weight of Stainless Steel Flat Bar  
 $Width (mm) \times Thickness (mm) \times 0.00798 = Weight per Mtr.$   
 $Width (mm) \times Thickness (mm) \times 0.00243 = Weight per Feet$
- 6) Weight of Stainless Steel Sheets & Plates  
 $Length (Mtrs) \times Width (Mtrs) \times Thick (mm) \times 8 = Weight per PC$   
 $Length (Feet) \times Width (Feet) \times Thick (mm) \times 3/4 = Weight per PC$
- 7) Weight of Stainless Steel Circle  
 $Dia (mm) \times Dia (mm) \times Thck (mm) / 160 = Gms. per PC$   
 $Dia (mm) \times Dia (mm) \times Thck (mm) \times 0.0000063 = Kg. per PC$
- 8) Weight of Brass Pipes / Copper Pipes  
 $O.D. (mm) - W. Thick (mm) \times W. Thick (mm) \times 0.0260 = Wt. Per Mtr.$
- 9) Weight Lead Pipe  
 $O.D (mm) - W. Thick (mm) \times W. Thick (mm) \times 0.0345 = Wt. Per Mtr$
- 10) Weight of Aluminium Pipe  
 $O.D. (mm) - W. Thick (mm) \times W. Thick (mm) \times 0.0083 = Wt. per Mtr.$
- 11) Weight of Aluminium Sheet  
 $Length (Mtrs) \times Width(Mtrs) \times Thick (mm) \times 2.69 = Weight per PC$
- 12) Weight Conversion of Mtr. to Ft.  
 $Length (Mtrs) \times Width (Mtrs) \times Thick (mm) \times 2.69 = Weight per PC$
- 13) Wt. of 1 Mtr / 3.2808 = Wt per Ft.  
 Barlow's Formula for calculating bursting pressure  
 $P = 2ST/D$  or  $t-DP/2S$  or  $S-DP/2T$  or  $D=2ST/P$   
 $P =$  Bursting Pe'vressure P Si.,  
 $S =$  Tensile Strength of tubes,  $T =$  Wall Thickness (in inches)  
 $D =$  Outside Diameter (in inches)
- 14) Formula for Healthy Business  
 Honesty + Quality of Goods + Quick Service = Good Healthy Business



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**DEFENSE**



**CEMENT PLANT**



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Tubes

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Flanges

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**Mumbai Branch off. :**

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