



ROYAL GROUP

**ROYAL FORGE
AND FITTINGS INDUSTRIES**

AN ISO 9001:2015 CERTIFIED COMPANY

Royal Solutions for Industrial Strength



Manufacturer, Importer, Exporters & Suppliers of :
Stainless Steel, Carbon Steel, Flanges & Pipe Fittings, etc.
Stockist & Suppliers of: Ferrous & Non Ferrous Metals,
All Types of Industrial Raw Material Etc.



+91 98195 88125



royalfittingsindustries@gmail.com



www.royalfittings.co.in

Royal Solutions for Industrial Strength



At **Royal Forge & Fittings Industries**, we are a leading name in the manufacturing, import, export, and supply of high-quality industrial raw materials. Specializing in Stainless Steel, Carbon Steel, Flanges, and Pipe Fittings, we proudly serve as a one-stop solution for industries worldwide.

Our mission is to deliver durability, efficiency, and reliability through an extensive product line that meets the diverse and demanding needs of our clients. With a commitment to excellence, we combine innovative technology and stringent quality control to exceed expectations in every project.

Our Expertise

With a robust presence in the industry, we cater to diverse sectors by providing a comprehensive range of:

- Stainless Steel and Carbon Steel Products
- Flanges and Pipe Fittings
- Industrial Raw Materials

Our expertise lies in delivering solutions that are customized to client requirements and aligned with international quality standards. As trusted stockists and suppliers, we ensure a seamless supply chain of ferrous and non-ferrous metals, guaranteeing timely delivery and customer satisfaction.



Our expertise lies in delivering solutions that are customized to client requirements and aligned with international quality standards. As trusted stockists and suppliers, we ensure a seamless supply chain of ferrous and non-ferrous metals, guaranteeing timely delivery and customer satisfaction.

Our Mission and Vision

At Royal Forge & Fittings Industries, our mission is to deliver unparalleled industrial solutions that empower businesses globally. We envision becoming a global leader in the supply and manufacturing of industrial raw materials, driven by innovation, quality, and customer satisfaction.



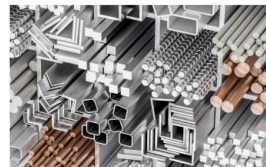
Our Founder

The success story of Royal Forge & Fittings Industries is rooted in the vision and dedication of our founder, Bhupendra Choudhary. With decades of experience in the industrial sector, he possesses a profound understanding of market dynamics and customer needs. His unwavering commitment to integrity, quality, and innovation has been instrumental in shaping the company into a trusted global partner.

Why Choose Us?



Quality Assurance:
Stringent quality checks at every stage of production.



Wide Range of Products:
From stainless steel to ferrous and non-ferrous metals.



Global Reach:
Serving clients worldwide with unmatched efficiency.



Expert Team:
Highly skilled professionals dedicated to excellence.

Contact Us

For inquiries and orders, reach out to us:

Mobile: +91 98195 88125 / 99201 99939

Office: +91 91679 53341

Email: royalfittingsindustries@gmail.com
sales@royalfittings.co.in

Web: www.royalfittings.co.in

Our Locations

Factory Address: RS No.103, Plot No.10, Ramdev Industrial, Kashipura Road, Por GIDC Ramangamdi, Vadodara - 391243

Corporate Office: Plot No. 497/9, GIDC, Makarpura, Vadodara - 390010, Gujarat (INDIA)



OUR CERTIFICATE



Certificate of Compliance

Application for
Pressure Equipment Directive (PED) 2014/68/EU.

This is to certify that the product(s):

**MANUFACTURER, IMPORTER, EXPORTERS & SUPPLIERS OF
STAINLESS STEEL, CARBON STEEL, FLANGES &
PIPE FITTINGS, STOCKIST & SUPPLIERS OFFERROUS &
NON FERROUS METALS & INDUSTRIAL RAW MATERIAL.**

Manufactured by

ROYAL FORGE & FITTINGS INDUSTRIES

**RS NO 103, 97/PAIKI 1, 2, PLOT NO. - 10, RAMAN GAMDI,
POR GIDC, VADODARA - 391243, GUJARAT, INDIA.**

has been assessed & found in accordance with the requirements of
Pressure Equipment Directive (PED) 2014/68/EU.
QCC is non-notified certification body, issue this
'compliance certificate' after audit of manufacturer product(s) & technical file(s).
This certificate applies to the tested sample only not for whole production.
It's manufacturer sole responsibility to meet all the necessary conformity
assessment activities according to **PED 2014/68/EU** and related standards
before placing them on the market & CE mark on the product(s).

Certificate No. : CE/E96S/0125

Original Certificate Date : 04-January-2025

Issue Date : 04-January-2025

Expiry Date : 03-January-2028

To check this certificate status visit:
"<http://uasl.uk.com/certifiedorganization>"

Authorized Signature

For Quality Control Certification
UK Office: 82, Adley Street,
London - E5 0DZ, United Kingdom



Quality Control Certification accredited by UASL, UK.
This certificate doesn't provide the certified organisation with immunity from its legal obligations.
This certificate remains the property of QCC Certification to whom it must be returned on request.



Certificate

This is to Certify that
**ROYAL FORGE & FITTINGS
INDUSTRIES**

**RS NO 103, 97/PAIKI 1, 2, PLOT NO. - 10, RAMAN GAMDI,
POR GIDC, VADODARA - 391243, GUJARAT, INDIA.**

has been found in Compliance with requirements of
Quality Management System

ISO 9001:2015

for the following scope:

**MANUFACTURER, IMPORTER, EXPORTERS & SUPPLIERS OF
STAINLESS STEEL, CARBON STEEL, FLANGES &
PIPE FITTINGS, STOCKIST & SUPPLIERS OFFERROUS &
NON FERROUS METALS & INDUSTRIAL RAW MATERIAL.**

Certificate No. : QMS/A4E8/0125

Original Certificate Date : 04-January-2025

Issue Date : 04-January-2025

Expiry Date : 03-January-2028

To check this certificate status visit:
"<http://uasl.uk.com/certifiedorganization>"

Quality Control Certification

UK Office: 82, ADLEY STREET,
LONDON - E5 0DZ, United Kingdom
India Office: 2nd Floor, Aman Market,
Narela Mandi, Delhi - 110 040, India



"Quality Control Certification (QCC)" accredited by "UASL, England, UK". This certificate remains the property of "QCC" to whom it must be returned on request.



Certificate

This is to Certify that
**ROYAL FORGE & FITTINGS
INDUSTRIES**

**RS NO 103, 97/PAIKI 1, 2, PLOT NO. - 10, RAMAN GAMDI,
POR GIDC, VADODARA - 391243, GUJARAT, INDIA.**

has been found in Compliance with requirements of
Environmental Management System

ISO 14001:2015

for the following scope:

**MANUFACTURER, IMPORTER, EXPORTERS & SUPPLIERS OF
STAINLESS STEEL, CARBON STEEL, FLANGES &
PIPE FITTINGS, STOCKIST & SUPPLIERS OFFERROUS &
NON FERROUS METALS & INDUSTRIAL RAW MATERIAL.**

Certificate No. : EMS/A50B/0125

Original Certificate Date : 04-January-2025

Issue Date : 04-January-2025

Expiry Date : 03-January-2028

To check this certificate status visit:
"<http://uasl.uk.com/certifiedorganization>"

Quality Control Certification

UK Office: 82, ADLEY STREET,
LONDON - E5 0DZ, United Kingdom
India Office: 2nd Floor, Aman Market,
Narela Mandi, Delhi - 110 040, India



"Quality Control Certification (QCC)" accredited by "UASL, England, UK". This certificate remains the property of "QCC" to whom it must be returned on request.



Certificate

This is to Certify that
**ROYAL FORGE & FITTINGS
INDUSTRIES**

**RS NO 103, 97/PAIKI 1, 2, PLOT NO. - 10, RAMAN GAMDI,
POR GIDC, VADODARA - 391243, GUJARAT, INDIA.**

has been found in Compliance with requirements of
Occupational Health and Safety Management Systems

ISO 45001:2018

for the following scope:

**MANUFACTURER, IMPORTER, EXPORTERS & SUPPLIERS OF
STAINLESS STEEL, CARBON STEEL, FLANGES &
PIPE FITTINGS, STOCKIST & SUPPLIERS OFFERROUS &
NON FERROUS METALS & INDUSTRIAL RAW MATERIAL.**

Certificate No. : OHSMS/E942/0125

Original Certificate Date : 04-January-2025

Issue Date : 04-January-2025

Expiry Date : 03-January-2028

To check this certificate status visit:
"<http://uasl.uk.com/certifiedorganization>"

Quality Control Certification

UK Office: 82, ADLEY STREET,
LONDON - E5 0DZ, United Kingdom
India Office: 2nd Floor, Aman Market,
Narela Mandi, Delhi - 110 040, India



"Quality Control Certification (QCC)" accredited by "UASL, England, UK". This certificate remains the property of "QCC" to whom it must be returned on request.



Dear Valued Customer,

Subject: Vendor Registration Request for Supply of Ferrous and Non-Ferrous Metals

We hope this message finds you in excellent health and high spirits.

It gives us immense pleasure to introduce **Royal Forge & Fittings Industries**, a leading manufacturer, stockist, and supplier of premium ferrous and non-ferrous metals. With years of expertise and a proven track record, we specialize in producing superior-quality stainless steel pipes and fittings, available in an extensive range of grades, shapes, and sizes to cater to the diverse needs of our customers.

At **Royal Forge & Fittings Industries**, our commitment to excellence drives us to serve a broad spectrum of industries, including but not limited to **Food & Beverages, Chemicals, Fertilizers, Petrochemicals, Nuclear and Thermal Power Plants, Cement, Paper, Refineries, and more**. Our mission is to consistently deliver products that meet your exacting requirements, ensuring the success of your manufacturing and operational processes.

We take pride in our ability to provide:

- **High-Quality Products:** Designed and manufactured to meet stringent industry standards.
- **Timely Deliveries:** Ensuring minimal downtime in your operations.
- **Customized Solutions:** Tailored to meet specific application needs.
- **Reliable Support:** Backed by an experienced team and state-of-the-art facilities.

To formalize this association, we would be delighted to initiate and complete any vendor registration formalities required by your organization. We see this process not merely as an administrative step but as the foundation for a long-lasting and meaningful partnership.

Should there be any specific requirements or documents needed to facilitate this registration, please do not hesitate to contact us. We are committed to ensuring a smooth and efficient onboarding process. Our team is ready to provide all necessary details and address any queries you may have.

As a company dedicated to quality, reliability, and customer satisfaction, we look forward to the opportunity to serve you as an approved vendor. It would be an honor to contribute to your organization's growth and success by delivering products and services that meet and exceed your expectations.

Thank you for considering **Royal Forge & Fittings Industries** as a trusted partner. We assure you of our unwavering commitment to excellence and look forward to the prospect of working together.

Best Regards,
For, **Royal Forge & Fittings Industries**



BUTT-WELD FITTINGS



45° Elbow



90° Elbow



180° Elbow



Cross



Long Pattern
Stub Ends



Short Pattern
Stub Ends



Ball Caps



Tee



Reducing Tee



Concentric Reducer



Eccentric Reducer



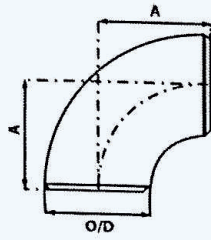
The following table represents the size range, product standards, and material grades of industrial pipe fittings like stainless steel, carbon steel & alloy steel pipe fittings, etc. The range includes.

Material, Size & Specification

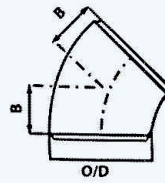
Standards	ASME / ANSI B16.9, ANSI B16.28, MSS-SP-43		
Size	1/8" NB TO 48" NB. (Seamless & 100% X-Ray Welded, Fabricated)		
Thickness	SCH: 5s, 10s, 40s, 80s, 10, 20, 40, STD, 60, 80, XS, 100, 120, 140, 160, XXS, Custom Thickness.		
Dimension	B16.5, BS 4504, EN-1092,		
Specialize	Long Bend with Radius – R = 3D, 5D & 10D Pigable Bend & As per your drawing		
Value Added Service	Polish (Electro & Commercial) Heat Treatment	Annealed & Pickled, Sand Blasting	Machining Etc.

Used to allow the flow of Fluids, like steam, water, air, oil, etc, through the desired cross-section with diversion of flow to the desired point.

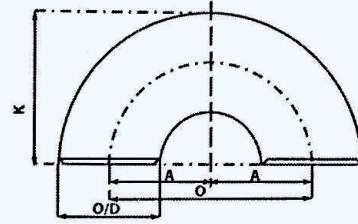
BUTT-WELD FITTINGS (as per B 16.9)



90 Deg. LR Elbow



45 Deg. LR Elbow



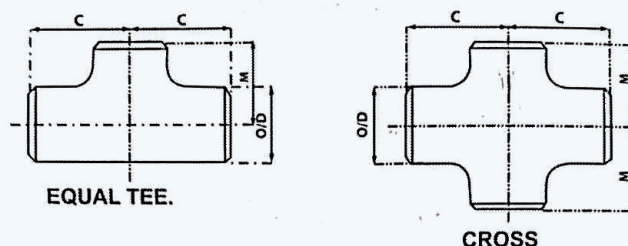
180 Deg. LR Return Bend

Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)	Dimension A	Dimension B	Center to Center O	Back to Face K
1/2"	21.3	38.0	16	76	48
3/4"	26.7	38.0	19	76	51
1"	33.4	38.0	22	76	56
1 1/4"	42.2	48.0	25	95	70
1 1/2"	48.3	57.0	29	114	83
2"	60.3	76.0	35	152	108
2 1/2"	73.0	95.0	44	190	132
3"	88.9	114.0	51	229	159
3 1/2"	101.6	133.0	57	267	184
4"	114.3	152.0	64	305	210
5"	141.3	190.0	79	381	262
6"	168.3	229.0	95	457	313
8"	219.1	305.0	127	610	414
10"	273.0	381.0	159	762	518
12"	323.8	457.0	190	914	619
14"	355.6	533.0	222	1067	711
16"	406.4	610.0	254	1219	813
18"	457.0	686.0	286	1372	914
20"	508.0	762.0	318	1524	1016
22"	559.0	838.0	343	1676	1118
24"	610.0	914.0	381	1829	1219
26"	660.0	991.0	406	—	—
28"	711.0	1067.0	438	—	—
30"	762.0	1143.0	470	—	—
32"	813.0	1219.0	502	—	—
34"	864.0	1295.0	533	—	—
36"	914.0	1372.0	565	—	—

Note: All Dimensions are in MM.



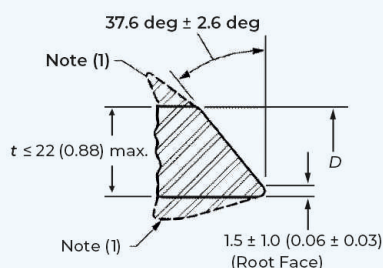
BUTT-WELD FITTINGS (as per B 16.28)



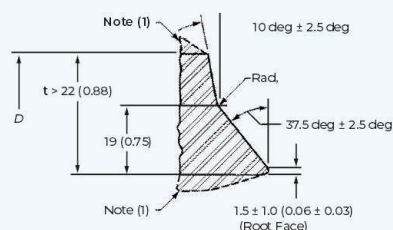
Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)	Run 'C'	Outlet 'M'	Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)	Run 'C'	Outlet 'M'
1/2"	21.3	25	25	12"	323.8	279	254
3/4"	26.7	29	29	14"	355.6	305	279
1"	33.4	38	38	16"	406.4	343	305
1 1/4"	42.2	48	48	18"	457.0	343	343
1 1/2"	48.3	57	57	20"	508.0	381	381
2"	60.3	64	64	22"	559.0	419	419
2 1/2"	73.0	86	76	24"	610.0	432	432
3"	88.9	95	86	26"	660.0	495	495
3 1/2"	101.6	105	95	28"	711.0	521	521
4"	114.3	124	105	30"	762.0	559	559
5"	141.3	143	124	32"	813.0	597	597
6"	168.3	178	143	34"	864.0	635	635
8"	219.1	216	178	36"	914.0	673	673
10"	273.0	254	216				

Note : All Dimensions are in MM.

TABLE 8-1 WELDING BEVELS AND ROOT FACE



(a) Plain Bevel



(b) Compound Bevel

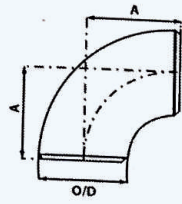
Nominal Wall Thickness, t , mm (in.)	End Preparation
Less than x [Note (2)]	Cut square or slightly chamfer, at manufacturer's option (not illustrated)
x to 22 (0.88), inclusive [Note (2)]	Plain bevel as in Illustration (a) above
More than 22 (0.88)	Compound bevel as in illustration (b) above

GENERAL NOTE: In the illustrations, dimensions in parentheses are in Inches; other dimensions are in millimeters.

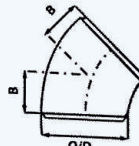
NOTES :

(1) See section 8 and Figure 8-1 for transition contours.

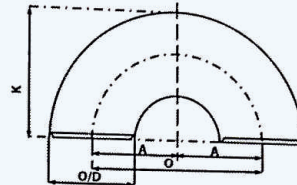
(2) $x = 5$ mm (0.19 in.) for carbon steel or ferritic alloy steel and 3 mm (0.12 in.) for austenitic steel or nonferrous alloys.



90 Deg. SR ELBOW



45 Deg. SR ELBOW



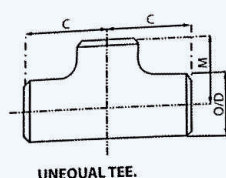
180 Deg. SR RETURN BEND

Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)	Dimension A	Dimension B	Centre to Centre O	Back to Face K
1/2"	21.3	—	—	—	—
3/4"	26.7	—	—	—	—
1"	33.4	25	—	51	41
1 1/4"	42.2	32	—	64	52
1 1/2"	48.3	38	—	76	62
2"	60.3	51	—	102	81
2 1/2"	73.0	64	—	127	100
3"	88.9	76	31.6	162	121
3 1/2"	101.6	89	36.8	178	140
4"	114.3	102	42.1	203	159
5"	141.3	127	52.6	254	197
6"	168.3	152	63.4	305	237
8"	219.1	203	84.2	406	313
10"	273.0	254	105.2	508	391
12"	323.8	305	126.3	610	467
14"	355.6	356	147.3	711	533
16"	406.4	406	168.3	813	610
18"	457.0	457	189.4	914	686
20"	508.0	508	210.4	1016	762
22"	559.0	559	231.5	1118	838
24"	610.0	610	252.5	1219	914

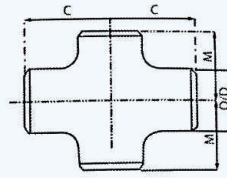
Note: All Dimensions are in MM.



BUTT-WELD FITTINGS



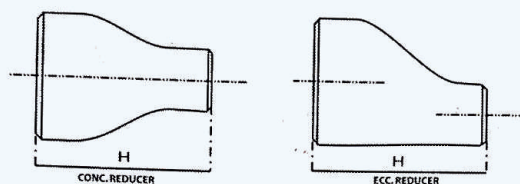
UNEQUAL TEE.



CROSS UNEQUAL

Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)		Outside Diameter at Bevel (O/D)		Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)		Outside Diameter at Bevel (O/D)	
	Run	Outlet	Run 'c'	Outlet 'M'		Run	Outlet	Run 'c'	Outlet 'M'
1/2" x 3/8"	21.3	17.3	25	25	10" x 8"	273.0	219.1	216	203
1/2" x 1/4"	21.3	13.7	25	25	10" x 6"	273.0	168.3	216	194
3/4" x 1/2"	26.7	21.3	29	29	10" x 5"	273.0	141.3	216	191
3/4" x 3/8"	26.7	17.3	29	29	10" x 4"	273.0	114.3	216	184
1"x3/4"	33.4	26.7	38	38	12" x 10"	323.8	273.0	254	241
1" x 1/2"	33.4	21.3	38	38	12" x 8"	323.8	219.1	254	229
1 1/4" x 1"	42.2	33.4	48	48	12" x 6"	323.8	168.3	254	219
1 1/4" x 3/4"	42.2	26.7	48	48	12" x 5"	323.8	141.3	254	216
1 1/4" x 1/2"	42.2	21.3	48	48	14" x 12"	355.6	323.8	279	270
1 1/2" x 1 1/4"	48.3	42.2	57	57	14" x 10"	355.6	273.0	279	257
1 1/2" x 1"	48.3	33.4	57	57	14" x 8"	355.6	219.1	279	248
1 1/2" x 3/4"	48.3	26.7	57	57	14" x 6"	355.6	168.3	279	238
1 1/2" x 1/2"	48.3	21.3	57	57	16" x 14"	406.4	355.6	305	305
2"x1 1/2"	60.3	48.3	64	60	16" x 12"	406.4	323.8	305	295
2" x 1 1/4"	60.3	42.2	64	57	16" x 10"	406.4	273.0	305	283
2" x 1"	60.3	33.4	64	51	16" x 8"	406.4	219.1	305	273
2" x 3/4"	60.3	26.7	64	44	16" x 6"	406.4	168.3	305	264
2 1/2" x 2"	73.0	60.3	76	70	18" x 16"	457.0	406.4	343	330
2 1/2" x 1 1/2"	73.0	48.3	76	67	18" x 14"	457.0	355.6	343	330
2 1/2" x 1 1/4"	73.0	42.2	76	64	18" x 12"	457.0	323.8	343	321
2 1/2" x 1"	73.0	33.4	76	57	18" x 10"	457.0	273.0	343	308
3" x 2 1/2"	88.9	73.0	86	83	18" x 8"	457.0	219.1	343	298
3" x 2"	88.9	60.3	86	76	20" x 18"	508.0	457.0	381	368
3" x 1 1/2"	88.9	48.3	86	73	20" x 16"	508.0	406.4	381	356
3" x 1 1/4"	88.9	42.2	86	70	20" x 14"	508.0	355.6	381	356
3 1/2" x 3"	101.6	88.9	95	92	20" x 12"	508.0	323.8	381	346
3 1/2" x 2 1/2"	101.6	73.0	95	89	20" x 10"	508.0	273.0	381	333
3 1/2" x 2"	101.6	60.3	95	83	20" x 8"	508.0	219.1	381	324
3 1/2" x 1 1/2"	101.6	48.3	95	79	22" x 20"	559.0	508.0	419	406
4 x 3 1/2"	114.3	101.6	105	102	22" x 18"	559.0	457.0	419	394
4" x 3"	114.3	88.9	105	98	22" x 16"	559.0	406.4	419	381
4" x 2 1/2"	114.3	73.0	105	95	22" x 14"	559.0	355.6	419	381
4"x2"	114.3	60.3	105	89	22" x 12"	559.0	323.8	419	371
4" x 1 1/2"	114.3	48.3	105	86	22" x 10"	559.0	273.0	419	359
5" x 4"	141.3	114.3	124	117	24" x 22"	610.0	559.0	432	432
5" x 3 1/2"	141.3	101.6	124	114	24" x 20"	610.0	508.0	432	432
5"x3"	141.3	88.9	124	111	24" x 18"	610.0	457.0	432	419
5"x2 1/2"	141.3	73.0	124	108	24" x 16"	610.0	406.4	432	406
5"x2"	141.3	60.3	124	105	24" x 14"	610.0	355.6	432	406
6"x5"	168.3	141.3	143	137	24" x 12"	610.0	323.8	432	397
6"x4"	168.3	114.3	143	130	24" x 10"	610.0	273.0	432	384
6"x3 1/2"	168.3	101.6	143	127	26" x 24"	660.0	610.0	495	483
6" x 3"	168.3	88.9	143	124	26" x 22"	660.0	559.0	495	470
6" x 2 1/2"	168.3	73.0	143	121	26" x 20"	660.0	508.0	495	457
8" x 6"	219.1	168.3	178	166	26" x 18"	660.0	457.0	495	444
8" x 5"	219.1	141.3	178	162	26" x 16"	660.0	406.4	495	432
8" x 4"	219.1	114.3	178	156	26" x 14"	660.0	355.6	495	432
8" x 3 1/2"	219.1	101.6	178	152	26" x 12"	660.0	323.8	495	422
					28" x 26"	711.0	660.0	521	521
					28" x 24"	711.0	610.0	521	508
					28" x 22"	711.0	559.0	521	495
					28" x 20"	711.0	508.0	521	483

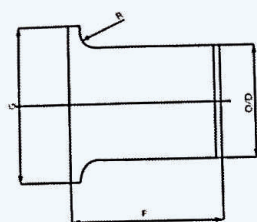
BUTT-WELD FITTINGS (As per B 16.9)



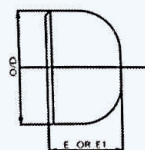
Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)		End to End H	Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)		End to End H
	Run	Outlet			Run	Outlet	
3/4" x 1/2"	26.7	21.3	38	12" x 10"	323.8	273.0	203
3/4" x 3/8"	26.7	17.3	38	12" x 8"	323.8	219.1	203
1" x 3/4"	33.4	26.7	51	12" x 6"	323.8	168.3	203
1" x 1/2"	33.4	21.3	51	12" x 5"	323.8	141.3	203
1 1/4" x 1"	42.2	33.4	51	14" x 12"	355.6	323.8	330
1 1/4" x 3/4"	42.2	26.7	51	14" x 10"	355.6	273.0	330
1 1/4" x 1/2"	42.2	21.3	51	14" x 8"	355.6	219.1	330
1 1/2" x 1 1/4"	48.3	42.2	64	14" x 6"	355.6	168.3	330
1 1/2" x 1"	48.3	33.4	64	16" x 14"	406.4	355.6	356
1 1/2" x 3/4"	48.3	26.7	64	16" x 12"	406.4	323.8	356
1 1/2" x 1/2"	48.3	21.3	64	16" x 10"	406.4	273.0	356
2" x 1 1/2"	60.3	48.3	76	16" x 8"	406.4	219.1	356
2" x 1 1/4"	60.3	42.2	76	18" x 16"	457.0	406.4	381
2" x 1"	60.3	33.4	76	18" x 14"	457.0	356.6	381
2" x 3/4"	60.3	26.7	76	18" x 12"	457.0	323.8	381
2 1/2" x 2"	73.0	60.3	89	18" x 10"	457.0	273.0	381
2 1/2" x 1 1/2"	73.0	48.3	89	20" x 18"	508.0	457.0	508
2 1/2" x 1 1/4"	73.0	42.2	89	20" x 16"	508.0	406.4	508
2 1/2" x 1"	73.0	33.4	89	20" x 14"	508.0	355.6	508
3" x 2 1/2"	88.9	73.0	89	20" x 12"	508.0	323.8	508
3" x 2"	88.9	60.3	89	22" x 20"	559.0	508.0	508
3" x 1 1/2"	88.9	48.3	89	22" x 18"	559.0	457.0	508
3" x 1 1/4"	88.9	42.2	89	22" x 16"	559.0	406.4	508
3 1/2" x 3"	101.6	88.9	102	22" x 14"	559.0	355.6	508
3 1/2" x 2 1/2"	101.6	73.0	102	24" x 22"	610.0	559.0	508
3 1/2" x 2"	101.6	60.3	102	24" x 20"	610.0	508.0	508
3 1/2" x 1 1/2"	101.6	48.3	102	24" x 18"	610.0	457.0	508
4" x 3 1/2"	114.3	101.6	102	24" x 16"	610.0	406.4	508
4" x 3"	114.3	88.9	102	26" x 24"	660.0	610.0	610
4" x 2 1/2"	114.3	73.0	102	26" x 22"	660.0	559.0	610
4" x 2"	114.3	60.3	102	26" x 20"	660.0	508.0	610
4" x 1 1/2"	114.3	48.3	102	26" x 18"	660.0	457.0	610
5" x 4"	141.3	114.3	127	28" x 26"	711.0	660.0	610
5" x 3 1/2"	141.3	101.6	127	28" x 24"	711.0	610.0	610
5" x 3"	141.3	88.9	127	28" x 20"	711.0	508.0	610
5" x 2 1/2"	141.3	73.0	127	28" x 18"	711.0	457.0	610
5" x 2"	141.3	60.3	127	30" x 28"	762.0	711.0	610
6" x 5"	168.3	141.3	140	30" x 26"	762.0	660.0	610
6" x 4"	168.3	114.3	140	30" x 24"	762.0	610.0	610
6" x 3 1/2"	168.3	101.6	140	30" x 20"	762.0	508.0	610
6" x 3"	168.3	88.9	140	32" x 30"	813.0	762.0	610
6" x 2 1/2"	168.3	73.0	140	32" x 28"	813.0	711.0	610
8" x 6"	219.1	168.3	152	32" x 26"	813.0	660.0	610
8" x 5"	219.1	141.3	152	32" x 24"	813.0	610.0	610
8" x 4"	219.1	114.3	152	34" x 32"	864.0	813.0	610
8" x 3 1/2"	219.1	101.6	152	34" x 30"	864.0	762.0	610
10" x 8"	273.0	219.1	178	34" x 26"	864.0	660.0	610
10" x 6"	273.0	168.3	178	34" x 24"	864.0	610.0	610
10" x 5"	273.0	141.3	178				
10" x 4"	273.0	114.3	178				



BUTT-WELD FITTINGS (as per B 16.9)



STUBEND



CAP

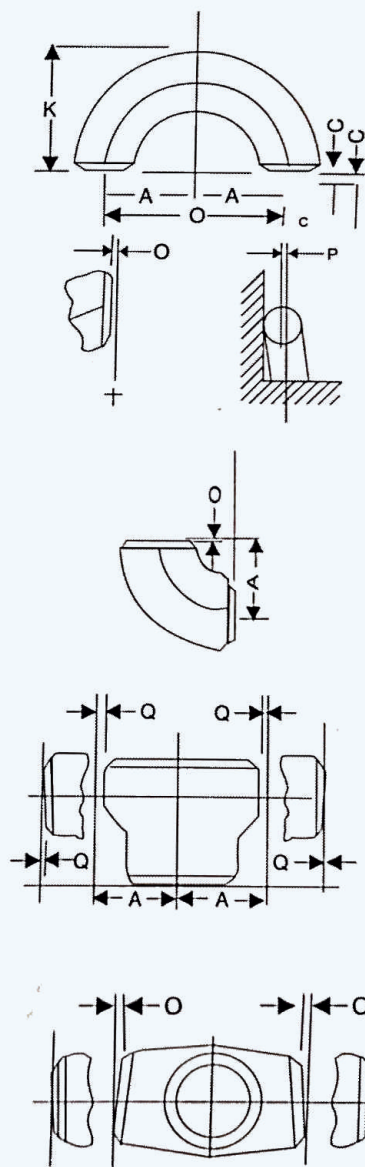
Nominal Pipe Size (NPS)	Outside Diameter at Bevel (O/D)	Long Pattern Length "F"	Short Pattern "F"	Radius of Follet "R"	Dia of Lap "G"	Length "E"	Limiting Wall Thk for Length "E"	Length "E 1"
1/2"	21.3	76.0	51	3	35	25	4.57	25
3/4"	26.7	76.0	51	3	43	25	3.81	25
1"	33.4	102.0	51	3	51	38	4.57	38
1¼"	42.2	102.0	51	5	64	38	4.83	38
1½"	48.3	102.0	51	6	73	38	5.08	38
2"	60.3	152.0	64	8	92	38	5.59	44
2½"	73.0	152.0	64	8	105	38	7.11	51
3"	88.9	152.0	64	10	127	51	7.62	64
3½"	101.6	152.0	76	10	140	64	8.13	76
4"	114.3	152.0	76	11	157	64	8.64	76
5"	141.3	203.0	76	11	186	76	9.65	89
6"	168.3	203.0	89	13	216	89	10.92	102
8"	219.1	203.0	102	13	270	102	12.7	127
10"	273.0	254.0	127	13	324	127	12.7	152
12"	323.8	254.0	152	13	381	152	12.7	178
14"	355.6	305.0	152	13	413	165	12.7	191
16"	406.4	305.0	152	13	470	178	12.7	203
18"	457.0	305.0	152	13	533	203	12.7	229
20"	508.0	305.0	152	13	584	229	12.7	254
22"	559.0	305.0	152	13	641	254	12.7	254
24"	610.0	305.0	152	13	692	267	12.7	305

DIMENSIONAL TOLERANCES AS PER ANSI B 16.9/ B 16.28/ MSS SP-43 BUTT WELD FITTING



All Fittings	Outside Diameter at Bewel (1), (2) D	Inside Diameter at End (1), (2), (3)	Wall Thickness (3)	0 Deg. and 45 Deg. Elbows and Tees	Reducers & Lap Joints Stub Ends	Caps	180 deg. Returns				lap Joint Stub Ends		
							Centre to end Dimension A, B, C, M	Centre to Overall Length F, H	Overall Length E	Centre to Centre Dimension O	Back to Face Dimension K	Alignment of ends U	Outside Diameter of Lap G
1/2 to 2½	1	0.8	Not Less than 87.5% of nominal thickness	2	2	4	7	7	1	+0.1	+0.1	See Table 7 for limiting dimensions	
3 to 3½	1	1.6		2	2	4	7	7	1	+0.1	+0.1		
4	+2	1.6		2	2	4	7	7	1	+0.1	+0.1		
5 to 6	-3	1.6		2	2	7	7	7	1	+0.1	+0.1		
8	+4	1.6		2	2	7	7	7	1	+0.1	+0.2		
10	+4	3.2		2	2	7	10	7	2	+0.2	+0.2		
12 to 18	+4	3.2		2	2	7	10	7	2	+0.2	+0.2		
20 to 24	+6	4.8		3	3	7	10	7	2	+0.2	+0.2		
26 to 30	+7	4.8		3	3	10	-	-	-	-	-		-
32 to 48	+7	4.8		5	5	10	-	-	-	-	-		-

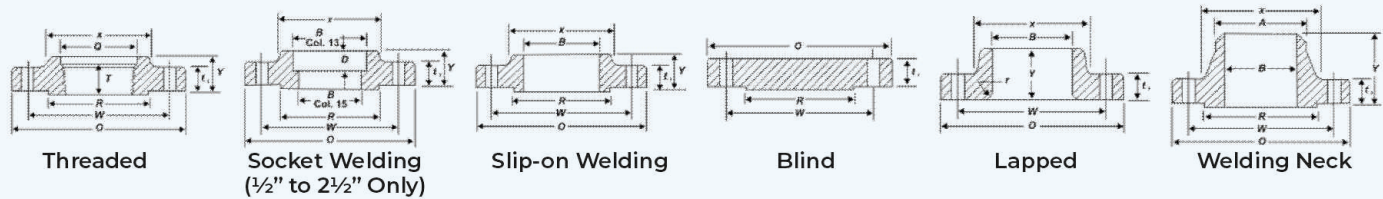
Nominal Pipe size (NPS)	Angularity - Tall	
	Off Angle Q	Off Plane P
1/2 to 4	1	2
5 to 8	2	4
10 to 12	3	5
14 to 16	3	7
18 to 24	4	10
26 to 30	5	10
32 to 42	5	13
44 to 48	5	20





Material, Size & Specification

Standards	ANSI B16.5, ANSI B16.47 Series A & B, MSS SP44, ASA, API-605,
Size	1/2" (15 NB) to 48" (1200NB)
Thickness	150#, 300#, 400#, 600#, 900#, 1500#, 2500# PN6, PN10, PN16, PN25, PN40, PN64, etc.
Stainless Steel	ASTM A182 F202, F304/304L/304H, F316/316L, F316H, F316Ti, F310, F321, F904L
Alloys Steel	ASTM A182 F1, F5, F9, F11, F22, F91
Alloys Steel	ASTM A105/A105N, A350 LF1, LF2 CL1/CL2, LF3 CL1/CL2, A694 F42, F46, F48, F50, F52, F56, F60, F65, F70, A516.60, 65, 70 (Spectacle Blind Flange, Spacer Ring/Spade Flange), Steel RST37.2, C22.8
Other	Monel, Nickel, Inconel, Hastalloy, Copper, Brass, Bronze, Tantalum, Bismuth, Aluminum, High Speed Steel, Zinc. Lead, etc.
Types of Flanges	Weld neck Flanges (WNRF), Slip-on Flanges (SORF), Blind Flanges (BLRF), Lap Joint Flanges (SOLJ), Socket-weld Flanges (SWRF), Screwed (Threaded) Flanges, Long weld neck Flanges (LWNRF), Spectacle Blind Flanges, Spacer & Blind Flanges, Ring Type Joint Flanges (RTJ), Reducing Flanges, Raised Face (RF) Flanges, Orifice Flanges, Large Diameter Flanges, Custom Flanges, Drawing Flanges, Forged Flanges, Plate Flanges, Flat Face Flanges, etc.



DIMENSIONS OF CLASS 150 FLANGES

Nominal Pipe Size NPS	Outside Diameter of Flange O	Thickness of Flange, Min., T ₁	Drilling				Diameter of Hub, X	Hub Diameter Beginning of Chamfer Welding Neck A	Length Thru Hub			Threaded/Length Threaded Min. B	Bore			Corner Radius of Bore Lapped Flange and Pipe, R	Depth of Socket D	Diameter of RF, R
			Thickness Lap Joint Min., t ₁	Diameter of Bolt Circle W	Diameter of Bolt Holes	Numbers of Bolts			Threaded/Slip-On/Socket Welding, Y	Lapped Y	Welding, Y		Slip-On/Socket Welding, Min. B	Lapped Min. B	Welding Neck/Socket Welding B (Note 2)			
1/2	90	9.6	11.2	60.3	15.9	4	30	21.3	14	16	46	16	22.2	22.9	15.8	3	10	34.9
3/4	100	11.2	12.7	69.9	15.9	4	38	26.7	14	16	51	16	27.7	28.2	20.9	3	11	42.9
1	110	12.7	14.3	79.4	15.9	4	49	33.4	16	17	54	17	34.5	34.9	26.6	3	13	50.8
1 1/4	115	14.3	15.9	88.9	15.9	4	59	42.2	19	21	56	21	43.2	43.7	35.1	5	14	63.5
1 1/2	125	15.9	17.5	98.4	15.9	4	65	48.3	21	22	60	22	49.5	50.0	40.9	6	16	73.0
2	150	17.5	19.1	120.7	19.1	4	78	60.3	24	25	62	25	61.9	62.5	52.5	8	17	92.1
2 1/2	180	20.7	22.3	139.7	19.1	4	90	73.0	27	29	68	29	74.6	75.4	62.7	8	19	104.8
3	190	22.3	23.9	152.4	19.1	4	108	88.9	29	30	68	30	90.7	91.4	77.9	10	21	127.0
3 1/2	215	22.3	23.9	177.8	19.1	8	122	101.6	30	32	70	32	103.4	104.1	90.1	10	—	139.7
4	230	22.3	23.9	190.5	19.1	8	135	114.3	32	33	75	33	116.1	116.8	102.9	11	—	157.2
5	255	22.3	23.9	215.9	22.3	8	164	141.3	35	36	87	36	143.8	144.4	128.2	11	—	185.7
6	280	23.9	25.4	241.3	22.3	8	192	168.3	38	40	87	40	170.7	171.4	154.1	13	—	215.9
8	345	27.0	28.6	298.2	22.3	8	246	219.1	43	44	100	44	221.5	222.2	202.7	13	—	269.9
10	4.5	28.6	30.2	362.0	25.4	12	3.5	273.0	48	49	100	49	276.2	277.4	254.6	13	—	323.8
12	845	3.2	31.8	431.8	25.4	12	365	323.8	54	55	113	55	327.0	328.2	304.8	13	—	381.0
14	535	33.4	35.0	476.3	28.6	12	400	355.6	56	79	125	57	359.2	360.2	To be Specified by Purchaser	13	—	412.8
16	595	35.0	36.6	539.8	28.6	16	457	406.4	62	87	125	64	410.5	411.2		13	—	469.9
18	635	38.1	39.7	577.9	31.8	16	505	457.0	67	97	138	68	461.8	462.3		13	—	533.4
20	700	41.3	42.9	635.0	31.8	20	559	508.0	71	103	143	73	513.1	514.4		13	—	584.2
24	815	46.1	47.7	749.3	35.0	20	663	610.0	81	111	151	83	616.0	616.0		13	—	692.2

DIMENSIONS OF CLASS 300 FLANGES

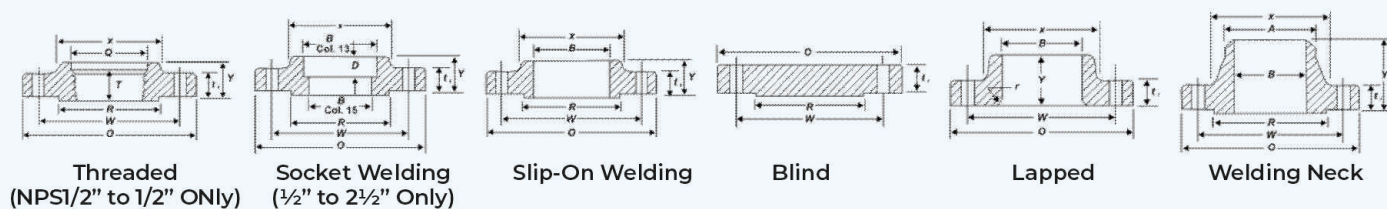
Nominal Pipe Size NPS	Outside Diameter of Flange O	Thickness of Flange, Min., T1	Thickness Lap Joint Min., t1	Drilling			Diameter of Hub, X	Hub Diameter Beginning of Chamfer Welding Neck A	Lenght Thru Hub			Threaded/Lenght Threaded Min. B	Bore			Comer Radius of Bore Lapped Flange and Pipe, R	Counter Bore Threaded FLANGE Min Q	Depth of Socket D	Diameter of RF, R
				Diameter of Bolt Circle W	Diameter of Bolt Holes	Numbers of Bolts			Threaded/Slip-On /Socket Welding, Y	Lapped Y	Welding, Y		Slip-On/Socket Welding, Min. B	Lapped Min. B	Welding Neck/Socket Welding B (Note 2)				
1/2	95	12.7	14.3	66.7	15.9	4	38	21.3	21	22	51	16	22.2	22.9	15.8	3	23.6	10	34.9
3/4	115	14.9	15.9	82.6	19.1	4	48	26.7	24	25	56	16	27.7	28.2	20.9	3	29.0	11	42.9
1	125	15.9	17.5	88.9	19.1	4	54	33.4	25	27	60	18	34.5	34.9	26.6	3	35.8	13	50.8
1¼	135	17.5	19.1	98.4	19.1	4	64	42.2	25	27	64	21	43.2	43.7	35.1	5	44.4	14	63.5
1½	155	19.1	20.7	114.3	22.2	4	70	48.3	29	30	67	23	49.5	50.2	40.9	6	50.3	16	73.0
2	165	20.7	22.3	127.0	19.0	4	84	60.3	32	33	68	29	61.9	62.5	52.5	8	63.5	17	92.1
2½	190	23.9	25.4	149.2	22.3	4	100	73.0	37	38	75	32	74.6	75.4	62.7	8	76.2	19	104.8
3	210	27.0	28.6	168.3	22.3	4	117	88.9	41	43	78	32	90.7	91.4	77.9	10	92.2	21	127.0
3½	230	28.6	30.2	184.2	22.3	8	133	101.6	43	44	79	37	103.4	104.1	90.1	10	104.9	—	139.7
4	255	30.2	31.8	200.0	22.3	8	146	114.3	46	48	84	37	116.1	116.1	102.3	11	117.6	—	157.2
5	280	33.4	35.0	235.0	22.3	8	178	141.3	49	51	97	43	143.8	144.4	128.2	11	144.4	—	185.7
6	320	35.0	36.6	269.9	22.3	8	206	168.3	51	52	97	47	170.7	171.4	154.1	13	171.1	—	215.9
8	380	39.7	41.3	330.2	25.4	8	260	219.1	60	62	110	51	221.5	222.2	202.7	13	222.2	—	269.9
10	445	46.1	47.7	387.4	28.6	12	321	273.0	65	95	116	56	276.2	277.4	254.6	13	276.2	—	323.8
12	520	49.3	50.8	450.8	31.8	12	375	323.8	71	102	129	61	327.0	328.2	304.8	13	328.3	—	381.0
14	585	52.4	54.0	514.4	31.8	12	425	355.6	75	111	141	64	359.2	360.2	To be Specified by Purchaser	13	360.4	—	412.8
16	650	55.6	57.2	571.5	35.0	16	483	406.4	81	121	144	69	410.5	411.2		13	411.2	—	469.9
18	710	58.8	60.4	628.6	35.0	16	533	457.0	87	130	157	70	461.8	462.3		13	462.0	—	533.4
20	775	62.0	63.5	685.8	35.0	20	587	508.0	94	140	160	74	513.1	514.4		13	512	—	584.2
24	915	68.3	69.9	812.8	41.3	20	702	610.0	105	152	167	83	616.0	616.0		13	614.4	—	692.2

NOTE : (1) Height of RE 2mm

(2) Dimensions column 16 Correspond to the inside diameters of the pipe as given in ASME B36.10M for Standard Wall Pipe, The Thickness of the Standard Wall is the same as Schedule 40 in Size NPS 10 and smaller. These bore sizes are furnished unless otherwise specified by the Purchaser.



FLANGES



DIMENSIONS OF CLASS 400 FLANGES

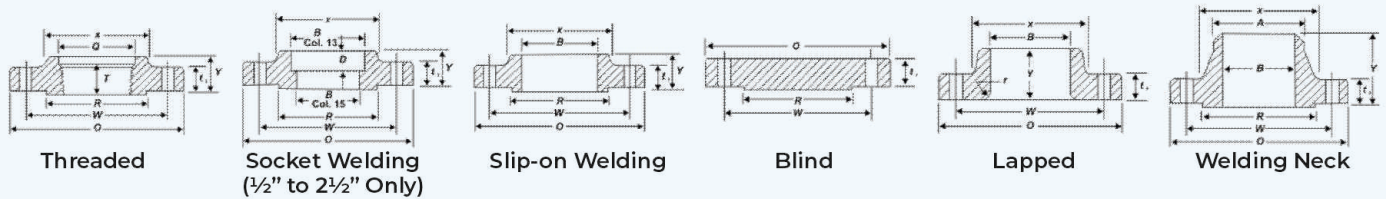
Nominal Pipe Size NPS	Outside Diameter of Flange O	Thickness of Flanges Min F	Diameter of Hub, X	Drilling			Hub Diameter Beginning of Chamfer Welding Neck A	Length Thru Hub			Threaded/Length Thru Flange Min., T	Bore			Corner Radius of Bore of Lapped Flange and Pipe, R	Counter Bore Threaded Flange Min., Q	Diameter of RF R	Socket Weld D
				Diameter of Bolt Circle W	Diameter of Bolt Holes in	Number of Bolts		Threaded/ Slip-On Y	Lapped, Y	Welding Neck Y		Slip-On Min., B	Lapped Min., B	Welding Neck B				
1/2	95	14.3	38	66.7	15.9	4	21.3	22	22	52	16	22.2	22.9		3	23.6	10	34.9
3/4	115	15.9	48	82.6	19.0	4	26.7	25	25	57	16	27.7	28.2		3	29.6	11	42.9
1	125	17.5	54	88.9	19.0	4	33.4	27	27	62	18	34.5	34.9		3	35.8	13	50.8
1 1/4	135	20.7	64	98.4	19.0	4	42.2	29	29	67	21	43.2	43.7		5	44.4	14	63.5
1 1/2	155	22.3	70	114.3	22.2	4	48.3	32	32	70	23	49.5	50.0		6	50.6	16	73.0
2	165	25.4	84	127.0	19.0	8	60.3	37	37	73	29	61.9	62.5	To be Specified by Purchaser	8	63.5	17	92.7
2 1/2	190	28.6	100	149.2	22.2	8	73.0	41	41	79	32	74.6	75.4		8	76.2	19	104.8
3	210	31.8	117	168.3	22.2	8	88.9	46	46	83	35	90.7	91.4		10	92.2	21	127.0
4	255	35.0	146	200.0	25.4	8	114.3	51	51	89	37	116.1	116.8		11	117.6	-	157.2
5	280	38.1	178	235.0	25.4	8	141.3	54	54	102	48	143.8	144.4		11	144.4	-	185.7
6	320	41.3	206	269.9	25.4	12	168.3	57	57	103	46	170.7	171.4		13	171.4	-	215.9
8	380	47.7	260	330.0	28.6	12	219.1	68	68	117	51	221.5	222.2		13	222.2	-	269.9
10	445	54.0	321	387.4	31.8	16	273.0	73	102	124	56	276.2	277.4		13	276.2	-	323.8
12	520	57.2	375	450.8	35.0	16	323.8	79	108	137	61	327.0	328.2		13	328.6	-	381.0
14	585	60.4	425	514.4	35.0	20	355.6	84	117	149	64	359.2	360.2		13	360.4	-	412.8
16	650	63.5	483	571.5	38.1	20	406.4	94	127	152	69	410.5	411.2		13	411.2	-	469.9
18	710	66.7	533	628.6	38.1	24	457.0	98	137	165	70	461.8	462.3		13	462.0	-	533.4
20	775	69.9	587	685.8	41.3	24	508.0	102	146	168	74	513.1	514.4		13	512.8	-	584.2
24	915	76.2	702	812.8	47.7	24	610.0	114	159	175	83	616.0	616.0		13	614.4	-	692.2

Note : (1) Height of 7mm

DIMENSIONS OF CLASS 600 FLANGES

Nominal Pipe Size NPS	Outside Diameter of Flange O	Thickness of Flanges Min F	Diameter of Hub, X	Drilling			Hub Diameter Beginning of Chamfer Welding Neck A	Length Thru Hub			Threaded/Length Thru Flange Min., T	Bore			Corner Radius of Bore of Lapped Flange and Pipe, R	Counter Bore Threaded Flange Min., Q	Diameter of RF R	Socket Weld D
				Diameter of Bolt Circle W	Diameter of Bolt Holes in	Number of Bolts		Threaded/ Slip-On Y	Lapped, Y	Welding Neck Y		Slip-On Min., B	Lapped Min., B	Welding Neck B				
1/2	95.5	14.3	38	66.7	15.9	4	21.3	22	22	52	16	22.2	22.9		3	23.6	10	34.9
3/4	117.5	15.9	48	82.6	19.1	4	26.7	25	25	57	16	27.7	28.2		3	29.6	11	42.9
1	124.0	17.5	54	88.9	19.1	4	33.4	27	27	62	18	34.5	34.9		3	35.8	13	50.8
1 1/4	133.5	20.7	64	98.4	19.1	4	42.2	29	29	67	21	43.2	43.7		5	44.4	14	63.5
1 1/2	155.5	22.3	70	114.3	22.3	4	48.3	32	32	70	23	49.5	50.0		6	50.6	16	73.0
2	165.0	25.4	84	127.0	19.1	8	60.3	37	37	73	29	61.9	62.5	To be Specified by Purchaser	8	63.5	17	92.1
2 1/2	190.5	28.6	100	149.2	22.3	8	73.0	41	41	79	32	74.6	75.4		8	76.2	19	104.8
3	209.5	31.8	117	168.3	22.3	8	88.9	46	46	83	35	90.7	91.4		10	92.2	21	127.0
4	273.0	38.1	152	215.9	25.4	8	114.3	54	54	102	42	116.1	116.8		11	117.6	-	157.2
5	330.0	44.5	189	266.7	28.6	8	141.3	60	60	114	48	143.8	144.4		11	144.4	-	185.7
6	355.5	47.7	222	292.1	28.6	12	168.3	67	67	117	51	170.7	171.4		13	171.4	-	215.9
8	419.0	55.6	273	349.2	31.8	12	219.1	76	76	133	58	221.5	222.2		13	222.2	-	269.9
10	508.0	63.5	343	431.8	35.0	16	273.0	86	111	152	66	276.2	277.4		13	276.2	-	323.8
12	559.0	66.7	400	489.0	35.0	20	323.8	92	117	156	70	327.0	328.2		13	328.6	-	381.0
14	603.5	69.9	432	527.0	38.1	20	355.6	94	127	165	74	359.2	360.2		13	360.4	-	412.8
16	686.0	76.2	495	603.0	41.3	20	406.4	106	140	178	78	410.5	411.2		13	411.2	-	469.9
18	743.0	82.6	546	654.0	44.5	20	457.0	117	152	184	80	461.8	462.3		13	462.0	-	533.4
20	813.0	88.9	610	723.9	44.5	24	508.0	127	165	190	83	513.1	514.4		13	512.8	-	584.2
24	940.0	101.6	718	838.2	50.8	24	610.0	140	184	203	93	616.0	616.0		13	614.4	-	692.2

Note : (1) Height of 7mm



DIMENSIONS OF CLASS 900 FLANGES

Nominal Pipe Size NPS	Outside Diameter of Flange O	Thickness of Flanges Min F	Diameter of Hub, X	Drilling			Hub Diameter Beginning of Chamfer Welding Neck A	Length Thru Hub			Threaded /Length Threaded Flange Min., T	Bore			Corner Radius of Bore of Lapped Flange and Pipe, R	Counter Bore Threaded Flange Min., Q	Diameter of RF R	Socket Weld D
				Diameter of Bolt Circle W	Diameter of Bolt Holes in	Number of Bolts		Threaded/Slip-On Y	Lapped, Y	Welding Neck Y		Slip-On Min., B	Lapped Min., B	Welding Neck B				
1/2	120.7	22.3	38	82.6	22.3	4	21.3	32	32	60	23	22.2	22.9		3	23.6	34.9	10
3/4	130.0	25.4	44	88.9	22.3	4	26.7	35	35	70	26	27.7	28.2		3	29.0	42.9	11
1	149.4	28.6	52	101.6	25.4	4	33.4	41	41	73	29	34.5	34.9		3	35.8	50.8	13
1 1/4	158.8	28.6	64	111.1	25.4	4	42.2	41	41	73	31	43.2	43.7		5	44.4	63.5	14
1 1/2	177.8	31.8	70	123.8	28.6	4	48.3	44	44	83	32	49.5	50.0		6	50.6	73.0	16
2	215.9	38.1	105	165.1	25.4	8	60.3	57	57	102	39	61.9	62.5		8	63.5	92.1	17
2 1/2	244.3	41.3	124	190.5	28.6	8	73.0	64	64	105	48	74.6	75.4		8	76.2	104.8	19
3	241.3	38.1	127	190.5	25.4	8	88.9	54	54	102	42	90.7	91.4		10	92.2	127.0	—
4	292.1	44.5	159	235.0	31.8	8	114.3	70	70	114	48	116.1	116.8		11	117.6	157.2	—
5	349.3	50.8	190	279.4	35.0	8	141.3	79	79	127	54	143.8	144.4		11	144.4	185.7	—
6	381.0	55.6	235	317.5	31.8	12	168.3	86	86	140	58	170.7	171.4		13	171.4	215.9	—
8	469.9	63.5	298	393.7	38.1	12	219.1	102	114	162	64	221.5	222.2		13	222.2	269.9	—
10	546.1	69.9	368	469.9	38.1	16	273.0	108	127	184	72	276.2	277.4		13	276.2	323.8	—
12	609.5	79.4	419	533.4	38.1	20	323.8	117	143	200	77	327.0	328.2		13	328.6	381.0	—
14	641.4	85.8	451	558.8	41.3	20	355.6	130	156	213	89	359.2	360.2		13	360.4	412.8	—
16	704.9	88.9	508	616.0	44.5	20	406.4	133	165	216	86	410.5	411.2		13	411.2	469.9	—
18	787.4	101.6	565	685.8	50.8	20	457.0	152	190	229	89	461.8	462.3		13	462.0	533.4	—
20	857.3	108.0	622	749.3	54.0	20	508.0	159	210	248	97	513.1	514.4		13	512.8	584.2	—
24	1041.4	139.7	749	901.7	66.7	20	610.0	203	267	292	102	616.0	616.0		13	614.4	692.2	—

Note : (1) Height of 7mm

DIMENSIONS OF CLASS 1500 FLANGES

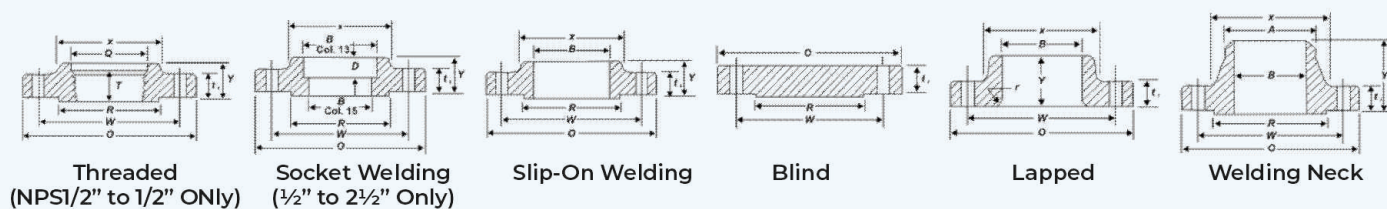
Nominal Pipe Size NPS	Outside Diameter of Flange O	Thickness of Flanges Min F	Diameter of Hub, X	Drilling			Hub Diameter Beginning of Chamfer Welding Neck A	Length Thru Hub			Threaded /Length Threaded Flange Min., T	Bore			Corner Radius of Bore of Lapped Flange and Pipe, R	Counter Bore Threaded Flange Min., Q	Diameter of RF R	Socket Weld D
				Diameter of Bolt Circle W	Diameter of Bolt Holes in	Number of Bolts		Threaded/Slip-On Y	Lapped, Y	Welding Neck Y		Slip-On Min., B	Lapped Min., B	Welding Neck B				
1/2	120.7	22.3	38	82.6	22.3	4	21.3	32	32	60	23	22.2	22.9		3	23.6	10	34.9
3/4	130.0	25.4	44	88.9	22.3	4	26.7	35	35	70	26	27.7	28.2		3	29.0	11	42.9
1	149.4	28.6	52	101.6	25.4	4	33.4	41	41	73	29	34.5	34.9		3	35.8	13	50.8
1 1/4	158.8	28.6	64	111.1	25.4	4	42.2	41	41	73	31	43.2	43.7		5	44.4	14	63.5
1 1/2	177.8	31.8	70	123.8	28.6	4	48.3	44	44	83	32	49.5	50.0		6	50.6	16	73.0
2	215.9	38.1	105	165.1	25.4	8	60.3	57	57	102	39	61.9	62.5		8	63.5	17	92.1
2 1/2	244.3	41.3	124	190.5	28.6	8	73.0	64	64	105	48	74.6	75.4		8	76.2	19	104.8
3	266.7	47.7	133	203.2	31.8	8	88.9	—	73	117	—	—	91.4		10	—	—	127.0
4	311.2	54.0	162	241.3	35.0	8	114.3	—	90	124	—	—	116.8		11	—	—	157.2
5	374.7	73.1	197	292.1	41.3	8	141.3	—	105	156	—	—	144.4		11	—	—	185.7
6	393.7	82.6	229	317.5	38.1	12	168.3	—	119	171	—	—	171.4		13	—	—	215.9
8	482.6	92.1	292	393.7	44.5	12	219.1	—	143	213	—	—	222.2		13	—	—	269.9
10	584.2	108.0	368	482.6	50.8	12	273.0	—	178	254	—	—	277.4		13	—	—	323.8
12	673.1	123.9	451	571.5	54.0	16	323.8	—	219	283	—	—	328.2		13	—	—	381.0
14	749.3	133.4	495	635.0	60.4	16	355.6	—	241	298	—	—	360.2		13	—	—	412.8
16	825.5	146.1	552	704.8	66.7	16	406.4	—	260	311	—	—	411.2		13	—	—	469.9
18	914.4	162.0	597	774.7	73.0	16	457.0	—	276	337	—	—	462.3		13	—	—	533.4
20	984.3	177.8	641	831.8	79.4	16	508.0	—	292	356	—	—	514.4		13	—	—	584.2
24	1168.4	203.2	762	990.6	92.1	16	610.0	—	330	406	—	—	616.0		13	—	—	692.2

NOTE : (1) Height of RE 2mm

(2) Dimensions column 16 Correspond to the inside diameters of the pipe as given in ASME B36.10M for Standard Wall Pipe, The Thickness of the Standard Wall is the same as Schedule 40 in Size NPS 10 and smaller. These bore sizes are furnished unless otherwise specified by the Purchaser.



FLANGES

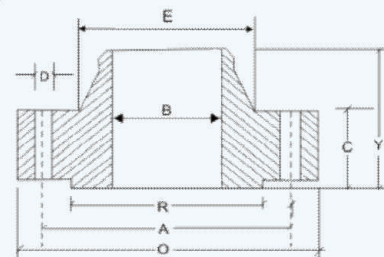


DIMENSIONS OF CLASS 2500 FLANGES

Nominal Pipe Size NPS	Outside Diameter of Flange O	Thickness of Flanges Min F	Diameter of Hub, X	Drilling			Hub Diameter Beginning of Chamfer Welding Neck A	Length Thru Hub			Threaded/Length Threaded Flange Min., T	Bore		Corner Radius of Bore of Lapped Flange and Pipe, R	Counter Bore Threaded Flange Min., Q	Socket Weld D
				Diameter of Bolt Circle W	Diameter of Bolt Holes in	Number of Bolts		Threaded Y	Lapped, Y	Welding Neck Y		Lapped Min., B	Welding Neck B			
1/2	133.4	30.2	48	88.9	22.3	4	21.3	40	40	73	29	22.9	To be Specified by Purchaser	3	23.6	34.9
3/4	139.7	31.8	51	95.2	22.3	4	26.7	43	43	79	32	28.2		3	29.0	42.9
1	158.8	35.0	57	108.0	25.4	4	33.4	48	48	89	35	34.9		3	35.8	50.8
1 1/4	184.2	38.1	73	130.2	28.6	4	42.2	52	52	95	39	43.7		5	44.4	63.5
1 1/2	203.2	44.5	79	146.0	31.8	4	48.3	60	60	111	45	50.0		6	50.6	73.0
2	235.0	50.9	95	171.4	28.6	8	60.3	70	70	127	51	62.5		8	63.5	92.1
2 1/2	266.7	57.2	114	196.8	31.8	8	73.0	79	79	143	58	75.4		8	76.2	104.8
3	304.8	66.7	133	228.6	35.0	8	88.9	—	92	168	—	91.4		10	—	127.0
4	355.6	76.2	165	273.0	41.3	8	114.3	—	108	190	—	116.8		11	—	157.2
5	419.1	92.1	203	323.8	47.7	8	141.3	—	130	229	—	144.4		11	—	185.7
6	482.6	108.0	235	368.3	54.0	8	168.3	—	152	273	—	171.4		13	—	215.9
8	552.5	127.0	305	438.2	54.0	12	219.1	—	178	318	—	222.2		13	—	269.9
10	673.1	165.1	375	539.8	66.7	12	273.0	—	229	419	—	277.4		13	—	323.8
12	762.0	184.2	441	619.1	73.0	12	323.8	—	254	464	—	328.2		13	—	381.0



WELDING NECK FLANGE BORES (B)



Nominal Pipe Size	Outside Dia	Sch. 20	Sch. 30	Std. Wall	Sch. 40	Extra Strong	Sch. 80	Sch. 120	Sch. 160	Double Extra Strong
15	21.33	—	—	15.7	15.7	13.3	13.3	—	11.7	6.5
20	26.67	—	—	20.8	20.8	18.8	18.8	—	15.5	11.0
25	33.40	—	—	26.6	25.4	24.3	24.3	—	20.7	15.2
32	42.16	—	—	35.0	35.0	32.4	32.4	—	29.4	22.7
40	48.26	—	—	40.8	40.8	38.1	38.1	—	33.7	27.9
50	60.31	—	—	52.3	52.3	49.2	49.2	—	42.8	38.1
65	73.02	—	—	62.4	62.4	59.2	59.2	—	53.9	44.9
80	88.90	—	—	77.9	77.9	73.6	73.6	—	66.6	58.4
100	114.30	—	—	102.2	102.2	97.1	97.1	92.0	87.3	80.0
125	141.30	—	—	128.1	128.1	122.2	122.2	115.9	109.5	103.2
150	168.27	—	—	154.0	154.0	146.3	146.3	139.7	131.7	124.3
200	219.07	206.2	204.9	202.7	202.7	193.6	193.6	182.5	173.0	174.6
250	273.05	260.3	257.4	252.5	254.5	242.8	242.8	230.1	215.9	222.2
300	323.85	311.1	307.0	304.8	303.2	288.8	288.8	273.0	257.2	273.0
350	355.60	337.8	336.5	336.5	333.3	371.5	371.5	300.0	284.1	—
400	406.40	390.3	387.3	387.3	381.0	363.5	363.5	344.5	325.4	—
450	457.20	441.1	434.9	438.1	428.6	409.5	409.5	387.3	366.7	—
500	508.00	488.9	482.6	488.9	477.8	455.6	455.6	431.8	407.9	—
600	609.60	590.5	581.0	590.5	574.6	547.6	547.6	517.5	490.5	—

ANSI FLANGE WEIGHTS (Kgs.)

N.P Size	150 Lb		300 Lb		600 Lb		900 Lb	
	WN	SO	WN	SO	WN	SO	WN	SO
1/2"	0.7	0.4	0.8	0.7	0.9	0.8	1.9	1.8
3/4"	0.9	0.7	1.4	1.2	1.6	1.4	2.7	2.5
1"	1.1	0.8	1.7	1.4	1.98	1.7	3.9	3.6
1 1/4"	1.5	1.2	2.2	1.8	2.6	2.1	4.5	4.1
1 1/2"	1.8	1.4	3.2	2.7	3.5	3.1	6.2	5.6
2"	2.7	2.2	3.6	3.2	4.7	3.8	11.3	10.3
2 1/2"	4.4	3.5	5.5	4.5	6.7	5.5	15.5	14.3
3"	5.1	4.1	7.3	6.1	8.7	7.3	15	12.3
3 1/2"	6.4	5.2	9	7.5	11.2	8.9	-	-
4"	7.5	5.6	11.9	10	18.3	15.8	24	20.5
5"	9	6.3	16	12.5	30.5	25	37.5	33.5
6"	11	7.8	20	16.2	37	29.5	50	43
8"	18.5	12.6	31	25	55	44	85	74
10"	25	18	44.3	35	91	71	125	105
12"	38	27.5	64	50	108	85	165	136
14"	51	37	88	72	150	96	198	158
16"	63	46	112	90	180	145	224	184
18"	71	50	118	115	240	175	320	258
20"	88	64	171	137	295	220	375	316
24"	120	90	240	210	363	315	680	608



DIMENSION OF FLANGES AS PER TABLE BS - 10

TABLE D

FOR WORKING STEAM PRESSURE UPTO 50 LBS PER SQ. INCH

Nominal Pipe Size	O.D. of Pipe	O.D.	P.C. D.	No. of Bolt	Dia of Bolt	Thick.
1/2"	21.3	95.3	66.7	4	12.7	4.8
3/4"	26.7	101.3	73.0	4	12.7	4.8
1"	33.4	114.3	82.6	4	12.7	4.8
1 1/4"	42.2	120.7	87.3	4	12.7	6.4
1 1/2"	48.3	133.4	98.4	4	12.7	6.4
2"	60.3	152.4	114.3	4	15.9	7.9
2 1/2"	73.0	165.1	127.0	4	15.9	7.9
3"	88.9	184.2	145.1	4	15.9	9.5
3 1/2"	101.6	203.2	165.1	4	15.9	9.5
4"	114.3	215.9	177.8	4	15.9	9.5
5"	141.3	254.0	209.6	8	15.9	12.7
6"	168.3	279.4	235.6	8	15.9	12.7
7"	190.5	304.8	260.4	8	15.9	12.7
8"	219.1	336.6	292.1	8	15.9	12.7
9"	244.5	368.3	323.9	8	15.9	15.9
10"	273.0	406.4	355.6	8	19.1	15.9
12"	323.9	457.2	406.4	12	19.1	15.9
14"	355.6	527.1	469.6	12	22.2	19.1
16"	406.4	577.9	520.7	12	22.2	19.1
18"	457.2	641.4	584.2	12	22.2	22.2
20"	508.0	704.9	641.4	16	22.5	25.4
24"	609.6	825.5	755.7	16	25.4	28.6

TABLE E

FOR WORKING STEAM PRESSURE UPTO 100 LBS PER SQ. INCH

Nominal Pipe Size	O.D. of Pipe	O.D.	P.C. D.	No. of Bolt	Dia of Bolt	Thick.
1/2"	21.3	95.3	66.7	4	12.7	6.4
3/4"	26.7	101.3	73.0	4	12.7	6.4
1"	33.4	114.3	82.6	4	12.7	7.1
1 1/4"	42.2	120.7	87.3	4	12.7	7.9
1 1/2"	48.3	133.4	98.4	4	12.7	8.7
2"	60.3	152.4	114.3	4	15.9	9.5
2 1/2"	73.0	165.1	127.0	4	15.9	10.3
3"	88.9	184.2	145.0	4	15.9	11.1
3 1/2"	101.6	203.2	165.1	8	15.9	11.9
4"	114.3	215.9	177.8	8	15.9	12.7
5"	141.3	254.0	209.6	8	15.9	14.3
6"	168.3	279.4	235.6	8	19.1	17.5
7"	190.5	304.8	260.4	8	19.1	19.1
8"	219.1	336.6	292.1	8	19.1	19.1
9"	244.5	368.3	323.9	12	19.1	20.6
10"	273.0	406.4	355.6	12	19.1	22.2
12"	323.9	457.2	406.4	12	22.2	25.4
14"	355.6	527.1	469.6	12	22.2	25.4
16"	406.4	577.9	520.7	12	22.2	25.4
18"	457.2	641.4	584.2	16	22.2	28.6
20"	508.0	704.9	641.0	16	22.2	31.8
24"	609.6	825.5	755.7	16	25.4	38.1

TABLE F FOR WORKING STEAM PRESSURE

ABOVE 100 LBS AND UPTO 150 LBS PER SQ. INCH

Nominal Pipe Size	O.D. of Pipe	O.D.	P.C. D.	No. of Bolt	Dia of Bolt	Thick.
1/2"	21.3	95.3	66.7	4	12.7	9.5
3/4"	26.7	101.3	73.0	4	12.7	9.5
1"	33.4	120.7	87.3	4	15.9	9.5
1 1/4"	42.2	133.4	98.4	4	15.9	12.7
1 1/2"	48.3	139.7	104.8	4	15.9	12.7
2"	60.3	165.1	127.0	4	15.9	15.9
2 1/2"	73.0	184.2	145.0	8	15.9	15.9
3"	88.9	203.2	165.1	8	15.9	15.9
3 1/2"	101.6	215.9	177.8	8	15.9	19.1
4"	114.3	228.6	190.5	8	15.9	19.1
5"	141.3	279.4	235.0	8	19.1	22.2
6"	168.3	304.8	260.4	12	19.1	22.2
7"	190.5	336.6	292.1	12	19.1	22.2
8"	219.1	368.3	323.9	12	19.1	25.0
9"	244.5	406.4	355.6	12	22.2	25.0
10"	273.0	431.8	381.0	12	22.2	25.0
12"	323.9	489.0	438.2	16	22.2	28.6
14"	355.6	552.5	495.3	16	25.4	31.8
16"	406.4	609.6	552.5	20	25.4	31.8
18"	457.2	673.1	609.6	20	28.6	34.9
20"	508.0	736.6	673.1	24	28.6	38.1
24"	609.6	850.9	781.1	24	31.8	41.3

TABLE H For working Steam pressure

ABOVE 150 LBS AND UPTO 250 LBS PER SQ. INCH

Nominal Pipe Size	O.D. of Pipe	O.D.	P.C. D.	No. of Bolt	Dia of Bolt	Thick.
1/2"	21.3	114.3	82.6	4	15.9	12.7
3/4"	26.7	114.3	82.6	4	15.9	12.7
1"	33.4	120.7	87.3	4	15.9	14.3
1 1/4"	42.2	133.4	98.4	4	15.9	17.0
1 1/2"	48.3	139.7	104.8	4	15.9	17.0
2"	60.3	165.1	127.0	4	15.9	19.1
2 1/2"	73.0	184.2	145.0	8	15.9	19.1
3"	88.9	203.0	165.1	8	15.9	22.2
3 1/2"	101.6	215.9	177.8	8	15.9	22.2
4"	114.3	228.6	190.5	8	15.9	25.4
5"	141.3	279.4	235.0	8	19.1	28.6
6"	168.3	304.8	260.4	12	19.1	28.6
7"	190.5	336.6	292.1	12	19.1	31.8
8"	219.1	368.3	323.9	12	19.1	31.8
9"	244.5	406.4	355.6	12	22.2	34.9
10"	273.0	431.8	381.0	12	22.2	34.9
12"	323.9	489.0	438.2	16	22.2	38.1
14"	355.6	552.5	495.3	16	25.4	41.3
16"	406.4	609.6	552.5	20	25.4	44.5
18"	457.2	673.1	609.6	20	28.6	47.6
20"	508.0	736.6	673.1	24	28.6	50.8
24"	609.6	850.9	781.1	24	31.8	57.2

NOTE : FOR 12.7 MM AND 15.87 BOLTS DIA THE DIAMETERS OF THE HOLES WILL BE 1.58MM LARGER AND FOR 19.01 AND ABOVE THE HOLE DIA WILL BE 3.17 LARGER.



Threaded, Socket-Welding, Slip-on, Lap Joint and Blind		
Outside Diameter	When O.D. is 24" or less	$\pm 1/16"$ (16mm)
	When O.D. is 24" or less	$\pm 1/8"$ (3.2mm)
Inside Diameter	Threaded	Within limits on boring guage
	Socket-Welding, Slip-on and Lap joint	10" & Smaller $+ 1/32"$ (0.8mm)-0" 12" & Larger $+1/16"$ (1.6mm) -0"
Outside Diameter of Hub	12" and Smalier	$+1/32"$ (0.8mm) $1/16"$ (1.6mm)
	14" and Larger	$\pm 1/8"$ (3.2mm)
Diameter of Contact Face	1 /16" Raised Face	$\pm 1/32"$ (0.8mm)
	1 /4" Raised Face Tongue & Groove Male, Female	$\pm 1/64"$ (0.4mm)
Diameter of Counterbore	Same as for Inside Diameter	
Drilling	Bolt Circle	$\pm 1/16"$ (1.6MM)
	Bolt hole Spacing	$\pm 1/32"$ (0.8MM)
	Eccentricity of Both Circle with Respect to Facing	2½" & Smaller $1/32"$ (0.8mm) max 3" & Larger $1/16"$ (1.6mm) max
	Eccentricity of Both Circle with Respect to Bore	$1/32"$ (0.8mm) Max
	Eccentricity of Facing with Respect to Bore	$1/32"$ (0.8mm) max
Thickness	18" and Smaller 20" and Larger	$+ 1/8"$ (3.2mm) -0" $+ 3/16"$ (4.8mm) - 0"
Length	10" and Smaller	$\pm 1/16"$ (1.6mm)
Thru Hub	12" and Larger	$\pm 1/8"$ (3.2mm)

Welding Neck		
Outside Diameter	When O.D. is 24" or less	$\pm 1/16"$ (16mm)
	When O.D. is 24" or less	$\pm 1/8"$ (3.2mm)
Inside Diameter	10" and Smaller	$+1/32"$ (0.8mm)
	12" thru 18"	$+ 1/16"$ (1.6mm)
	20" and Larger	$+1/8"$ (3.2mm) $- 1/16"$ (1.6mm)
Diameter of Contact Face	1/16" Raised Face	$+1/32"$ (0.8mm)
	1 /4" Raised Face Tongue & Groove Male, Female	$+1/64"$ (0.4mm)
Diameter of Hub at Base	When Hub Base is 24" or Smaller	$=1/16"$ (1.6mm)
	When Hub Base is Over 24"	$-1/8"$ (3.2mm)
Diameter of Hub at Point of Welding	5" and Smaller	$+3/32"$ (2.4mm) $-1/32"$ (0.8mm)
	6" and Larger	$+5/32"$ (4.0mm) $-1/32"$ (0.8mm)
	Bolt Circle	$+1/16"$ (1.6mm)
Drilling	Bolt hole spacing	$+1/32"$ (0.8mm)
	Eccentricity of Bolt Circle with Respect to Facing	2½" Smaller $1/32"$ (0.8mm) max 3" Larger $1/16"$ (1.6mm) max
	Eccentricity of Bolt Circle with Respect to Bore	$1/32"$ (0.8mm) max
	Eccentricity of Facing with Respect to Bore	$1/32"$ (0.8mm) max
Thickness	18" and Smaller 20" and Larger	$+ 1/8"$ (3.2mm) -0" $+ 3/16"$ (4.8mm) - 0"
Length	10" and Smaller	$\pm 1/16"$ (1.6mm)
Thru Hub	12" and Larger	$\pm 1/8"$ (3.2mm)



SOCKET-WELD FITTINGS



45° Elbow



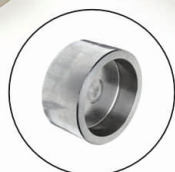
90° Elbow



Cross



Union



Caps



Tee



Reducing Tee



Concentric Reducer



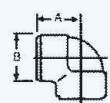
The following table represents size range, product standards and material grades of forged high pressure fittings, socket, weld like stainless steel, carbon steel & alloy steel etc. The range includes:

Material, Size & Specification

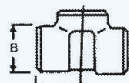
Stainless Steel	ASTM A182 F304/304L/ 304H/ 316/ 316L/ 317/ 317L/ 321/ 310/ 904L etc.
Carbon Steel	ASTM A105/ A105N/ A694 F42/46/52/56/60/65/70/A350LF3/A350LF2 etc.
Alloy Steel	ASTM A182 F1/F5/F9/F11/F22/F91etc.
Others	Monel, Nickel, Inconel, Hastalloy, Copper, Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead etc. Elbow, Tee, Union, Cross, Coupling, Cap, Bushing, Plug, Swage nipple, Welding Boss, Hexagon Nipple, Barrel Nipple, Barrel Nipple, Welding Nipple, Parraler Nipple, Street Elbow, Hexagon Nut, Hose Nipple, Bend, Adapter, Insert, Cross, Weldolet, Elbowlet, Sockolet, Thredolet, Nipolet Letrolet etc.
Size Range	1/8" NB to 4" NB (Socket weld)
Thread Class	2000 LBS, 3000 LBS, 6000 LBS, 9000 LBS

Used To Allow Flow Of Fluids, Like Steam, Water, Air, Oil, etc., Through The Desired Size Of Flowing Cross-section With Diversion Of Flow To The Desired Point Under Critical Working Conditions.

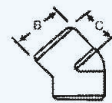
DIMENSION IN MM OF FORGED SCREWED FITTINGS TO ANSI B-16.11 THREADED TO ASA B 2.1



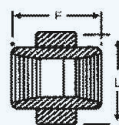
90° ELBOWS



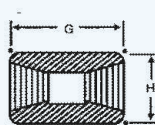
TEE



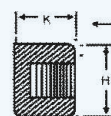
45° ELBOW



UNION



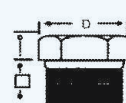
COUPLING



PIPE CAP



BUSHING

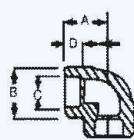


HEX HEAD PLUG

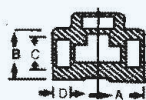
HALF COUPLING = G/2

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	4	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	28	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

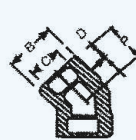
SOCKET WELD FITTING TO ANSI B-16.11



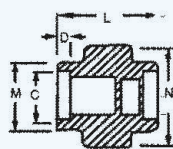
90° ELBOWS



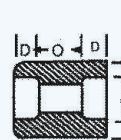
TEE



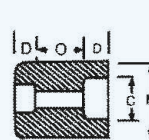
45° ELBOW



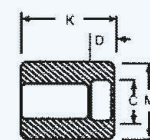
UNION



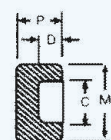
COUPLING



REDUCER



HALF COUPLING



CAP

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 OTHER SPECIFICATIONS AS PER CUSTOMERS REQUIREMENTS ARE AVAILABLE ON REQUEST



Royal Forge and Fitting Industries is India's fastest-growing Stockist of high-quality stainless steel ERW / NB pipes which are used in various applications across various sectors. Our diverse range of industrial Piping is being manufactured by using optimum quality raw materials and contemporary technology to meet definite industrial standards.

Material, Size & Specification

Welded Pipe

Size Range	1/8" NB to 48" NB
Thickness	Sch. 5S to Sch. 80S
Length	as per requirement (Max. up to 24 mtr. long)
Grades	304/L/H/LN, 316/L/H/LN/Ti, 309, 310/L/H/S, 317/L/H, 321/H, 347/H, UNS S31500, UNS S31803, UNS S2205, UNS S32750, UNS S32760
Specification	ASTM A-312, A-554, A-778, A-790

Seamless Pipe

Size Range	1/8" NB to 24" NB
Thickness	Sch. 10S to Sch. XXS
Length	as per requirement (Max. up to 24 mtr. long)
Grades	304/L/H/LN, 316/L/H/LN/Ti, 309, 310/L/H/S, 317/L/H, 321/H, 347/H, UNS S31500, UNS S31803, UNS S2205, UNS S32750, UNS S32760
Specification	ASTM A-312, A, A-790

ASTM STANDARDS FOR SEAMLESS & WELDED PIPES & TUBES



	Allowable Outside Diameter Variation In mm			Allowable wall		Exact Length		Testing
	Nominal Diameter	Over	Under	Over %	Under %	Over	Under	
ASTM A-213 Seamless Boiler Superheater & Heat Exchanger tubes	Under 25.4	0.1016	0.1016	+20	-0	3.175	0	Tension Test
	25.4- 38.1 Incl.	0.1524	0.1524	+20	-0	3.175	0	Flattening Test
	38.1- 50.8 Excl.	0.2032	0.2032	+22	-0	3.176	0	Flaring Test
	50.8- 63.5 Excl.	0.2540	0.2540	+22	-0	3.76	0	Hardness Test
	63.5- 76.2 Excl.	0.3048	0.3048	+22	-0	4.76	0	100% Hydrostatic Test
	76.2- 101.6 Incl.	0.3810	0.3810	+22	-0	4.76	0	Refer to ASTM A-1016
ASTM A-249 Welded Boiler Superheater, heat Exchanger & Condenser Tubes	Under 25.4	0.1016	0.1016	+10	-10	3.175	0	Tension Test
	25.4- 38.1 Incl.	0.1524	0.1524	+10	-10	3.175	0	Flattening Test
	38.1- 50.8 Excl.	0.2032	0.2032	+10	-10	3.176	0	Flaring Test
	50.8- 63.5 Excl.	0.2540	0.2540	+10	-10	4.76	0	*Reverse Bend Test
	63.5- 76.2 Excl.	0.3048	0.3048	+10	-10	4.76	0	Hardness Test
	76.2- 101.6 Incl.	0.3810	0.3810	+10	-10	4.76	0	100% Hydrostatic Test
				Minimum Wall Tubes +18% - 0 available on request				*Reverse Flattening Test
								Refer to ASTM A-1016
								*Whenever Applicable
ASTM A-269 Seamless & Welded Tubing for General Service	Under 12.7	0.13	0.13	+15	-15	3.2	0	Flare Test (Seamless Tube)
	25.7- 38.1 Incl.	0.13	0.13	+10	-10	3.2	0	Flange Test (Welded Only)
	38.1- 50.8 Excl.	0.25	0.25	+10	-10	4.8	0	Hardness Test
	88.9- 139.7 Excl.	0.38	0.38	+10	-10	4.8	0	Reverse Flattening Test
	139.7- 203.2 Excl.	0.76	0.76	+10	-10	4.8	0	(Welded Only)
								100% Hydrostatic Test
								Refer to ASTM A-1016
ASTM A-312 Seamless & Welded Austenitic Pipe	10.29 - 48.26	0.40	0.80	+ 20 %				Tension Test
	48.3 - 73.03	0.80	0.80	- 12.5 %				Flattening Test
	73.03 - 114.3	0.80	0.80	+ 22.5 %				100% Hydrostatic Test
	114.3 - 219.08	1.60	0.80	- 12.5 %				
ASTM A-270 Seamless & Welded Austenitic Pipe	25.4	0.05	0.20	+12.5	-12.5	3.2	0	Reverse Flattening Test
	38.1	0.05	0.20	+12.5	-12.5	3.2	0	100% Hydrostatic Test
	50.8	0.05	0.28	+12.5	-12.5	3.2	0	External Polish on all tubes
	63.5	0.05	0.28	+12.5	-12.5	3.2	0	Refer to ASTM A - 1016
	76.2	0.08	0.30	+12.5	-12.5	3.2	0	
	101.6	0.08	0.38	+12.5	-12.5	3.2	0	
ASTM A-268 Seamless & Welded Ferritic & Martensitic Stainless Steel tubes	Under 12.7	0.13	0.13	+15	-15	3.2	0	Tension test, Flaring Test,
	12.7- 38.1 Incl.	0.13	0.13	+10	-10	3.2	0	Flange Test, (ERW only)
	38.1 excl. 88.9 Incl.	0.28	0.28	+10	-10	4.8	0	Hardness Test, Reverse Flattening
	88.9- 168.3 Excl.	0.38	0.38	10	-10	4.8	0	Test, 100% Hydrostatic Test
								Refer to ASTM A-450
ASTM A-358 for Welded big diameter Pipes	for all sizes 5" NB & above	+0.5%	-0.5%	-	-03 mm	Customer's Specification		Transverse tension test, Transverse guided bend test Hydrostatic test, radiographic examination (as specified) dye penetrant (optional)
ASTM A-688 for Welded Feed Water- heater 'U' Tubes	Under 25.4mm	0.1016	0.1016	+20 +10	-0 (for min wall thk.) -10 (for Avg. wall thk.)	3 to 13	0	Tension, Hardness, Corrosion, Reverse bend, Flange, Flattening. Hydrostatic Test, Pneumatic Test, Non Destructive Test
ASTM A-778 Austenitic Stainless Steel Tubular Product	As per Table 1 Welded Unannealed ASTM A 530			12.5%	12.5%	RL 10ft > 3 meter FL 6 meter + 6mm - 0mm		Transverse Tension Test Transverse Guided Test

*Eddy current non destructive test & inter granular corrosion test can be offered on request.

EQUIVALENT EN SPECIFICATIONS

EN 10216-5	Seamless Stainless Steel Tubes for Pressure Purpose
EN 10297-2	Seamless Stainless Steel for Mechanical & General Engineering Purpose
EN 10246-2	Non - Destructive Testing of Steel Tubes
EN ISO 1127	Dimensions & Tolerances of Stainless Steel Tubes

Tolerance on OD	Permissible Deviation on OD (Whichever is Greater)	Tolerance on THK	Permissible Deviation on THK (Whichever is Greater)
D1	±1.5% or ± 0.75 mm	T1	± 15 % or ± 0.6 mm
D2	± 1% or ± 0.5 mm	T2	± 12.5 % or ± 0.4 mm
D3	+0.75% or ± 0.3 mm	T3	± 10 % or ± 0.2 mm
D4	+ 0.5% or ± 0.1 mm	T4	± 7.5 % or ± 0.15 mm



PIPE AND TUBES SIZE CHART

Nominal Size		OD	Sch 5S	Sch 5	Sch 10S	Sch 10	Sch 20	Sch 30	STD WT	Sch 40S
Inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1/8	6	10.3	-	-	1.24	1.24	-	-	1.73	1.73
1/4	8	13.7	-	-	1.65	1.65	-	-	2.24	2.24
3/8	10	17.1	-	-	1.65	1.65	-	-	2.31	2.31
1/2	15	21.3	1.65	1.65	2.11	2.11	-	-	2.77	2.77
3/4	20	26.7	1.65	1.65	2.11	2.11	-	-	2.87	2.87
1	25	33.4	1.65	1.65	2.77	2.77	-	-	3.38	3.38
1¼	32	42.2	1.65	1.65	2.77	2.77	-	-	3.56	3.56
1½	40	48.3	1.65	1.65	2.77	2.77	-	-	3.68	3.68
2	50	60.3	1.65	1.65	2.77	2.77	-	-	3.91	3.91
2½	65	73.0	2.11	2.11	3.05	3.05	-	-	5.16	5.16
3	80	88.9	2.11	2.11	3.05	3.05	-	-	5.49	5.49
3½	90	101.6	2.11	2.11	3.05	3.05	-	-	5.74	5.74
4	100	114.3	2.11	2.11	3.05	3.05	-	-	6.02	6.02
5	125	141.3	2.77	2.77	3.40	3.40	-	-	6.55	6.55
6	150	168.3	2.77	2.77	3.40	3.40	-	-	7.11	7.11
8	200	219.1	2.77	2.77	3.76	3.76	6.35	7.04	8.18	8.18
10	250	273.0	3.40	3.40	4.19	4.19	6.35	7.80	9.27	9.27
12	300	323.8	3.96	3.96	4.57	4.57	6.35	8.38	9.53	9.53
14	350	355.6	3.96	3.96	4.78	6.35	7.92	9.53	9.53	9.53
16	400	406.4	4.19	4.19	4.78	6.35	7.92	9.53	9.53	9.53
18	450	457.2	4.19	4.19	4.78	6.35	7.92	11.13	9.53	9.53
20	500	508.0	4.78	4.78	5.54	6.35	9.53	12.70	9.53	9.53
22	550	559.0	4.78	4.78	5.54	6.35	9.53	12.70	9.53	9.53
24	600	610.0	5.54	5.54	6.35	6.35	9.53	14.27	9.53	9.53
26	650	660.4	-	-	-	7.93	12.70	-	9.53	9.53
28	700	711.4	-	-	-	7.93	12.70	15.88	9.53	9.53
30	750	762.0	6.35	6.35	7.92	7.93	12.70	15.88	9.53	9.53
32	800	812.8	-	-	-	7.93	12.70	15.88	9.53	9.53
34	850	863.6	-	-	-	7.93	12.70	15.88	9.53	9.53
36	900	914.4	-	-	-	7.93	12.70	15.88	9.53	9.53
38	950	965.2	-	-	-	-	-	-	9.53	-
40	1000	1016	-	-	-	-	-	-	9.53	-
42	1050	1066.8	-	-	-	-	-	-	9.53	-
44	1100	1117.6	-	-	-	-	-	-	9.53	-
46	1150	1168.4	-	-	-	-	-	-	9.53	-
48	1200	1219.2	-	-	-	-	-	-	9.53	-



	Sch 40	Sch 60	Sch XS	Sch 80S	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	Sch XXS
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
	1.73	-	2.41	2.41	2.41	-	-	-	-	-
	2.24	-	3.02	3.02	3.02	-	-	-	-	-
	2.31	-	3.20	3.20	3.20	-	-	-	-	-
	2.77	-	3.73	3.73	3.73	-	-	-	4.78	7.47
	2.87	-	3.91	3.91	3.91	-	-	-	5.56	7.82
	3.38	-	4.55	4.55	4.55	-	-	-	6.35	9.09
	3.56	-	4.85	4.85	4.85	-	-	-	6.35	9.70
	3.68	-	5.08	5.08	5.08	-	-	-	7.14	10.15
	3.91	-	5.54	5.54	5.54	-	-	-	8.74	11.07
	5.16	-	7.01	7.01	7.01	-	-	-	9.53	14.02
	5.49	-	7.62	7.62	7.62	-	-	-	11.13	15.24
	5.74	-	8.08	8.08	8.08	-	-	-	-	-
	6.02	-	8.56	8.56	8.56	-	11.13	-	13.49	17.12
	6.55	-	9.53	9.53	9.53	-	12.70	-	15.88	19.05
	7.11	-	10.97	10.97	10.97	-	14.27	-	18.26	21.95
	8.18	10.31	12.70	12.70	12.70	15.09	18.26	20.62	23.01	22.23
	9.27	12.70	12.70	12.70	15.09	18.26	21.44	25.40	28.58	25.40
	10.31	14.27	12.70	12.70	17.48	21.44	25.40	28.58	33.32	25.40
	11.13	15.09	12.70	12.70	19.05	23.83	27.79	31.75	35.71	-
	12.70	16.66	12.70	12.70	21.44	26.19	30.96	36.53	40.49	-
	14.27	19.05	12.70	12.70	23.83	29.36	34.93	39.67	45.24	-
	15.09	20.62	12.70	12.70	26.19	32.54	38.10	44.45	50.01	-
	-	22.23	12.70	12.70	28.58	34.93	41.28	47.63	53.98	-
	17.48	24.61	12.70	12.70	30.96	38.89	46.02	52.37	59.54	-
	-	-	12.70	-	-	-	-	-	-	-
	-	-	12.70	-	-	-	-	-	-	-
	-	-	12.70	12.70	-	-	-	-	-	-
	17.48	-	12.70	-	-	-	-	-	-	-
	17.48	-	12.70	-	-	-	-	-	-	-
	19.05	-	12.70	-	-	-	-	-	-	-
	-	-	12.70	-	-	-	-	-	-	-
	-	-	12.70	-	-	-	-	-	-	25.40
	-	-	12.70	-	-	-	-	-	-	25.40
	-	-	12.70	-	-	-	-	-	-	25.40
	-	-	12.70	-	-	-	-	-	-	25.40
	-	-	12.70	-	-	-	-	-	-	25.40



WEIGHT & THICKNESS CHART OF PIPES

Nominal Pipe Size		Outside Diameter		Sch-5S		Sch-10S		Sch-10		Sch-20		Sch-30		Sch-40S		Sch-80		Sch-160		Sch-XX	
mm	inch	mm	inch	Thick (mm)	Wt (Mtr)	Thick (mm)	Wt (Mtr)	Thick (mm)	Wt (Mtr)	Thick (mm)	Wt (Mtr)	Thick (mm)	Wt (Mtr)	Thick (mm)	Wt (Mtr)	Thick (mm)	Wt (Mtr)	Thick (mm)	Wt (Mtr)	Thick (mm)	Wt (Mtr)
6	1/8	10.29	0.405	1	0.23	1.24	0.28			-	-	-	-	1.73	0.37	2.41	0.48	-	-	-	-
8	1/4	13.72	0.540	1.2	0.37	1.65	0.49			-	-	-	-	2.24	0.64	3.02	0.81	-	-	-	-
10	3/8	17.15	0.675	1.2	0.47	1.65	0.63			-	-	-	-	2.31	0.86	3.20	1.12	-	-	-	-
15	1/2	21.34	0.840	1.65	0.81	2.11	1.00			-	-	-	-	2.77	1.29	3.73	1.64	4.78	1.98	7.47	2.59
20	3/4	26.67	1.050	1.65	1.03	2.11	1.28			-	-	-	-	2.87	1.71	3.91	2.23	5.56	2.94	7.82	3.69
25	1	33.4	1.315	1.65	1.31	2.77	2.09			-	-	-	-	3.38	2.54	4.55	3.29	6.35	4.30	9.09	5.53
32	1¼	42.16	1.660	1.65	1.67	2.77	2.69			-	-	-	-	3.56	3.44	4.85	4.53	6.35	5.69	9.7	7.88
40	1½	48.26	1.900	1.65	1.93	2.77	3.10			-	-	-	-	3.68	4.11	5.08	5.49	7.23	7.43	10.16	9.69
50	2	60.33	2.375	1.65	2.42	2.77	3.92			-	-	-	-	3.91	5.52	5.54	7.60	8.74	11.29	11.07	13.65
65	2½	73.03	2.875	2.11	3.75	3.05	5.27			-	-	-	-	5.16	8.77	7.01	11.58	9.53	15.15	14.05	20.71
80	3	88.9	3.500	2.11	4.59	3.05	6.45			-	-	-	-	5.49	11.46	7.62	15.50	11.13	21.67	15.24	28.10
90	3½	101.6	4.000	2.11	5.25	3.05	7.40			-	-	-	-	5.74	13.77	8.08	18.91	-	-	16.15	34.54
100	4	114.3	4.500	2.11	5.93	3.05	8.35			-	-	-	-	6.02	16.32	8.56	22.66	13.49	34.04	17.12	41.64
125	5	141.3	5.563	2.77	9.61	3.4	11.56			-	-	-	-	6.55	22.09	9.53	31.43	15.88	49.85	19.05	58.29
150	6	168.28	6.625	2.77	11.48	3.4	14.04			-	-	-	-	7.11	28.68	10.97	43.19	18.26	68.57	21.95	80.39
200	8	219.1	8.625	2.77	15.01	3.76	20.26			6.35	33.81	7.04	37.37	8.18	43.18	12.70	65.61	23.01	112.94	22.23	109.54
250	10	273.0	10.750	3.4	22.92	4.19	28.20			6.35	42.38	7.8	51.78	9.27	61.19	15.06	97.23	28.58	174.85	25.4	157.41
300	12	323.9	12.750	3.96	31.72	4.57	36.53			6.35	50.47	8.38	66.18	9.53	74.99	17.45	133.85	33.32	242.34	25.4	189.77
350	14	355.6	14.000	3.96	34.87	4.78	41.97	6.35	54.77	7.92	68.92	9.53	82.55	9.53	82.55	19.05	160.47	35.71	285.92	-	-
400	16	406.4	16.000	4.19	42.20	4.78	48.05	6.35	62.74	7.92	78.99	9.53	94.67	9.53	94.67	21.41	206.31	40.49	370.84	-	-
450	18	457.2	18.000	4.19	47.53	4.78	53.41	6.35	70.71	7.92	89.06	11.13	124.27	9.53	106.79	-	-	45.24	466.49	-	-
500	20	508.0	20.000	4.78	60.23	5.54	68.75	6.35	78.68	9.53	118.90	12.7	157.45	9.53	118.90	-	-	50.01	573.29	-	-
550	22	558.8	22.000	4.78	66.28	5.54	75.53	6.35	86.64	9.53	131.02	12.7	173.59	9.53	131.02	-	-	53.97	681.96	-	-
600	24	609.6	24.000	5.54	83.76	6.35	94.45	6.35	94.61	9.53	143.14	14.27	212.64	9.53	143.14	-	-	59.54	819.75	-	-

SWG / BWG DIMENSION & WEIGHT PER METER

Gauge No.		10		12		14		16		18		19		20		22	
Dimension		SWG	BWG	SWG	BWG	SWG	BWG	SWG	BWG	SWG	BWG	SWG	BWG	SWG	BWG	SWG	BWG
Size	OD (mm)	3.251	3.404	2.642	2.769	2.032	2.1089	1.626	1.651	1.219	1.245	1.016	1.067	0.914	0.889	0.711	0.711
1/4	6.35	-	-	-	-	0.218	0.222	0.191	0.192	0.155	0.158	0.134	0.140	0.123	0.120	0.099	0.099
5/16	7.93	-	-	-	-	0.297	0.305	0.254	0.257	0.203	0.206	0.174	0.182	0.159	0.155	0.127	0.127
3/8	9.52	0.506	0.517	0.451	0.464	0.377	0.388	0.318	0.322	0.251	0.256	0.214	0.224	0.195	0.190	0.155	0.155
1/2	12.70	0.762	0.785	0.659	0.682	0.538	0.554	0.447	0.453	0.347	0.354	0.295	0.308	0.267	0.261	0.211	0.211
5/8	15.87	1.018	1.053	0.867	0.900	0.698	0.720	0.575	0.582	0.443	0.452	0.374	0.392	0.339	0.330	0.267	0.267
3/4	19.05	1.274	1.321	1.076	1.118	0.858	0.886	0.703	0.713	0.539	0.550	0.455	0.476	0.411	0.401	0.323	0.323
1	25.40	1.786	1.858	1.492	1.555	1.178	1.219	0.959	0.973	0.731	0.746	0.615	0.644	0.555	0.541	0.436	0.436
1¼	31.82	2.304	2.400	1.913	1.996	1.502	1.555	1.218	1.236	0.925	0.944	0.776	0.814	0.701	0.682	-	-
1½	38.10	2.811	2.930	2.324	2.427	1.818	1.883	1.471	1.493	1.115	1.138	0.935	0.980	0.843	0.821	-	-
1¾	45.45	3.404	3.551	2.806	2.932	2.189	2.268	1.768	1.794	1.338	1.365	1.120	1.175	1.010	0.983	-	-
2	50.80	3.825	4.003	3.157	3.300	2.459	2.548	1.984	2.013	1.499	1.531	1.255	1.317	1.131	1.101	-	-
2¼	57.15	4.347	4.539	3.573	3.736	2.779	2.880	2.240	2.273	1.692	1.727	1.415	-	-	-	-	-
2½	63.50	4.860	5.075	3.989	4.172	3.099	3.212	2.496	2.533	1.884	1.923	1.575	-	-	-	-	-
2¾	69.85	5.372	5.612	4.405	4.608	3.419	3.544	2.752	2.794	2.076	2.119	1.735	-	-	-	-	-
3	76.20	5.884	6.148	4.822	5.045	3.739	3.877	3.008	3.054	-	-	-	-	-	-	-	-
3½	88.90	6.908	7.220	5.654	5.917	4.379	4.541	-	-	-	-	-	-	-	-	-	-
4	101.60	7.933	8.293	6.487	6.790	5.020	5.206	-	-	-	-	-	-	-	-	-	-



	ALLOWABLE OUTSIDE DIAMETER TOLERANCE IN mm	ALLOWABLE WALL THICKNESS TOLERANCES		ALLOWABLE OUTSIDE DIAMETER TOLERANCE IN mm	ALLOWABLE WALL THICKNESS TOLERANCES
ASTM A-270/A1016 (Seamless and Welded Austenitic and Ferritic) Austenitic Stainless Steel Sanitary Tubing			ASTM A-312/A999 (Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes)		
OUTSIDE DIAMETER (mm)			1/8-1½, incl	+0.40, -0.40	—
[25] and under	+0.13, -0.13	+12.5%, -12.5%	Over 1½ to 4, incl	+0.80, -0.80	—
Over [25] to 2 [50]	+0.20, -0.20	+12.5%, -12.5%	Over 4 to 8, incl	+1.60, -0.80	—
Over [50] to 3 [75]	+0.25, -0.25	+12.5%, -12.5%	Over 8 to 18, incl	+2.40, -0.80	—
Over 3 [75] to 4 [100]	+0.38, -0.38	+12.5%, -12.5%	Over 18 to 26, incl	+3.20, -0.80	—
[100] to 5½ [140], excl.	+0.38, -0.38	+12.5%, -12.5%	Over 26 to 34, incl	+4.0, -0.80	—
[140] to 8 [200], excl.	+0.75, -0.75	+12.5%, -12.5%	Over 34 to 48, incl	+4.80, -0.80	—
8 [200] to 12 [300]	+1.25, -1.25	+12.5%, -12.5%	1/8 to 2½ incl., all t/D ratios	—	+20.0, -12.5%
ASTM A-249/A1016 (Welded, Austenitic Steel Boiler, Superheater, Heat-Exchanger and Condenser Tubes)			3 to 18 incl., t/D up to 5% incl.	—	+22.5, -12.5%
Under 1 [25]	+0.1, -0.11	+10.0%, -10.0%	3 to 18 incl., t/D > 5%	—	+15.0, -12.5%
1 to 1½ [25 to 40], incl	+0.15, -0.15	+10.0%, -10.0%	20 and larger, welded, all t/D ratios	—	+17.5, -12.5%
Over 1½ to 2 [40 to 50], excl	+0.2, -0.20	+10.0%, -10.0%	20 and larger, seamless, t/D up to 5% incl.	—	+22.5, -12.5%
2 to 2½ [50 to 65], excl	+0.25, -0.25	+10.0%, -10.0%	20 and larger, seamless, t/D > 5%	—	+15.0, -12.5%
2½ to 3 [65 to 75], excl	+0.30, -0.30	+10.0%, -10.0%	ASTM A-268/A1016 (Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service)		
3 to 4 [75 to 100], incl	+0.38, -0.38	+10.0%, -10.0%	Up to 1/2 [12.7], excl	+0.13, -0.13	+15.0%, -15.0%
Over 4 to 7½ [100 to 200], incl	+0.38, -0.64	+10.0%, -10.0%	1/2 to 1½ [12.7 to 38.1], excl	+0.13, -0.13	+10.0%, -10.0%
Over 7½ to 9 [200 to 225], incl	+0.38, -1.14	+10.0%, -10.0%	1½ to 3½ [38.1 to 88.9], excl	+0.25, -0.25	+10.0%, -10.0%
ASTM A-269/A 1016 (Seamless and Welded Austenitic Stainless Steel Tubing for General Service)			3½ to 5½ [88.9 to 139.7], excl	+0.38, -0.38	+10.0%, -10.0%
Up to 1/2 [13]	+0.13, -0.13	+15.0%, -15.0%	5½ to 8 [139.7 to 203.2], incl	+0.76, -0.38	+10.0%, -10.0%
1/2 to 1½ [13 to 38], excl	+0.13, -0.13	+10.0%, -10.0%	ASTM A-213/A1016 (Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes)		
1½ to 3½ [38 to 89], excl	+0.25, -0.25	+10.0%, -10.0%	Under 1 [25]	+0.10, -0.11	+20%, -0.0%
3½ to 5½ [89 to 140], excl	+0.38, -0.38	+10.0%, -10.0%	1 to 1½ [25 to 40], incl	+0.15, -0.15	+20%, -0.0%
5½ to 8 [140 to 203], excl	+0.76, -0.76	+10.0%, -10.0%	Over 1½ to 2 [40 to 50], excl	+0.20, -0.20	+22%, -0.0%
8 to 12 [203 to 305], excl	+1.01, -1.01	+10.0%, -10.0%	2 to 2½ [50 to 65], excl	+0.25, -0.25	+22%, -0.0%
12 to 14 [305 to 356], excl	+1.26, -1.26	+10.0%, -10.0%	2½ to 3 [65 to 75], excl	+0.30, -0.30	+22%, -0.0%
ASTM A358/A999/A928 (Welded, LSAW Austenitic and Duplex pipes for High Temperature Service)			3 to 4 [75 to 100], incl	+0.38, -0.38	+22%, -0.0%
All Sizes	+0.5, -0.5%	+NSF, 0.3MM	Over 4 to 7½ [100 to 200], incl	+0.38, -0.64	+22%, -0.0%
			Over 7½ to 9 [200 to 225], incl	+0.38, -1.14	+22%, -0.0%

Permissible variations from the specified average wall thickness shall be $\pm 10\%$ of the specified average wall thickness for cold formed tubes

DIN STANDARD- For Welded tube, DIN 17457: the tolerance on OD and wall thickness is given in DIN 2463 or EN 10217-7 (See below table)

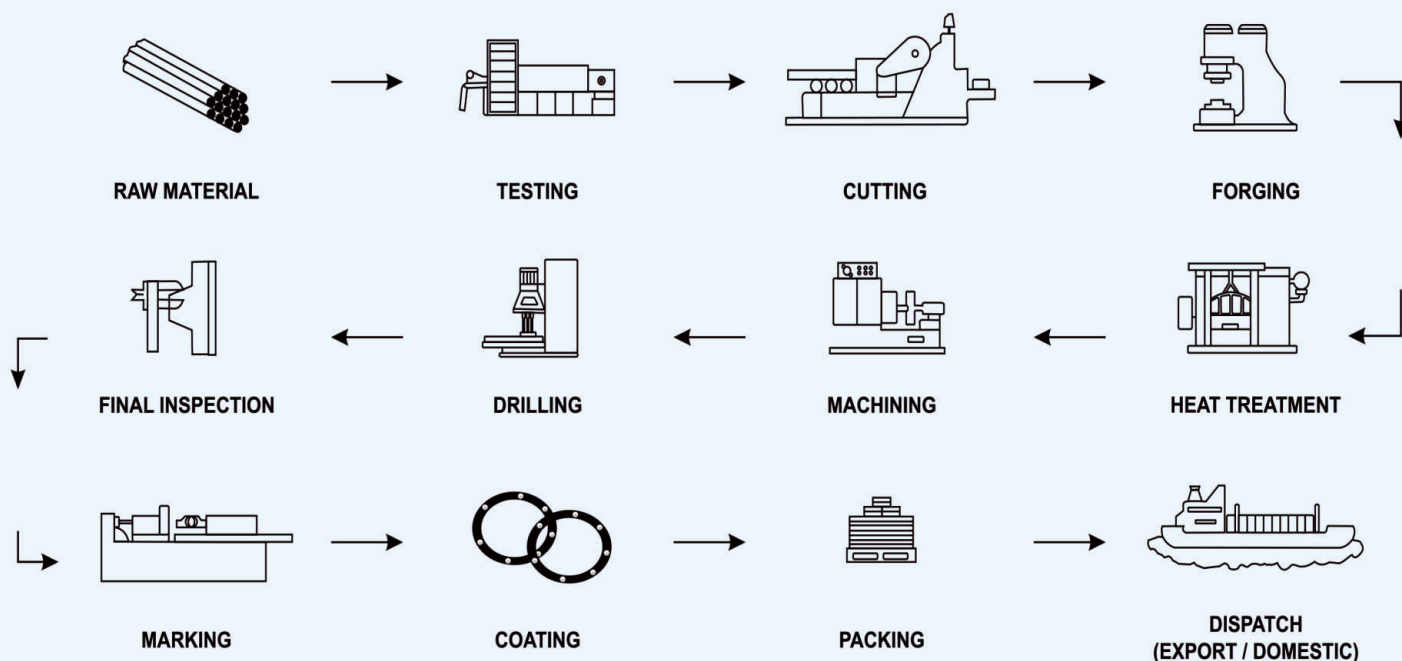
OUTSIDE DIAMETER D (mm)	Tolerance on Outside Diameter D		Tolerances on Wall Thickness T	
	Tolerance Class	Permissible Deviation		
D ≤ 168.3	D3	+ 0.75% or + 0.3 mm Whichever is greater	T3	+ 10% or + 0.2 mm Whichever is greater
	D4	+ 0.5% or + 0.1 mm Whichever is greater		
D > 168.3	D2	+ 1.0%		

DIN STANDARD- For Seamless tube, DIN 17456/17458: the tolerance on OD and wall thickness is given in EN 1127(See below table)

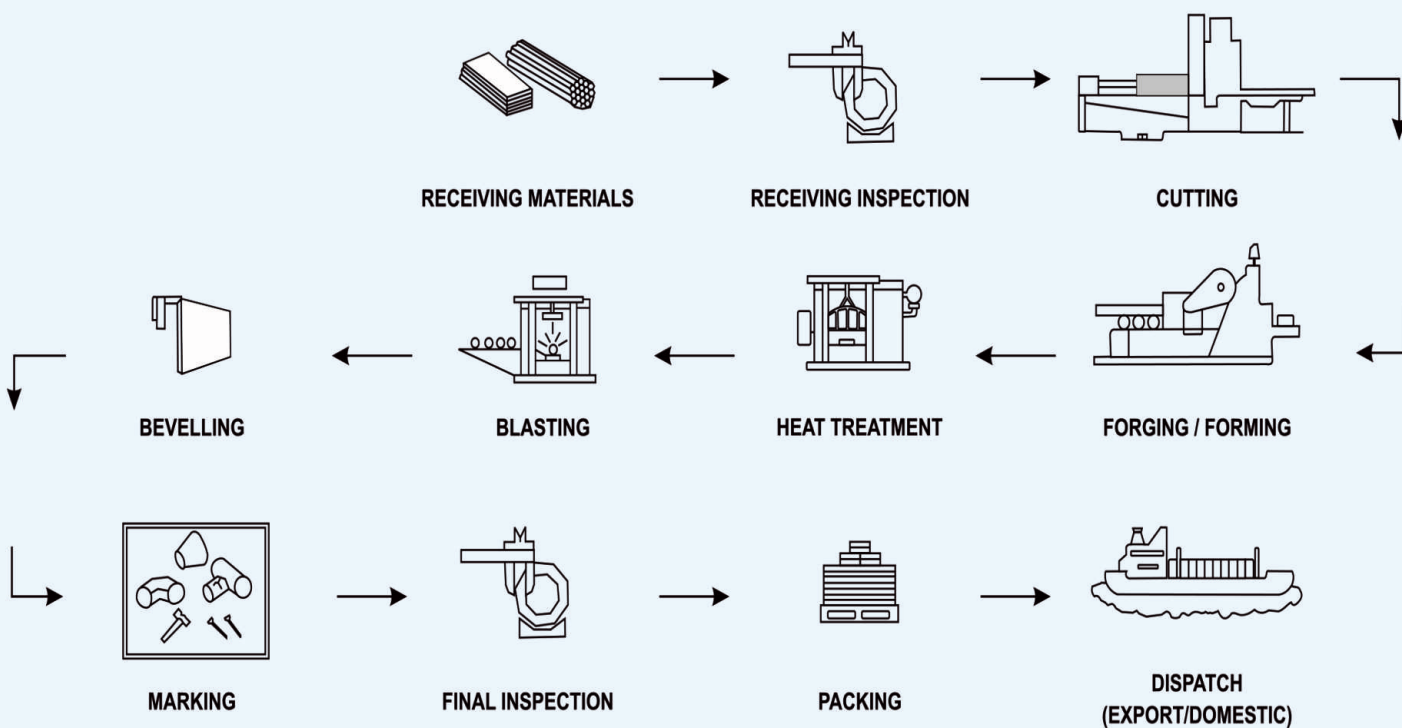
Tolerance Class	Tolerance on Outside Diameter D	Tolerance Class	Tolerance on Wall Thickness T
D1	+ 1.5% with + 0.75mm min.	T1	+ 15% with + 0.6 mm min.
D2	+ 1.0% with + 0.50mm min.	T2	+ 12.5% with + 0.4 mm min.
D3	+ 0.75% with + 0.3mm min.	T3	+ 10% with + 0.2 mm min.
D4	+ 0.5% with + 0.10mm min.	T4	+ 7.5% with + 0.15 mm min.



SCHEMATIC DETAILS OF PRODUCTION PROCESS FOR FLANGES

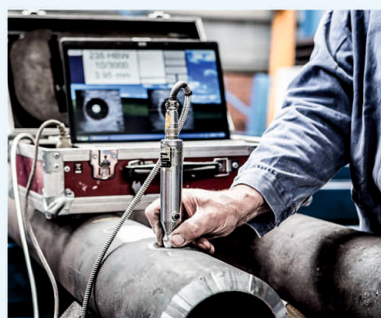


SCHEMATIC DETAILS OF MANUFACTURING PROCEDURE OF BW PIPE FITTINGS





TESTING PROCESS





At **Royal Forge & Fittings Industries**, quality is at the heart of everything we do. We are steadfast in our commitment to deliver world-class products that exceed customer expectations while maintaining the highest standards of safety, sustainability, and operational excellence.

Our Quality Commitment:

- Continuously enhance our knowledge, skills, and systems to improve organizational efficiency and ensure outstanding product quality.
- Consistently meet and surpass customer requirements by involving every employee in the pursuit of quality excellence.
- Innovate in materials, technology, and processes to deliver superior products at the most competitive prices.
- Ensure the right product, at the right time, in the right place, with accurate documentation.



Quality Assurance

We strictly adhere to a comprehensive quality assurance plan to guarantee product reliability and consistency. Our stainless steel pipes and fittings are manufactured under an approved quality manual and follow a client-specific Quality Assurance Plan (QAP).

Key Steps in Quality Assurance:

Raw Material Control:

Thorough inspection and verification of all incoming materials.

In-Process Inspection:

Stage-wise monitoring to ensure compliance with technical specifications.

Final Inspection:

Rigorous testing of finished products before release.

Calibration:

Regular calibration of equipment and measuring instruments for precision and accuracy.

Testing Capabilities:

Non-Destructive Testing (NDT):

Includes ultrasonic testing, radiographic testing, hydrostatic testing, and dye penetrant testing, ensuring structural integrity without compromising the product.

Destructive Testing:

Includes tensile tests, hardness tests, flattening, flare, and reverse-bend tests to validate mechanical properties.

Continuous Improvement



We are committed to continuous improvement in quality, safety, and environmental management systems. By fostering a culture of innovation, we:

- Set measurable objectives and targets for improvement.
- Train and upskill employees to enhance competence and awareness.
- Develop new designs and technologies to remain competitive and meet emerging client needs.

Our Promise:



- Deliver high-quality products and exceptional service at competitive prices.
 - Build strong, lasting relationships with customers, suppliers, and stakeholders.
- Consistently enhance processes through stringent quality controls and proactive innovation.

At Royal Forge & Fittings Industries, quality is not just a policy—it is a way of life. We pledge to continue raising the bar in everything we do to ensure the satisfaction and success of our valued clients.

OUR MACHINERY

At Royal Forge & Fittings Industries, we pride ourselves on utilizing advanced machinery to ensure precision, quality, and efficiency in our manufacturing processes. Our state-of-the-art equipment allows us to meet diverse customer requirements and maintain industry-leading standards.

Key Machinery in Our Facility:

1. **Cutting Machines (4 Units)** – For precise material cutting.
2. **Elbow Bending Machine** – For creating seamless bends in pipes and fittings.
3. **Elbow Beveling Machines (2 Units)** – Ensuring perfect bevel edges for welding.
4. **Elbow Machine** – Dedicated to producing high-quality elbows.
5. **Tee Machine** – Specialized for manufacturing tees with accuracy.
6. **Tee Beveling Machine** – For creating beveled edges in tees.
7. **Air Machine** – Supporting various pneumatic operations.
8. **Lathe Machines (2 Units)** – For shaping and finishing components.
9. **CNC Machines (2 Units)** – For high-precision automated machining.
10. **VMC Machine** – Delivering precise vertical milling capabilities.
11. **Argon Machine** – Used for specialized production tasks.
12. **Laser Marking Machine** – For accurate and durable product markings.





At Royal Forge & Fittings Industries, inspection and testing are at the core of our commitment to delivering the finest stainless steel products to our esteemed clients. Our rigorous testing protocols encompass a wide range of assessments designed to meet and exceed industry standards, ensuring the utmost quality and reliability in every product we deliver.

Our inspection and testing process is meticulously carried out during both in-process and final stages, divided into two primary categories:

Physical Tests (Destructive Testing)

Physical testing ensures the structural integrity and mechanical properties of our stainless steel pipes and fittings. These tests are designed to confirm the durability and performance of the materials in various applications. Key physical tests include:

Tensile Test: Assessing the material's strength and elongation.

Hardness Test: Measuring the resistance to deformation.

Flaring Test: Testing the ductility of the material.

Flange Test: Ensuring the product's structural stability under stress.

Reverse-Bend Test: Evaluating flexibility and resilience.

Reverse Flattening Test: Confirming resistance to deformation under pressure.

Impact Test: Measuring material toughness at different temperatures.

IGC Test (Practice A, B, C & E): Assessing resistance to intergranular corrosion.

Non-Destructive Testing (NDT)

Non-destructive tests focus on identifying hidden flaws or defects without damaging the product. This ensures internal and surface integrity, critical for high-performance applications. Our NDT methods include:

Hydro-Static Test: Verifying the strength and leak-proof nature of the material.

Eddy Current Test: Detecting surface and sub-surface defects.

Ultrasonic Testing: Inspecting internal structures for hidden imperfections.

Air Under Water Test: Ensuring airtight integrity under pressure.

Radiography Testing: Examining the internal composition through X-rays or gamma rays.

P.M.I. Test (Positive Material Identification): Confirming material composition.

Spectro Test: Analyzing the chemical properties of the material.

Dye Penetrant Test: Identifying surface cracks or imperfections.

By integrating both destructive and non-destructive testing methodologies, Royal Forge & Fittings Industries ensures that every product meets the highest quality standards. Our third-party inspection process reinforces our dedication to transparency, accountability, and customer satisfaction, guaranteeing that every product delivered to our clients is reliable, durable, and fit for purpose.



At **Royal Forge & Fittings Industries**, our commitment to quality, precision, and reliability has enabled us to cater to a broad spectrum of industries. Our products are designed to meet the rigorous demands of various sectors, ensuring superior performance and durability.



Construction & Infrastructure



Oil and Gas Industry



Power Sectors



Refineries



Chemical Industry



Petrochemical Industry



Iron & Steel Plant



Cement Plant



Automotive Industry



Aerospace Industry



Marine Industry



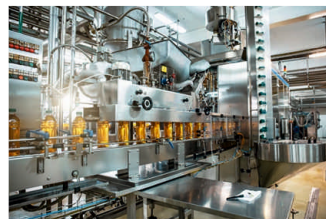
Pulp and Paper Industry



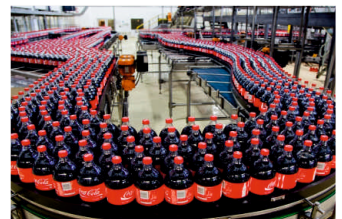
Pharmaceutical Industry



Dairy Industries



Food Industry



Beverages Plant

...and Many More!

From small-scale enterprises to large-scale industrial operations, **Royal Forge & Fittings Industries** is proud to support diverse sectors with tailored solutions. Our dedication to innovation, quality, and customer satisfaction ensures that we remain a trusted partner across industries worldwide.



ROYAL GROUP
ROYAL FORGE
AND FITTINGS INDUSTRIES
AN ISO 9001:2015 CERTIFIED COMPANY
Royal Solutions for Industrial Strength



GSTIN: 24ABKFR2557E127



+91 98195 88125 | 99201 99939 | Office.: 9167953341



royalfittingsindustries@gmail.com,
sales@royalfittings.co.in



www.royalfittings.co.in



Factory Add.: RS No.103, Plot No.10, Ramdev Industrial,
Kashipura Road, Por GIDC Ramangamdi, Vadodara -391243



Corporate Office : Plot No. 497/9, GIDC, Makarpura,
Vadodara -390 010 Gujarat (INDIA)

