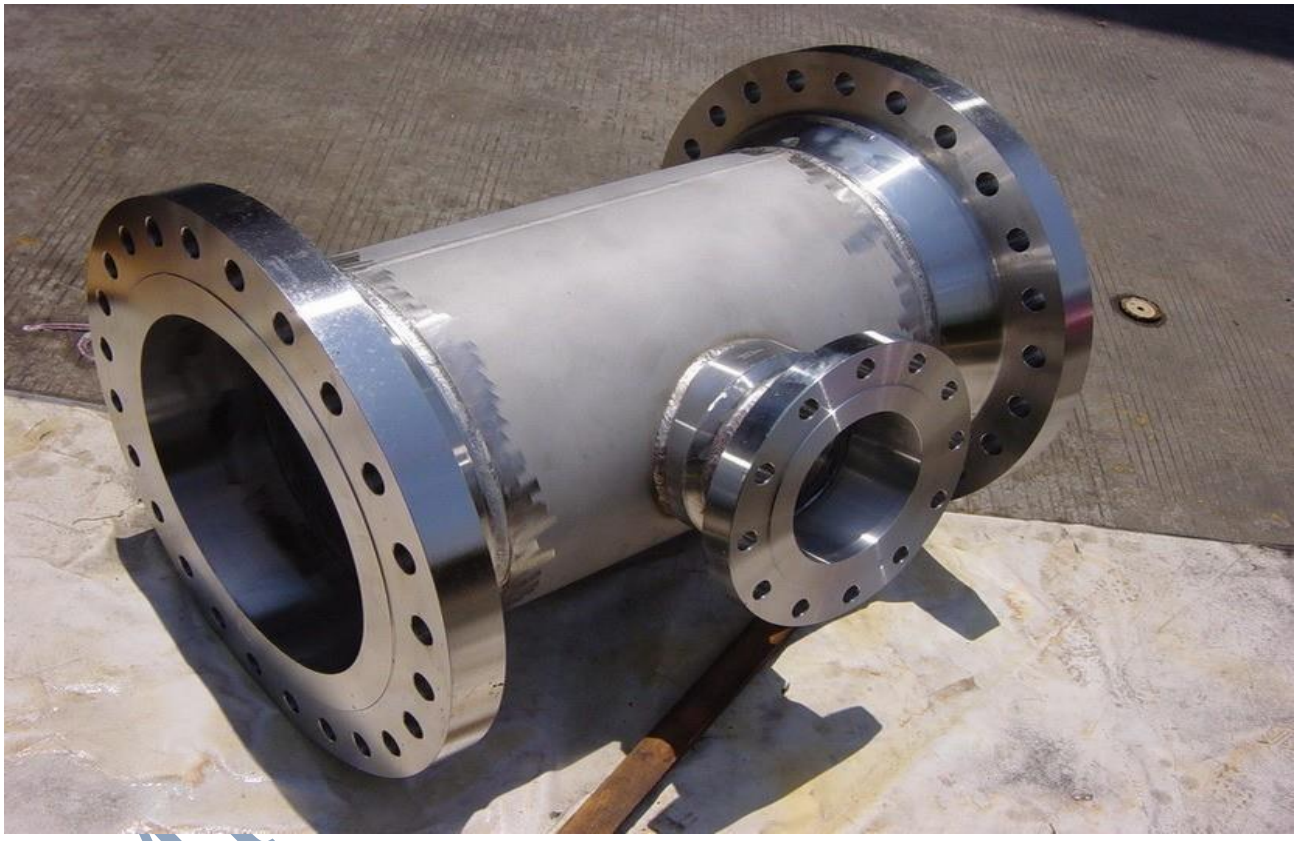
What is Flange?

EMPEX STAINLESS
SALES@EMPEXSTAINLESS.COM



Flanges are devices used to connect pipes to each other, to valves, to pumps, to fittings, and to other equipment such as filters and pressure vessels. It is usually welded or threaded, and the two flanges are joined together by bolting them with gaskets to provide a seal, providing easy access to the piping system.

Many different flange standards are found worldwide to allow easy functionality and interchangeability. Common standards include ASA/ASME (USA), PN/DIN (European),

BS10 (British/Australian), and JIS/KS (Japanese/Korean).

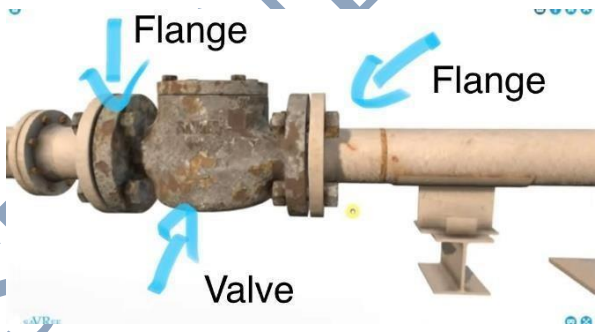
The flange can withstand high pressure and temperature, so they have different pressure and temperature ratings for different materials. In a piping application, the type of flange to be used depends largely on the strength required.

Flanges come in many different shapes and sizes and are used in a wide range of industries around the world. With so many varieties and specifications, it may not be easy to identify which one is right for your need. Here is a simple guide to the most common and popular types of flanges and their uses.

Read Also: 16 Types of Measuring Tools and Their Application

A flange is a method of connection pipes, valves, pumps, and other equipment to form a piping system. It is the second and most connection after welding. Flanges provides easy access for

cleaning inspection or modification.



See the above picture. The valve can be dismantled easily for maintenance or modification. Two flanges on right side connected and two flanges are connected on left side.

To easily understand Flanges, you need to understand these 6 things:

1- Flange Type

2- Flange Face

3- Size

4- Schedule

5- Pressure-temperature rating

6- Material

Types of Flanges

Following are the different types of flanges:

1. Weld neck flange
2. Long welding neck flange
3. Slip on flange
4. Threaded flange
5. Socket weld flange
6. Lap joint flange
7. Blind flange
8. Orifice flange
9. Nipo flange
10. Swivel flange
11. Expanding flange
12. Reducing flange
13. Elbow flange
14. Puddle flange
15. Split flange
16. Cast flange

1- FLANGE TYPE

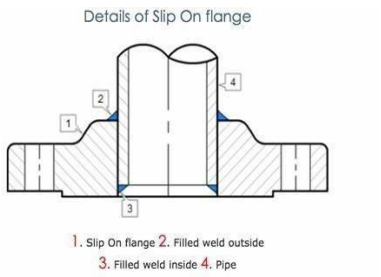
Weld neck Flange:

Easy to recognize because of the long-tapered hub. It is the most widely used in process piping.

- Used for high pressure and high temperature application
- Decrease the high stress concentration at the bottom of the flange.
- Used in all pressure class

Slip on flange

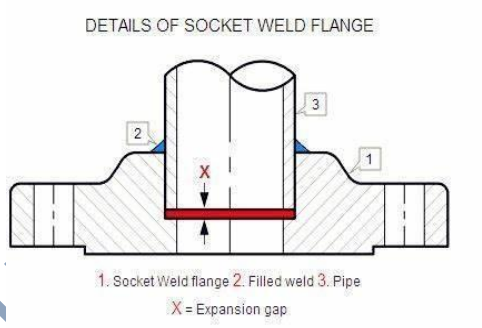
The flange slip over the pipe and welded with two filets welds on inside and outside of the flange. It has short service life compared to weld neck flange.



Socket weld flange

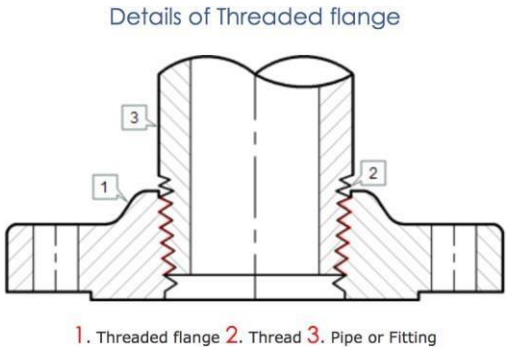
This flange is attached to the pipe by a filled weld. The flange has a socket, so the pipe is inserted and fits on the sockets

- Can be used in high pressure system
- A high skilled welder is required.
- There is an expansion gap that is must be 1/16” to prevent residual stress, as shown in photo



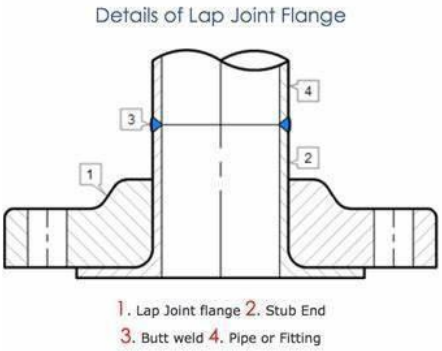
Threaded Flange

It has a female thread, so it’s connected to a male thread. Unlike other flanges, threaded flange is connected to the pipe without welding. It is used for low temperature and low-pressure applications.



Lab Joint flange:

This flange consists of two parts, which are stub end and the flange. It is used for low pressure applications.

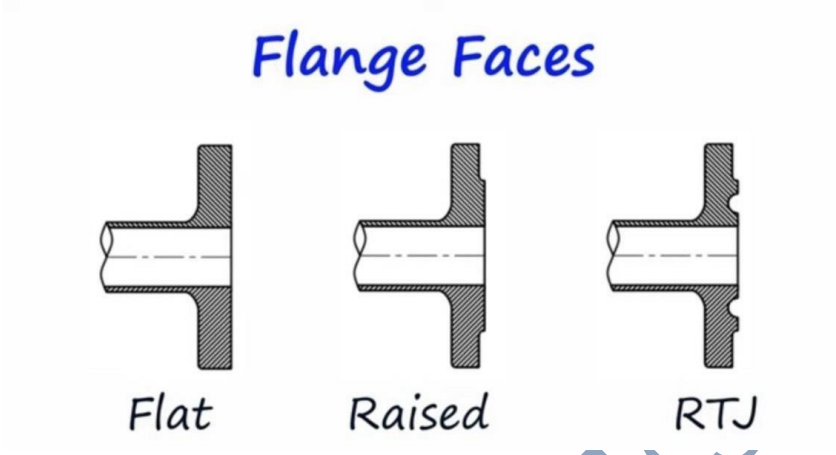


This table shows the features of each type. It simplifies a lot.

Flange Type	NPS (inch)	ASME Class	Faces	Joint Integrity	Weld	ASME Standards
Welding Neck Flange	All	All	All	High	One butt weld.	B16.5, B31.3
Slip-on Flange	Many	Generally, ≤ 600	FF, RF	Medium	One or two fillet welds.	B16.5, B31.3
Socket Weld Flange	Generally, ≤ ½ to 2. Max ≤ 4	≤ 600	FF, RF	Medium	One fillet weld.	B16.5, B31.3
Lap Joint Ring Flange	Not used for small sizes.	NA	FF	NA	None	B16.5, B31.3
Stub End of Lap Joint Flange		150 to 2500	FF, RF, RTJ	High	One butt weld.	B16.9, B31.3
Threaded Flange	Generally, ≤ ½ to 2. Max ≤ 4	≤ 300	FF, RF	Low	None	B1.20.1, B31.3
Blind Flange	All	All	All	NA	None	B16.5, B31.3

2- FLANGE FACE

Flange face is the area where gasket is installed. The three common types are Flat,Raised, Ring type



	Flange Face Type		
Characteristics	**Flat Face**	**Raised Face**	**Ring-Type Joint**
Sealing Area	Large	Medium	Small
Sealing Face	Inner diameter to outside diameter.	Inner diameter to raised face outside diameter.	Groove in flange face.
Pressure Range	Narrow. Low pressures only.	Broad	Broad. Generally used for higher pressures.
Pressure Class	125#, 250#	All.	All. Generally ≥ 900#
Temperature Range	Narrow. Low temperatures only.	Broad	Broad
Gasket Type	Soft. Non-metallic.	Non-metallic, semi-metallic.	Hard. Metal.

3- Size

From 1/2" to 24" NPS according to ASME B16.5 26" to 60"

NPS according to ASME B16.47.

What is ASME 16.5B?

ASME 16.5B is a standard for a pipe flange and flanged fittings that covers the flanges sizes from NPS 1/2" to 24". And same for B16.47

*Nominal Pipe Size (NPS) is basically representing the pipe size The Larger NPS, the Thicker Wall Thickness Becomes

4- Pressure-temperature rating

*ASME has developed a flange class considering temperature and pressure rating.

There are seven classes:

150# 300# 400# 600# 900# 1500# 2500#

These pressure classes of flanges are commonly knowns as "pounds" or "Class".

Higher the flange rating, heavier the flange and can withstand higher pressure and temperature.

Working Pressure (bar) (psi)							
Temperature (°C) (°F)	Class						
	150	300	400	600	900	1500	2500
-29 - 38	19.8 287	51.7 749	68.9 999	103.4 1499	155 2246	259 3754	431 6246
50	19.5 283	51.7 749	68.9 999	103.4 1499	155 2246	259 3754	431 6246
100	17.7 257	51.5 746	68.7 996	103.0 1493	155 2246	258 3739	429 6217
150	15.8 229	50.2 728	66.8 968	100.3 1454	151 2188	251 3638	418 6058
200	13.8 200	48.6 704	64.8 939	97.2 1409	146 2116	243 3522	405 5870
250	12.1 175	46.3 671	61.7 894	92.7 1343	139 2014	232 3362	386 5594
300	10.2 148	42.9 622	57.0 826	85.7 1242	129 1870	214 3101	357 5174
325	9.3 135	41.4 600	55.0 797	82.6 1197	124 1797	207 3000	344 4986
350	8.4 122	40.0 580	53.4 774	80.0 1159	120 1739	200 2899	334 4841
375	7.4 107	37.8 548	50.4 730	75.7 1097	114 1652	189 2739	315 4565
400	6.5 94.2	34.7 503	46.3 671	69.4 1006	104 1507	174 2522	290 4203
425	5.5 79.7	28.8 417	38.4 557	57.5 833	86.3 1251	144 2087	240 3478
450	4.6 66.7	23.0 333	30.7 445	46.0 667	69.0 1000	115 1667	192 2783
475	3.7 53.6	17.1 248	22.8 330	34.2 496	51.3 743	85.4 1238	142 2058
500	2.8 40.6	11.6 168	15.4 223	23.2 336	34.7 503	57.9 839	96.5 1399
538	1.4 20.3	5.9 85.5	7.9 114	11.8 171	17.7 257	29.5 428	49.2 713

Blue is in Psi Black

is in Bar

*ASME stands for American Society for Mechanical Engineers.

5- Schedule

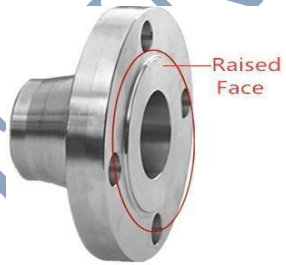
Pipe or flange schedule number can be:
5 SCH, 10 SCH, 20 SCH, 30 SCH, 40 SCH, 60 SCH , 80 SCH , 100 SCH , 120 SCH , 140 SCH , 160 SCH
If it is stainless steel, S is added Example: 5s
SHC, 10s SCH.....etc.
40 SCH and 80 SCH are the most used.

NOMINAL WALL THICKNESS														
Nom Pipe Size	OD	Sch 10	Sch 20	Sch 30	STD Wall	Sch 40	Sch 60	EXT Hvy	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XX Hvy
½	0.84	0.083	.....	.....	0.109	0.109	.....	0.147	0.147	.....	.....	.....	0.188	0.294
¾	1.05	0.083	.....	.....	0.113	0.113	.....	0.154	0.154	.....	.....	.....	0.219	0.308
1	1.315	0.109	.....	.....	0.133	0.133	.....	0.179	0.179	.....	.....	.....	0.25	0.358
1 ¼	1.66	0.109	.....	.....	0.14	0.14	.....	0.191	0.191	.....	.....	.....	0.25	0.382
1 ½	1.9	0.109	.....	.....	0.145	0.145	.....	0.2	0.2	.....	.....	.....	0.281	0.4
2	2.375	0.109	.....	.....	0.154	0.154	.....	0.218	0.218	.....	.....	.....	0.344	0.436
2 ½	2.875	0.12	.....	.....	0.203	0.203	.....	0.276	0.276	.....	.....	.....	0.375	0.552
3	3.5	0.12	.....	.....	0.216	0.216	.....	0.3	0.3	.....	.....	.....	0.438	0.6
3 ½	4	0.12	.....	.....	0.226	0.226	.....	0.318	0.318	.....	.....	.....	.....	0.636
4	4.5	0.12	.....	.....	0.237	0.237	.....	0.337	0.337	.....	0.438	.....	0.531	0.674
5	5.563	0.134	.....	.....	0.258	0.258	.....	0.375	0.375	.....	0.5	.....	0.625	0.75
6	6.625	0.134	.....	.....	0.28	0.28	.....	0.432	0.432	.....	0.562	.....	0.719	0.864
8	8.625	0.148	0.25	0.277	0.322	0.322	0.406	0.5	0.5	0.594	0.719	0.812	0.906	0.875
10	10.75	0.165	0.25	0.307	0.365	0.365	0.5	0.5	0.594	0.719	0.844	1	1.125	1
12	12.75	0.18	0.25	0.33	0.375	0.406	0.562	0.5	0.688	0.844	1	1.125	1.312	1
14	14	0.25	0.312	0.375	0.375	0.438	0.594	0.5	0.75	0.938	1.094	1.25	1.406	.....
16	16	0.25	0.312	0.375	0.375	0.5	0.656	0.5	0.844	1.031	1.219	1.438	1.594	.....
18	18	0.25	0.312	0.438	0.375	0.562	0.75	0.5	0.938	1.156	1.375	1.562	1.781	.....
20	20	0.25	0.375	0.5	0.375	0.594	0.812	0.5	1.031	1.281	1.5	1.75	1.969	.....
22	22	0.25	.....	.....	0.375	.....	.....	0.5	.....	.....	.....	.....	.....	.....
24	24	0.25	0.375	0.562	0.375	0.688	0.969	0.5	1.219	1.531	1.812	2.062	2.344	.....

Stainless Steel (SS)

ASTM A182 F304 or F316

Example:



This is a Stainless steel, Weld Neck, 600# class, 6 inch,

Raised Face Flange or
6” 600# ASTM A182 F304 Sch80 WN RF

#1 Weld Neck Flange

This type of flange consists of a long tapered hub. Usually machined from a forging, these flanges are welded to a pipe. Flanges with weld necks are great for applications when there is a requirement for a continuous flow of fluid through the piping system.

These flanges are commonly used in high-pressure and high/low-temperature applications. There are two types of welding neck flanges: a regular type for use with pipes and an elongated type for use in process plants. By preventing pressure drops, turbulence and erosion/corrosion of metals near flanged joints are prevented.

#2 Long Welding Neck Flange

These flanges are similar to weld neck flanges, except that the neck is extended and acts like a boring extension. Long Weld Neck Flanges are designed to be used in place of weld neck flanges and pipe pieces for bolt-up connections to ships, columns, or barrels.

This design reduces stress on the neck and transfers it to the base, which attaches to the vessel. These are generally used to connect large networks of pipes as they can withstand high pressures. Heavy barrel (HB) and equal barrel (E) are two common types of these flanges.

#1 Weld Neck Flange

This type of flange consists of a long tapered hub. Usually machined from a forging, these flanges are welded to a pipe. Flanges with weld necks are great for applications when there is a requirement for a continuous flow of fluid through the piping system.

These flanges are commonly used in high-pressure and high/low-temperature applications. There are two types of welding neck flanges: a regular type for use with pipes and an elongated type for use in process plants. By preventing pressure drops, turbulence and erosion/corrosion of metals near flanged joints are prevented.

#2 Long Welding Neck Flange

These flanges are similar to weld neck flanges, except that the neck is extended and acts like a boring extension. Long Weld Neck Flanges are designed to be used in place of weld neck flanges and pipe pieces for bolt-up connections to ships, columns, or barrels.

This design reduces stress on the neck and transfers it to the base, which attaches to the vessel. These are generally used to connect large networks of pipes as they can withstand high pressures. Heavy barrel (HB) and equal barrel (E) are two common types of these flanges.

#3 Slip-on Flange

These types of flanges are connected to the pipe and welded inside and outside. Slip-on flanges have a larger bore size than the outside diameter of the pipe to be connected, as the pipe must slide inside the flange to be welded.

These flanges are also referred to as "hubbed flanges" because their slim and compact shape makes them easy to identify. It is mainly used for liquids with low pressure or low risk of leakage. Apart from their application, the slip-on flange is much cheaper and quite popular among other types.

Read Also: Types of Metals: Their Properties and Uses [Explained]

#4 Threaded Flange

Threaded flanges are similar in design to slip-on flanges, the only difference being that they have a tapered thread. This design allows it to be attached to the pipe without welding. It has threads inside the flange bore that are fitted with matching male threads on the pipe or fitting.

The best application for them is in low-pressure, low-temperature environments, like slip-on flanges. These are available in sizes up to 4 inches and in several pressure ratings; however, they are used in smaller pipes such as water and air utility services.

Also, these flange requirements apply to explosive environments like gas stations and plants, where welding connections would be harmful.

#5 Socket Weld Flange

Socket weld flanges are joined to the pipe using a single fillet weld held outside the flange. These flanges are typically used on small-size high-pressure pipes that do not transfer highly corrosive fluids.

It is because these flange types tend to corrode in the gap between the pipe end and the socket shoulder. It is not often used for critical services. In this flange, the static strength is comparable to that of slip-on flanges, but the fatigue strength is 50% higher than that of double-welded slip-on flanges.

#6 Lap Joint Flange

Lap joint flanges have a flat face and are always used with a stub end. These flanges resemble slip-on flanges in shape, except for the radius at the crossing of the flange face and the bore to adjust the flanged portion of the stub end.

A lap joint flange slips over the pipe and seats behind the stub end, and the two are held together by bolt pressure. These flanges have freedom of movement around the pipe, facilitating opposing flange bolt holes. For stainless steel or nickel alloy pipelines, lap joint flanges are a cost-effective solution since the lap joint flange material can be of a lower grade.

Read ALso: Mechanical Properties That Every Mechanical Engg Should Know

#7 Blind Flange

A blind flange is a type of flange that has no bore center and is used to terminate or close the end of a piping system. These flanges are subjected to significant mechanical stress due to system pressure and the required bolting forces.

Because of this, they are suitable for high-pressure applications and testing the flow of a gas or liquid through pipes. A blind flange allows easy access to the pipeline since it can be easily unbolted by the operator to perform activities inside the terminal end. They can also seal a nozzle opening on a pressure vessel.

#8 Orifice Flange

Orifice flanges are used with orifice plates to measure or restrict the pressure or flow of gases and liquids in pipelines. They are found with an additional set of bolts called jack screws. They are often available with a plate and jack screw, allowing complete product.

An orifice flange's primary function is to measure fluid or gas flow rate through a piping system. In these flanges, a hole is drilled through the face perpendicular to the pipe, making them easy to identify.

#9 Nipo Flange

Also known as a weldoflange, this flange is a combination of a welding neck flange and a weldolet or nipolet. However, it is a solid piece of forged steel flange, not two separate products welded together.

Nickel flanges are available in several different materials, including carbon steel ASTM A105 (high-temperature), stainless steel ASTM A182 and nickel alloys. These are used to branch pipelines at 90 degrees. They are also fabricated in a reinforced version, which holds additional mechanical strength compared to the standard flange.

Read Also:Different Types of Gears: Their Working and Applications

#10 Swivel Flange

A swivel ring flange enables bolt holes to be aligned between two mating flanges, a feature that is important for various applications, including the installation of large-diameter pipelines, subsea and offshore pipelines, and pipeworks in shallow water.

These types of flanges are suitable for oil, gas, hydrocarbon, water, chemical, and other fluids in petrochemical and water-handling applications. This flange is ideal for offshore or subsea pipeline operations, allowing divers to more quickly and easily adjust bolt holes.

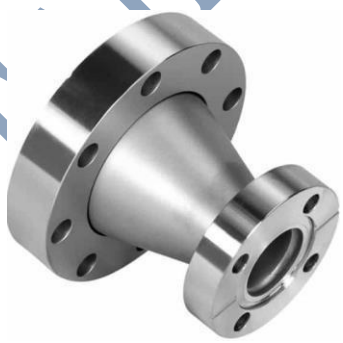
A swivel flange is available in all standard shapes, e.g. weld-neck, slip-on, lap-joint, socket weld, etc., and in all material grades.

#11 Expanding Flange

The purpose of expanding flanges is to increase the bore of a pipeline from one point to another or to connect pipes with other mechanical devices such as pumps and compressors. It is type of welding neck flange has a larger bore on the non-flange end.

It is not possible to increase pipe bores by more than two sizes with expanding flanges. The extended flange is compact and saves space compared to the reducer-welding neck flange.It only requires a butt-weld to install, which is very cost-effective and competitively priced.

#12 Reducing Flange



As the name suggests, the reducing flange is used to reduce the diameter of the pipe. These flanges are used where pipe installation space is limited. These are available in various sizes and material grades and are usually unavailable from stock.

An advantage of using a reducing flange is that the piping can be assembled without welding. Reducing flanges are easy to bolt on, provide a simple solution and are most cost-effective. This allows for the same considerations in terms of specifications, sizes, and material grades as the expansion flange.

Read Also: Types of Furnaces: Their Working & Applications

#13 Elbow Flange

An Elbow flange is widely used for piping connections that require compact pipe routing. The flanged elbow is used as a fitting. In contrast, flanged bends are made by welding a flange directly to a piping elbow (weld neck or any other type).

Compared to carbon steel elbow flange, stainless steel elbow flange will not erode, pitting or rust. A stainless steel elbow fitting has a smooth inner wall that prevents impurities from condensing.

#14 Puddle Flange

These flanges are used to seal pipes and cables made of plastic, steel, fiber cement, and vitrified clay against high-water columns. They prevent groundwater and pressurized water from entering concrete foundations and walls. ANSI B16. 5, ASTM A 182, ASTM A 105, and ASTM A 351 are the material standards for this type of flanges.

#15 Split Flange

A split flange comprises two interlocking pieces that securely fit together using nuts and bolts or welding in place. As split flanges are made of two parts, they can be used to strengthen piping, or to add attachments in areas where conventional flanges cannot.

Due to their suitability for high pressure, shock and vibration, these flanged fittings are used in challenging applications. In addition, they also allow easy connection between the hose and pipe, as well as between rigid lines. The advantage of using this flange is that it is easy to install over existing piping and hydraulic tubing.

Read Also: Types of Heat Exchangers: Their Working & Application

#16 Cast Flange

Cast pipe flanges are also types of flanges that are used in pipe systems to join pipes. Cast flanges typically have two types of bolts: one for sealing and one for tensioning. The main reason why cast iron is used for flanges is because it is cheap to produce, allows for more complex parts to be made at a lower cost, and has no real size limit.

#17 Square Flange

These types of flanges are square in shape and are used between pipe-to-pipe or pipe-to-component connections, such as valves, tees, and elbows. The square flange is made according to JIS B2291 / JIS F7806 standard.

These flanges are helpful in joining pipes of JIS standard nominal bore size together in hydraulic systems. The square flange is usually available in various pressure ratings to serve its purpose. Square flanges are widely used in a variety of high-pressure applications, such as pipe connections.

#18 Anchor Flange

An anchor flange is installed on a pipeline to counteract axial movement and prevent the pipeline from moving. Typically, after the flange has been welded to the pipe, it is anchored to a concrete foundation.

The purpose of these types of flanges is to restrain or limit main line thermal expansion and contraction, as well as to transfer built-up stress to external structures or a larger foundation. Using these flanges, equipment and valves protect against excessive stresses that can arise due to line temperature and pressure.

Read Also: Types of Dies in Manufacturing: Their Components and Uses (PDF)

Material Used to Manufacture Flange

Depending on the piping material and the application's requirements, flanges are manufactured from many different materials. Factors such as economy, flow pressure, operating temperature, and environmental corrosion are considered when selecting a flange for a particular application.

The following are common materials used to make flanges:

#1 Carbon Steel

It is a type of steel alloy that contains carbon. It offers high strength and hardness, increased carbon content, low melting point, and ductility.

#2 Alloy Steel

Metallurgy refers to alloying steel with elements that alter or enhance its properties. Common alloy steels are chromium, molybdenum, nickel, and manganese.

#3 Stainless Steel

Stainless steel contains chromium in excess of 10%. This chromium property enables stainless steel to have a higher corrosion resistance than carbon steel which rusts easily from exposure to air and moisture.

#4 Aluminum

Aluminum provides a low-density, ductile and malleable metal with moderate strength. It has better corrosion resistance properties than any other special alloy steel. This is important during flange manufacturing which requires low weight and strength.

#5 Cast Iron

Cast iron is made when the iron is alloyed with silicon, carbon, and many other alloys. Cast iron has many properties, such as machinability, castability, and fluidity.

#6 Brass

It is an alloy of zinc and copper, often containing tin or lead as well. It has good conductivity, cold ductility, high-temperature ductility, and good strength.

Read Also: 13 Different Types of Coupling and Their Applications [PDF]

Common Performance Features of Flange

There are many factors that affect the performance of a flange, but they need to be taken into consideration in order to achieve the best performance. The following are the common performance properties of flange:

#1 Durability

Durability defines the toughness or strength of the pipe flange under pressure or tension. It depends on flange design and compatibility with pipe and material strength.

#2 Ease of Assembly

In other words, it describes how effectively the disassembly and assembly processes work. Ease of setup and takedown is critical in applications where flanges are used as temporary attachments or fixes.

#3 Weight

The weight property defines the heaviness or mass of the flange. Weight depends on material density and size. In the case of high or large-density flanges, industrial buyers must pay attention to the strength of the pipe or pipe support.

Closing It Up

I hope I have covered everything about the "**Types of Flanges.**" If I missed something, or if you have any doubts, let me know in the comments. If you liked this article, please share it with your friends.

.

Welded neck flange

Slip on flange

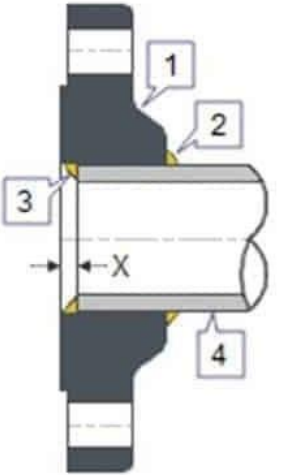
Lap joint flange

Screwed flange

Blind flanges

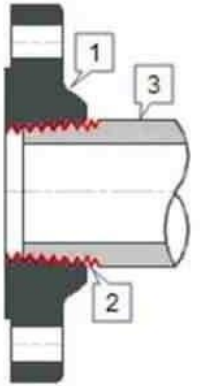
Spectacle blind flange

Slip-On Flanges



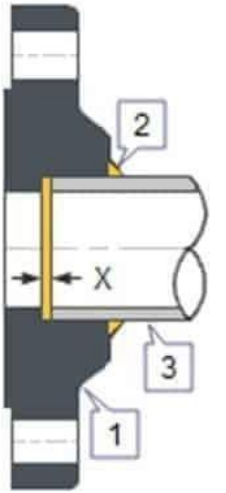
1. Slip On Flange **2.** Fillet Weld (outside)
3. Fillet Weld (inside) **4.** Pipe

Threaded Flanges



1. Threaded flange **2.** Thread
3. Pipe or Fitting

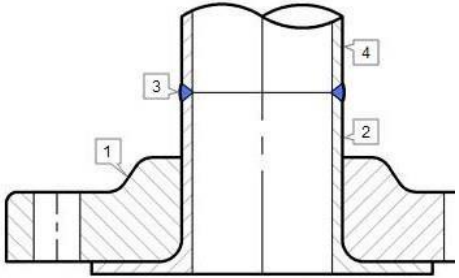
Socket-Welded Flanges



1. Socket Weld Flange **2.** Fillet Weld
3. Pipe **X** = Expansion gap

LAP JOINT FLANGES

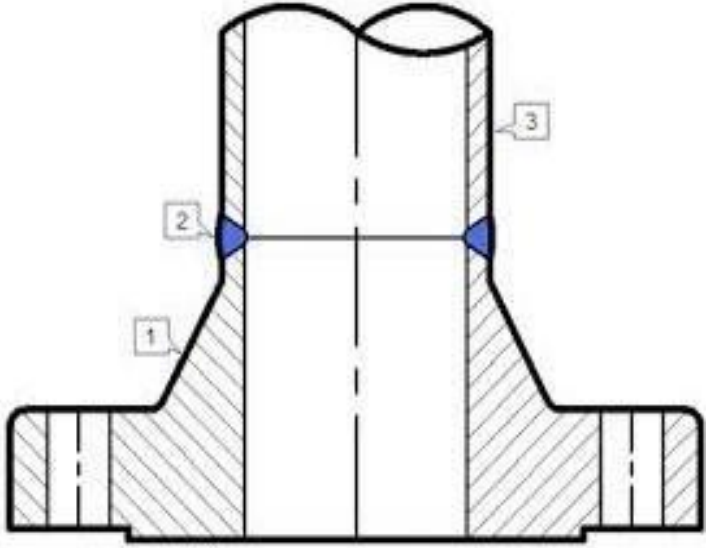
DETAILS OF LAP JOINT FLANGE



1. Lap Joint flange 2. Stub End
3. Butt weld 4. Pipe or Fitting

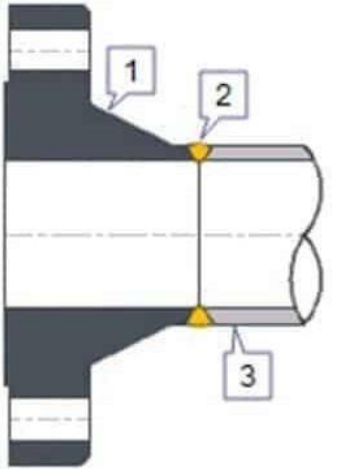
WELDING NECK FLANGES

DETAILS OF WELDING NECK FLANGE



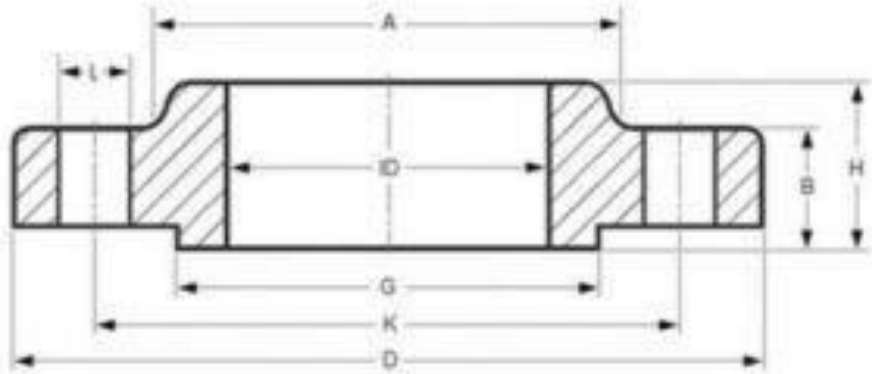
1. Weld Neck flange 2. Butt Weld

Weld Neck Flanges



1. Welding Neck flange **2.** Buttwel
3. Pipe or Fitting

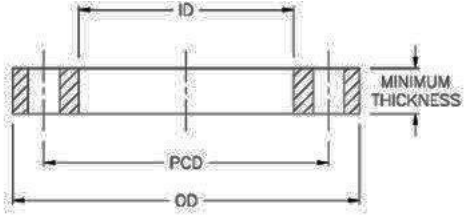
Slip On Flange - Stainless Steel



** Generic photo, not of actual item.*

DIMENSIONS OF CLASS 400 FLANGES

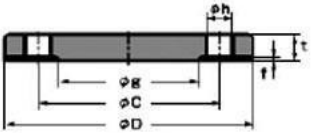
1	2	3	4	5	6	7	8	9	10	11	12	13	14
					Length Through Hub				Bore				
Nominal Pipe Size	Outside Diameter of Flange, O	Thickness of Flange Min., t_f	Diameter of Hub, X	Diameter Beginning of Chamfer Welding Neck, A	Threaded Slip-on, Y	Lapped, Y	Weldking Neck, Y	Thread Length Threaded Min., T	Slip-on Min., B	Lapped Min., B	Welding Neck, B	Corner Radius of Bore of Lapped Flange and Pipe, r	Counter-bore Threaded Flange Min., Q
1/2	3.75	0.56	1.50	0.84	0.88	0.88	2.06	0.62	0.88	0.90		0.12	0.93
3/4	4.62	0.62	1.88	1.05	1.00	1.00	2.25	0.62	1.09	1.11		0.12	1.14
1	4.88	0.69	2.12	1.32	1.06	1.06	2.44	0.69	1.36	1.38		0.12	1.41
1 1/4	5.25	0.81	2.50	1.66	1.12	1.12	2.62	0.81	1.70	1.72		0.19	1.75
1 1/2	6.12	0.88	2.75	1.90	1.25	1.25	2.75	0.88	1.95	1.97		0.25	1.99
2	6.50	1.00	3.31	2.38	1.44	1.44	2.88	1.12	2.44	2.46		0.31	2.50
2 1/2	7.50	1.12	3.94	2.88	1.62	1.62	3.12	1.25	2.94	2.97		0.31	3.00
3	8.25	1.25	4.62	3.50	1.81	1.81	3.25	1.38	3.57	3.60		0.38	3.63
3 1/2	9.00	1.38	5.25	4.00	1.94	1.94	3.38	1.56	4.07	4.10	To be	0.38	4.13
4	10.00	1.38	5.75	4.50	2.00	2.00	3.50	1.40	4.57	4.60	specified	0.44	4.63
5	11.00	1.50	7.00	5.56	2.12	2.12	4.00	1.69	5.66	5.69	by	0.44	5.69
6	12.50	1.62	8.12	6.63	2.25	2.25	4.06	1.81	6.72	6.75	purchaser	0.50	6.75
8	15.00	1.88	10.25	8.63	2.69	2.69	4.62	2.00	8.72	8.75		0.50	8.75
10	17.50	2.12	12.62	10.75	2.88	4.00	4.88	2.19	10.88	10.92		0.50	10.88
12	20.50	2.25	14.75	12.75	3.12	4.25	5.38	2.38	12.88	12.92		0.50	12.94
14	23.00	2.38	16.75	14.00	3.31	4.62	5.88	2.50	14.14	14.18		0.50	14.19
16	25.50	2.50	19.00	16.00	3.69	5.00	6.00	2.69	16.16	16.19		0.50	16.19
18	28.00	2.62	21.00	18.00	3.88	5.38	6.50	2.75	18.18	18.20		0.50	18.19
20	30.50	2.75	23.12	20.00	4.00	5.75	6.62	2.88	20.20	20.25		0.50	20.19
24	36.00	3.00	27.62	24.00	4.50	6.25	6.88	3.25	24.25	24.25		0.50	24.19



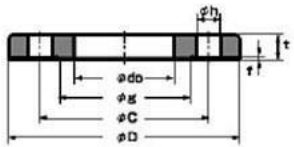
Nominal Pipe OD	Flange Size	OD	ID	Minimum Thickness	PCD	Bolt Hole No. x Dia.	Bolt Size
63	**50**	150	78	11	114	4X18	M16
75	**65**	165	92	11	127	4X18	M16
90	**80**	185	108	11	146	4X18	M16
110	**100**	215	128	13	178	4X18	M16
160	**150**	280	178	13	235	8X18	M16
200	**200**	335	235	19	292	8X18	M16
225	**225**	370	238	19	324	8X18	M16
250	**250**	405	288	19	356	8X22	M20
315	**300**	455	338	23	406	12X22	M20
355	**350**	525	376	30	470	12X26	M24
n/a	**375**	550	n/a	30	495	12X26	M24
400	**400**	580	430	30	521	12X26	M24
450	**450**	640	470	30	584	12X26	M24
500	**500**	705	533	38	641	16X26	M24
630	**600**	825	645	48	756	16X30	M27
710	**700**	910	740	56	845	20X30	M27
n/a	**750**	995	n/a	56	927	20X33	M30
800	**800**	1060	843	56	984	20X36	M33
900	**900**	1175	947	66	1092	24X36	M33
1000	**1000**	1255	1050	66	1175	24X36	M33

Note: This table has bolting compatibility with AS 2129 Table D flanges.

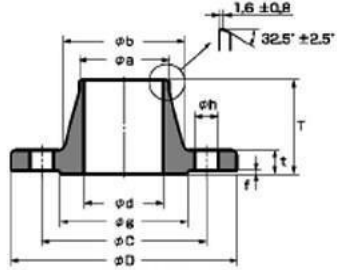
As per ISO 9624: "The inside diameter of the loose backing flange shall conform to the design of the flange adaptor. In some applications, values of the inside diameter of the loose backing flange differing from those given in the tables may be used."



Blind

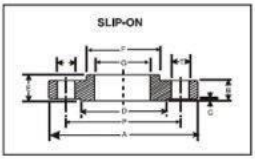


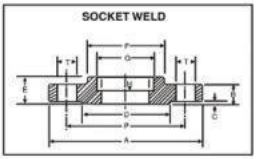
Plate

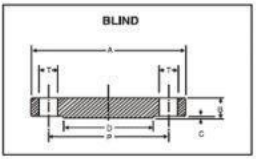


Weld Neck

Pipe		Pipe	D	do	t	F	g	c	Holes	h	Weld Neck			
inch	mm										d	a	b	T
3/8	10	17.3	115	17.8	23	1	52	80	4	19	-	17.3	40	61
1/2	15	21.7	120	22.2	23	1	55	85	4	19	15.8	21.7	42	61
3/4	20	27.2	135	27.7	25	1	60	95	4	23	21.1	27.2	46	71
1	25	34.0	140	34.5	27	1	70	100	4	23	26.8	34.0	56	74
1-1/4	32	42.7	150	43.2	30	2	80	110	4	23	35.1	42.7	60	75
1-1/2	40	48.6	175	49.1	32	2	90	130	4	25	40.7	48.6	75	85
2	50	60.5	185	61.1	34	2	105	145	8	25	52.2	60.5	92	104
2-1/2	65	76.3	220	77.1	38	2	130	175	8	25	65.3	76.3	118	107
3	80	89.1	230	90.0	40	2	140	185	8	25	76.4	89.1	130	120
3-1/2	90	101.6	255	102.6	42	2	150	205	8	27	89.5	101.6	140	126
4	100	114.3	270	115.4	44	2	165	220	8	27	101.5	114.3	154	126
5	125	139.8	325	141.2	50	2	200	265	8	33	-	-	-	-
6	150	165.2	365	166.6	54	2	240	305	12	33	150.0	165.2	230	173
8	200	216.3	425	218.0	60	2	290	360	12	33	198.7	216.3	280	215
10	250	267.4	500	269.5	68	2	355	430	12	39	247.5	267.4	348	256
12	300	318.5	560	321.0	77	3	410	485	16	39	296.4	318.5	402	286
14	350	355.6	615	358.1	81	3	455	530	16	46	331.8	355.6	438	301
16	400	406.4	680	409.0	89	3	515	590	16	46	379.1	406.4	490	314







DIMENSIONS OF CLASS 150 FLANGES AS PER ANSI B 16.5

N.B.	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	T	No.of Holes
15	89	11,1	1,6	35	16	30	22,4	9,5	21,3	-	48	16	16	23,0	60,3	3,0	15,9	4
20	98	12,7	1,6	43	16	38	27,7	11,0	26,7	-	52	16	16	28,0	69,8	3,0	15,9	4
25	108	14,3	1,6	51	17	49	34,5	12,5	33,4	-	56	17	17	35,0	79,4	3,0	15,9	4
32	117	15,9	1,6	64	21	59	43,2	14,5	42,2	-	57	21	21	43,5	88,9	5,0	15,9	4
40	127	17,5	1,6	73	22	65	49,5	16,0	48,3	-	62	22	22	50,0	98,4	6,5	15,9	4
50	152	19,0	1,6	92	25	78	62,0	17,5	60,3	-	64	25	25	62,5	120,6	8,0	19,0	4
65	178	22,2	1,6	105	29	90	74,7	19,0	73,0	-	70	29	29	75,5	139,7	8,0	19,0	4
80	190	23,8	1,6	127	30	108	90,7	20,5	88,9	-	70	30	30	91,5	152,4	9,5	19,0	4
90	216	23,8	1,6	140	32	122	103,4	-	101,6	-	71	32	32	104,0	177,8	9,5	19,0	8
100	229	23,8	1,6	157	33	135	116,1	-	114,3	-	76	33	33	117,0	190,5	11,0	19,0	8
125	254	23,8	1,6	186	37	164	143,8	-	141,3	-	89	37	37	145,0	215,9	11,0	22,2	8
150	279	25,4	1,6	216	40	192	170,7	-	168,3	-	89	40	40	171,0	241,3	12,5	22,2	8
200	343	28,6	1,6	270	44	246	221,5	-	219,1	-	102	44	44	222,0	293,4	12,5	22,2	8
250	406	30,2	1,6	324	49	305	276,4	-	273,0	-	102	49	49	277,0	362,0	12,5	25,4	12
300	483	31,8	1,6	381	56	365	327,2	-	323,9	-	114	56	56	328,0	431,8	12,5	25,4	12
350	533	34,9	1,6	413	57	400	359,2	-	355,6	-	127	57	79	360,0	476,2	12,5	28,6	12
400	597	36,5	1,6	470	64	457	410,5	-	406,4	-	127	64	87	411,0	539,8	12,5	28,6	16
450	635	39,7	1,6	533	68	505	461,8	-	457,2	-	140	68	97	462,0	577,8	12,5	31,8	16
500	698	42,9	1,6	584	73	559	513,1	-	508,0	-	144	73	103	514,0	635,0	12,5	31,8	20
600	813	47,6	1,6	692	83	664	616,0	-	609,6	-	152	83	111	616,0	749,3	12,5	34,9	20

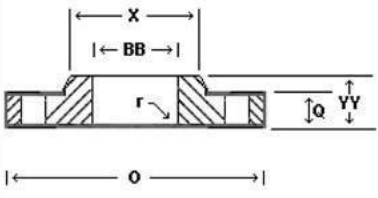
DIMENSIONS OF CLASS 300 FLANGES AS PER ANSI B 16.5

N.B.	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	T	No.of Holes
15	95	14,3	1,6	35	22	38	22,4	9,5	21,3	23,5	52	16	22	23,0	66,7	3,0	15,9	4
20	117	15,9	1,6	43	25	48	27,7	11,0	26,7	29,0	57	16	25	28,0	82,6	3,0	19,0	4
25	124	17,5	1,6	51	27	54	34,5	12,5	33,4	36,0	62	17	27	35,0	88,9	3,0	19,0	4
32	133	19,0	1,6	64	27	64	43,2	14,5	42,2	44,5	65	21	27	43,5	98,4	5,0	19,0	4
40	156	20,6	1,6	73	30	70	49,5	16,0	48,3	50,5	68	22	30	50,0	114,3	6,5	22,2	4
50	165	22,2	1,6	92	33	84	62,0	17,5	60,3	63,5	70	29	33	62,5	127,0	8,0	19,0	8
65	190	25,4	1,6	105	38	100	74,7	19,0	73,0	76,0	76	32	38	75,5	149,2	8,0	22,2	8
80	210	28,6	1,6	127	43	117	90,7	20,5	88,9	92,0	79	32	43	91,5	168,3	9,5	22,2	8
90	229	30,2	1,6	140	44	133	103,4	-	101,6	105,0	81	37	44	104,0	184,2	9,5	22,2	8
100	254	31,8	1,6	157	48	146	116,1	-	114,3	118,0	86	37	48	117,0	200,0	11,0	22,2	8
125	279	34,9	1,6	186	51	178	143,8	-	141,3	145,0	98	43	51	145,0	235,0	11,0	22,2	8
150	318	36,5	1,6	216	52	206	170,7	-	168,3	171,0	98	46	52	171,0	269,9	12,5	22,2	12
200	381	41,3	1,6	270	62	260	221,5	-	219,1	222,0	111	51	62	222,0	330,2	12,5	25,4	12
250	444	47,6	1,6	324	67	321	276,4	-	273,0	276,0	117	56	95	277,0	387,4	12,5	28,6	16
300	521	50,8	1,6	381	73	375	327,2	-	323,9	329,0	130	60	102	328,0	450,8	12,5	31,8	16
350	584	54,0	1,6	413	76	425	359,2	-	355,6	360,0	143	64	111	360,0	514,4	12,5	31,8	20
400	648	57,2	1,6	470	83	483	410,5	-	406,4	411,0	146	68	121	411,0	571,5	12,5	34,9	20
450	711	60,3	1,6	533	89	533	461,8	-	457,2	462,0	159	70	130	462,0	628,6	12,5	34,9	24
500	775	63,5	1,6	584	95	587	513,1	-	508,0	513,0	162	73	140	514,0	685,8	12,5	34,9	24
600	914	69,8	1,6	692	106	702	616,0	-	609,6	614,0	168	83	152	616,0	812,8	12,5	41,3	24

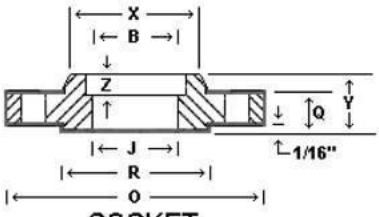
1) All dimensions are in Millimeters

2) Flanges except Lap Joint will be furnished with (1,6) Raised Face, which is included in "Thickness(C)" and "Length through Hub(Y)".

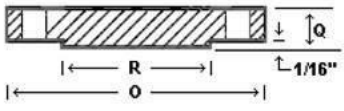
Dimensions for Class 600 Flanges



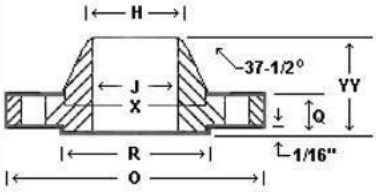
LAP JOINT



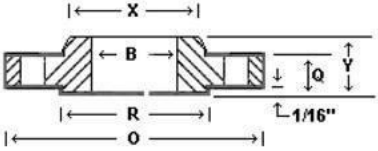
SOCKET



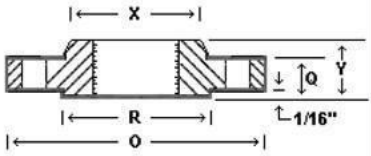
BLIND



WELDING NECK



SLIP ON

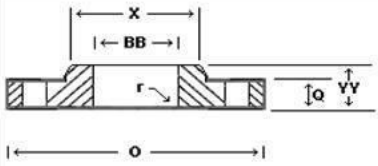


THREADED

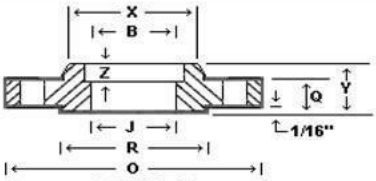
Nom. Pipe Size (inches)	O	Q*	R	X	No. and** Dia of Bolt Holes	Bolt Circle Dia.	YY*	H	J	Y*	B	r	YV	BB	Z	C	T
1/2	3.75	0.56	1.38	1.5	4-0.62	2.62	2.06	0.84	****	0.88	0.88	0.12	0.88	0.90	0.38	0.93	0.62
3/4	4.62	.62	1.69	1.88	4-0.75	3.25	2.25	1.05		1.00	1 09	0.12	1.00	1.11	.44	1.14	0.62
1	4.88	.69	2.00	2.12	4-0.75	3.50	2.44	1.32		1.06	1.36	0.12	1.06	1.38	0.5	1.41	0.69
11/4	5.25	0.81	2.50	2.5	4-0.75	3.88	2.62	1.66		1.12	1.70	0.19	1.12	1.72	0 56	1.75	0.81
11/2	6.12	0.88	2.88	2.75	4-0.88	4.50	2.75	1.90		1.25	1.95	0.25	1.25	1.97	0.62	1.99	0.88
2	6.50	1.00	3.62	3.31	8-0.75	5.00	2.88	2.38		1.44	2.44	0.31	1.44	2.46	0.69	2.50	1.12
21/2	7.50	1.12	4.12	3.94	8-0.88	5.88	3.12	2.88		1.62	2.94	0.31	1.62	2.97	0.75	3.00	1.25
3	8.25	1.25	5.00	4.62	8-0.88	6.62	3.25	3.50		1.81	3.57	0.38	1.81	3.60	0.81	3.63	1.38
31/2	9.00	1.38	5.5	5.25	8-1.00	7.25	3.38	4.00		1.94	4.07	0.38	1.94	4.10		4.13	1.56
4	10.75	1.50	6.19	6.00	8-1.00	8.50	4.00	4.50		2.12	4.57	0.44	2.12	4.60		4.63	1.62
5	13.00	1.75	7.31	7.44	8-1.12	10.50	4.50	5.56		2.38	5.66	0.44	2.38	5.69		5.69	1.88
6	14.00	1.88	8.50	8.75	12-1.12	11.50	4.62	6.63		2.62	6.72	0.50	2.62	6.75		6.75	2.00
8	16.50	2.19	10.62	10.75	12-1.25	13.75	5.25	8.63		3.00	8.72	0.50	3.00	8.75		8.75	2.25
10	20.00	2.50	12.75	13.5	16-1.38	17.00	6.00	10.75		3.38	10.88	0.50	4.38	10.92		10.88	2.56
12	22.00	2.62	15.00	15.75	20-1.38	19.25	6.12	12.75		3.62	12.88	0.50	4.62	12.92		12.94	2.75
14	23.75	2.75	16.25	17.00	20-1.50	20.75	6.50	14.00		3.69	14.14	0.50	5.00	14.18		14.19	2.88
16	27.00	3.00	18.50	19.50	20-1.62	23.75	7.00	16.00		4.19	16.16	0.50	5.5	16.19		18.19	3.06
18	29.25	3.25	21.00	21.50	20-1.75	25.75	7.25	18.00		4.62	18.18	0.50	6.00	18.20		18.10	3.12
20	32.00	3.50	23.00	24.00	24-1.75	28.50	7.50	20.00		5.00	20.2	0.50	6.5	20.25		20.19	3.25
24	37.00	4.00	27.25	28.25	24-2.00	33.00	8.00	24.00		5.50	24.25	0.50	7.25	24.25		24.19	3.62

The following charts are for reference use only. They are based upon older piping systems. Refer to current specifications when designing new systems

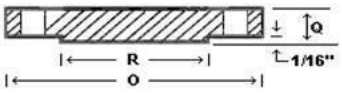
Dimensions for Class 900 Flanges



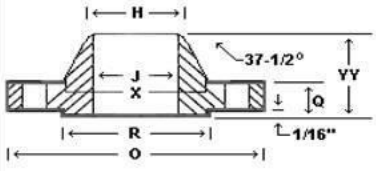
LAP JOINT



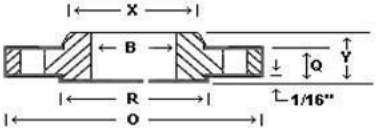
SOCKET



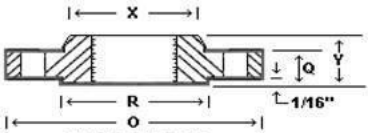
BLIND



WELDING NECK



SLIP ON



THREADED

Nom. Pipe Size (inches)	O	Q*	R	X	No. and** Dia of Bolt Holes	Bolt Circle Dia.	YY*	H	J	Y*	B	r	YV	BB	Z	C	T
1/2	4.75	0.88	1.38	1.50	4-0.88	3.25	2.38	0.84	To Be Specified by Purcaser	1.25	0.88	0.12	1.25	0.90	0.93	0.88	
3/4	5.12	1.00	1.69	1.75	4-0.88	3.50	2.75	1.05		1.38	1.09	0.12	1.38	1.11	1.14	1.00	
1	5.88	1.12	2.00	2.06	4-1.00	4.00	2.88	1.32		1.62	1.36	0.12	1.62	1.38	1.41	1.12	
11/4	6.25	1.12	2.50	2.50	4-1.00	4.38	2.88	1.66		1.62	1.70	0.19	1.62	1.72	1.75	1.19	
11/2	7.00	1.25	2.88	2.75	4-1.12	4.88	3.25	1.90		1.75	1.95	0.25	1.75	1.97	1.99	1.25	
2	8.50	1.50	3.62	4.12	8-1.00	6.50	4.00	2.38		2.25	2.44	0.31	2.25	2.46	2.50	1.50	
21/2	9.62	1.62	4.12	4.88	8-1.12	7.50	4.12	2.88		2.50	2.94	0.31	2.50	2.97	3.00	1.88	
3	9.50	1.50	5.00	5.00	8-1.00	7.50	4.00	3.50		2.12	3.57	0.38	2.12	3.60	3.63	1.62	
4	11.50	1.75	6.19	6.25	8-1.25	9.25	4.50	4.50		2.75	4.57	0.44	2.75	4.60	4.63	1.88	
5	13.75	2.00	7.31	7.50	8-1.38	11.00	5.00	5.56		3.12	5.66	0.44	3.12	5.69	5.69	2.12	
6	15.00	2.19	8.50	9.25	12-1.25	12.50	5.50	6.63		3.38	6.72	0.50	3.38	6.75	6.75	2.25	
8	18.5	2.50	10.62	11.75	12-1.50	15.5	6.38	8.63		4.00	8.72	0.50	4.5	8.75	8.75	2.50	
10	21.50	2.75	12.75	14.50	16-1.50	18.50	7.25	10.75		4.25	10.88	0.50	5.00	10.92	10.88	2.81	
12	24.00	3.12	15.00	16.50	20-1.50	21.00	7.88	12.75		4.62	12.88	0.50	5.62	12.92	12.94	3.00	
14	25.25	3.38	16.25	17.75	20-1.62	22.00	8.38	14.00		5.12	14.14	0.50	6.12	14.18	14.19	3.25	
16	27.75	3.50	18.50	20.00	20-1.75	24.25	8.5	16.00		5.25	16.16	0.50	6.50	16.19	16.19	3.38	
18	31.00	4.00	21.00	22.25	20-2.00	27.00	9.00	18.00		6.00	18.18	0.50	7.50	18.20	18.19	3.50	
20	33.75	4.25	23.00	24.50	20-2.12	29.50	9.75	20.00		6.25	20.20	0.50	8.25	20.25	20.19	3.62	
24	41.00	5.50	27.25	29.50	20-2.62	35.50	11.50	24.00		8.00	24.25	0.50	10.50	24.25	24.19	4.00	

The following charts are for reference use only. They are based upon older piping systems. Refer to current specifications when designing new systems

Weight (L.B.S.)***

Pressure Class	Nom. Size Pipe	Weld Neck	Slip-On	Thd.	Lap Joint	Blind	Socket
150	1/2	2	1	1	1	2	2
	3/4	2	1.5	1.5	1.5	2	2
	1	2.5	2	2	2	2	2
	11/4	2.5	2.5	2.5	2.5	3	3
	11/2	4	3	3	3	3	3
	2	6	5	5	5	4	5
	21/2	10	8	8	8	7	7
	3	11.5	9	10	9	9	8
	31/2	12	11	12	11	13	
	4	16.5	13	13	12	17	
	5	21	15	15	13	20	
	6	26	17	19.5	18	27	
	8	42	28	30	28	47	
	10	54	40	41	36	67	
	12	88	61	65	60	123	
	14	114	83	85	77	139	
	16	142	106	93	104	187	
	18	165	109	120	146	217	
	20	197	148	155	159	283	
	24	268	204	210	195	415	

All dimensions given in inches.

Dimensions & tolerances in accordance with ANSI B16.5. Carbon steel flanges mechanical properties and chemistry conform to ASTM A105.

Flanges are furnished faced, drilled and spot faced or back faced.

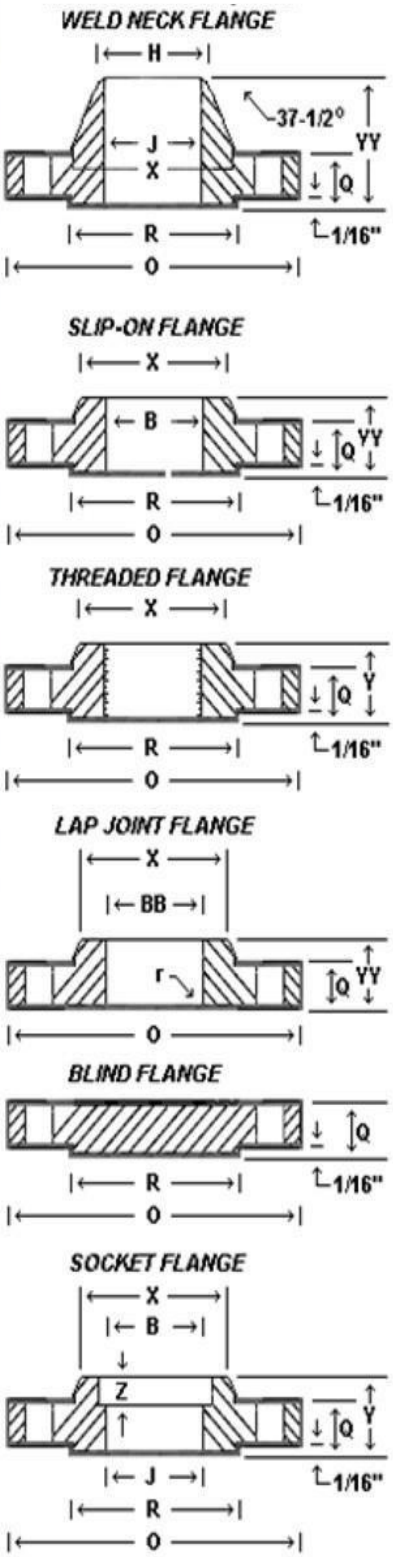
*1/16 in. raised face included in dimensions Q, Y and YY.

**Bolt hole diameter 1/8 in. larger than bolt diameter.

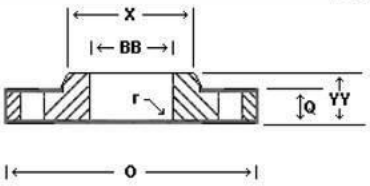
***Weights listed are approximate values.

**** To be specified by the customer

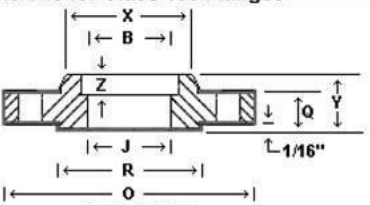
Flange Types



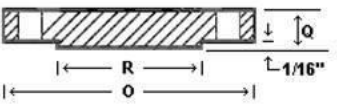
Dimensions for Class 150 Flanges



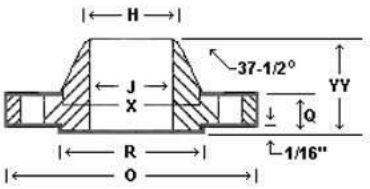
LAP JOINT



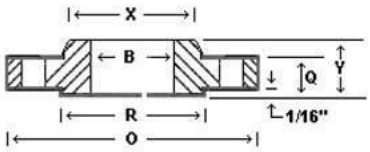
SOCKET



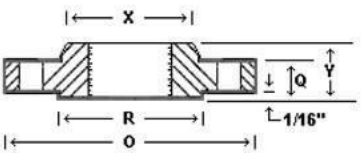
BLIND



WELDING NECK



SLIP ON

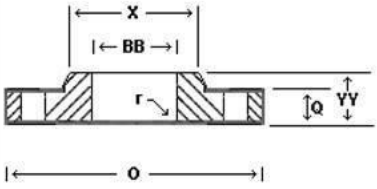


THREADED

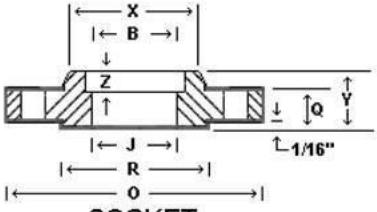
Nom. Pipe Size (inches)	O	Q	R	X	No. and** Dia. of Bolt Holes	Bolt Circle Dia	YY	H	J	Y	B	R	YY	BB	Z
1/2	3.50	.44	1.38	1.19	4-0.62	2.38	1.88	.84	.62	.62	.88	.12	.62	.90	.38
3/4	3.88	.50	1.69	1.50	4-0.62	2.75	2.06	1.05	.82	.62	1.09	.12	.62	1.11	.44
1	4.25	.56	2.00	1.94	4-0.62	3.12	2.19	1.32	1.05	.69	1.36	.12	.69	1.38	.50
11/4	4.62	.62	2.50	2.31	4-0.62	3.50	2.25	1.66	1.38	.81	1.70	.19	.81	1.72	.56
11/2	5.00	.68	2.88	2.56	4-0.62	3.88	2.44	1.90	1.61	.88	1.95	.25	.88	1.97	.62
2	6.00	.75	3.62	3.06	4-0.75	4.75	2.50	2.38	2.07	1.00	2.44	.31	1.00	2.46	.69
21/2	7.00	.88	4.12	3.56	4-0.75	5.50	2.75	2.88	2.47	1.12	2.94	.31	1.12	2.97	.75
3	7.50	.94	5.00	4.25	4-0.75	6.00	2.75	3.50	3.07	1.19	3.57	.38	1.19	3.60	.81
31/2	8.50	.94	5.50	4.81	8-0.75	7.00	2.81	4.00	3.55	1.25	40.70	.38	1.25	4.10	
4	9.00	.94	6.19	5.31	8-0.75	7.50	3.00	4.50	4.03	1.31	4.57	.44	1.31	4.60	
5	10.00	.94	7.31	6.44	8-0.88	8.50	3.50	5.56	5.05	1.44	5.66	.44	1.44	5.69	
6	11.00	1.00	8.50	7.56	8-0.88	9.50	3.50	6.63	6.07	1.56	6.72	.50	1.56	6.75	
8	13.50	1.12	10.62	9.69	8-0.88	11.75	4.00	8.63	7.98	1.75	8.72	.50	1.75	8.75	
10	16.00	1.19	12.75	12.00	12-1.00	14.25	4.00	10.75	10.02	1.94	10.88	.50	1.94	10.92	
12	19.00	1.25	15.00	14.38	12-1.00	17.00	4.50	12.75	12.00	2.19	12.88	.50	2.19	12.92	
14	21.00	1.38	16.25	15.75	12-1.12	18.75	5.00	14.00	To Be Specified by Purchaser	2.25	14.14	.50	3.12	14.18	
16	23.50	1.44	18.50	18.00	16-1.12	21.25	5.00	16.00		2.50	16.16	.50	3.44	16.19	
18	25.00	1.56	21.00	19.88	16-1.25	22.75	5.50	18.00		2.69	18.18	.50	3.81	18.20	
20	27.50	1.69	23.00	22.00	20-1.25	25.00	5.69	20.00		2.88	20.2	.50	4.06	20.25	
24	32.00	1.88	27.25	26.12	20-1.38	29.50	6.00	24.00		3.25	24.25	.50	4.38	24.25	

The following charts are for reference use only. They are based upon older piping systems. Refer to current specifications when designing new systems

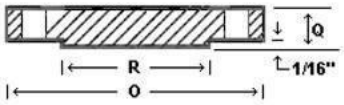
Dimensions for Class 1500 Flanges



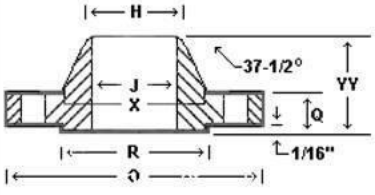
LAP JOINT



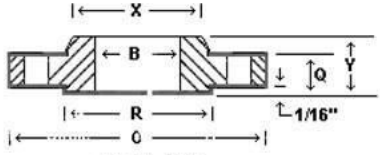
SOCKET



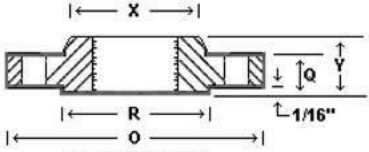
BLIND



WELDING NECK



SLIP ON



THREADED

1/2	4.75	0.88	1.38	1.50	4-0.62	3.50	2.38	0.84		1.38	1.00	0.19	1.38	1.11	0.44	1.14	1.00
3/4	5.12	1.00	1.69	1.75	4-0.88	3.50	2.75	1.05		1.38	1.09	0.19	1.38	1.11	0.44	1.14	1.00
1	5.88	1.12	2.00	2.06	4-1.00	4.00	2.88	1.32		1.62	1.36	0.19	1.62	1.38	0.56	1.41	1.13
1 1/4	6.25	1.12	2.50	2.50	4-1.00	4.38	3.38	1.66		1.62	1.75	0.19	1.62	1.72	0.69	1.75	1.19
1 1/2	7.00	1.25	2.88	2.75	4-1.12	4.88	3.25	1.90		1.75	1.95	0.25	1.75	1.97	0.62	1.99	1.25
2	8.50	1.50	3.62	4.12	8-1.00	6.50	4.00	2.38	speci	2.25	2.44	0.31	2.25	2.46	0.69	2.50	1.50
2 1/2	9.62	1.62	4.12	4.88	8-1.12	7.50	4.12	2.88		2.50	2.94	0.31	2.50	2.97	0.75	3.00	1.88
3	10.50	1.88	5.00	5.25	8-1.25	8.00	4.62	3.50	Fied	2.88		0.38	2.88	3.60		3.63	2.00
4	12.25	2.12	6.19	6.38	8-1.38	9.50	4.88	4.50		3.56		0.44	3.56	4.60		4.63	2.25
5	14.75	2.88	7.31	7.75	8-1.62	11.50	6.12	5.56	By	4.12		0.44	4.12	5.69		5.69	2.50
6	15.50	3.25	8.50	9.00	12-1.50	12.50	6.75	6.63		4.69		0.50	4.69	6.75		6.75	2.75
8	19.00	3.62	10.62	11.50	12-1.75	15.50	8.38	8.63	The	5.62		0.50	5.62	8.75		8.75	3.00
10	23.00	4.25	12.75	14.50	12-2.00	19.00	10.00	10.75		6.25		0.50	7.00	10.92		10.88	3.31
12	26.50	4.88	15.00	17.75	16-2.12	22.50	11.12	12.75	Purc	7.12		0.50	8.62	12.92		12.94	3.62
14	29.50	5.25	16.25	19.50	16-2.38	25.00	11.75	14.00				0.50	9.50	14.18			
16	32.50	5.75	18.50	21.75	16-2.62	27.75	12.25	16.00	Haser			0.50	10.25	16.19			
18	36.00	6.38	21.00	23.50	16-2.88	30.50	12.00	18.00				0.50	10.88	18.20			
20	38.75	7.00	23.00	25.25	16-3.12	32.75	14.00	20.00				0.50	11.5	20.25			
24	46.00	8.00	27.25	30.00	16-3.62	39.00	16.00	24.00				0.5	13.00	24.25			

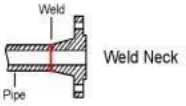
The following charts are for reference use only. They are based upon older piping systems. Refer to current specifications when designing new systems

Flange Types

A Flange is a method of connecting pipes, valves, pumps and other equipment to form a pipework system. It also provides easy access for cleaning, inspection or modification. Flanges are usually welded or screwed into such systems and then joined with bolts.

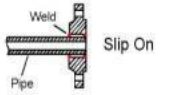
Weld Neck

This flange is circumferentially welded into the system at its neck which means that the integrity of the butt welded area can be easily examined by radiography. The bores of both pipe and flange match, which reduces turbulence and erosion inside the pipeline. The weld neck is therefore favoured in critical applications



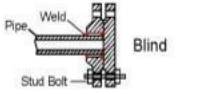
Slip-on

This flange is slipped over the pipe and then fillet welded. Slip-on flanges are easy to use in fabricated applications.



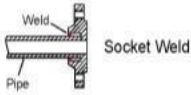
Blind

This flange is used to blank off pipelines, valves and pumps, it can also be used as an inspection cover. It is sometimes referred to as a blanking flange.



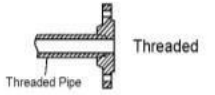
Socket Weld

This flange is counter bored to accept the pipe before being fillet welded. The bore of the pipe and flange are both the same therefore giving good flow characteristics.



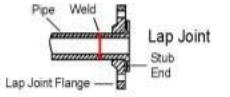
Threaded

This flange is referred to as either threaded or screwed. It is used to connect other threaded components in low pressure, non-critical applications. No welding is required.



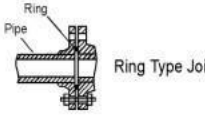
Lap Joint

These flanges are always used with either a stub end or taft which is butt welded to the pipe with the flange loose behind it. This means the stub end or taft always makes the face. The lap joint is favoured in low pressure applications because it is easily assembled and aligned. To reduce cost these flanges can be supplied without a hub and/or in treated, coated carbon steel.

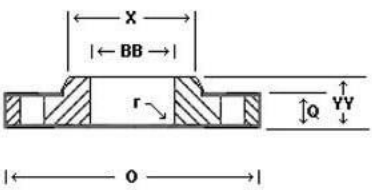


Ring Type Joint

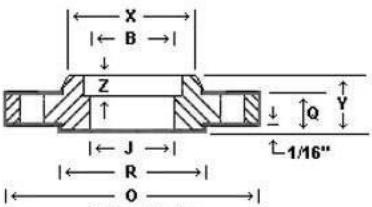
This is a method of ensuring leak proof flange connection at high pressures. A metal ring is compressed into a hexagonal groove on the face of the flange to make the seal. This jointing method can be employed on Weld Neck, Slip-on and Blind Flanges.



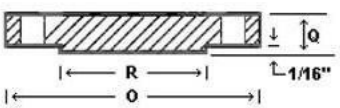
Dimensions for Class 2500 Flanges



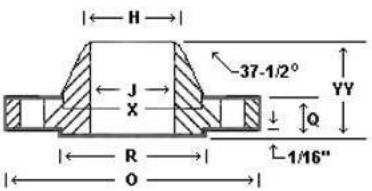
LAP JOINT



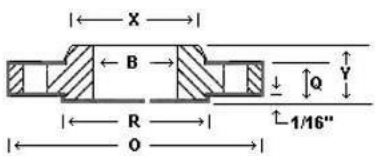
SOCKET



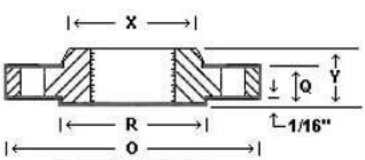
BLIND



WELDING NECK



SLIP ON

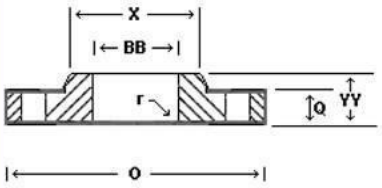


THREADED

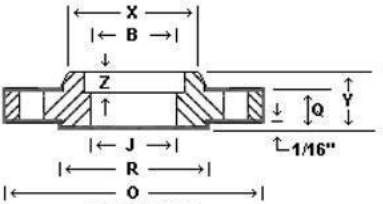
Nom. Pipe Size (inches)	O	Q*	R	X	No. and** Dia of Bolt Holes	Bolt Circle Dia.	YY*	H	J	Y*	B	R	YV	BB	C	T
1/2	5.25	1.19	1.38	1.69	4-0.88	3.50	2.88	0.84	To Be Specified by Purchaser	1.56	.12	1.56	0.90	0.93	1.12	1.12
3/4	5.50	1.25	1.69	2.00	4-0.88	3.75	3.12	1.05		1.69	.12	1.69	1.11	1.14	1.25	
1	6.25	1.38	2.00	2.25	4-1.00	4.25	3.50	1.32		1.88	.12	1.88	1.38	1.41	1.38	
11/4	7.25	1.50	2.50	2.88	4-1.12	5.12	3.75	1.66		2.06	.19	2.06	1.72	1.75	1.50	
11/2	8.00	1.75	2.88	3.12	4-1.25	5.75	4.38	1.90		2.38	.25	2.38	1.97	1.99	1.75	
2	9.25	2.00	3.62	3.75	8-1.12	6.75	5.00	2.38		2.75	.31	2.75	2.46	2.50	2.00	
21/2	10.50	2.25	4.12	4.50	8-1.25	7.75	5.62	2.88		3.12	.31	3.12	2.97	3.00	2.25	
3	12.00	2.62	5.00	5.25	8-1.38	9.00	6.62	3.50		3.62	.38	3.62	3.60	3.63	2.50	
4	14.00	3.00	6.19	6.50	8-1.62	10.75	7.50	4.50		4.25	.44	4.25	4.60	4.63	2.75	
5	16.50	3.62	7.31	8.00	8-1.88	12.75	9.00	5.56		5.12	.44	5.12	5.69	5.69	3.00	
6	19.00	4.25	8.50	9.25	8-2.12	14.5	10.75	6.63		6.00	.50	6.00	6.75	6.75	3.25	
8	21.75	5.00	10.62	12.00	12-2.12	17.25	12.50	8.63		7.00	.50	7.00	8.75	8.75	3.75	
10	26.50	6.50	12.75	14.75	12-2.62	21.25	16.50	10.75		9.00	.50	9.00	10.92	10.88	4.25	
12	30.00	7.25	15.00	17.38	12-2.88	24.38	18.25	12.75		10.00	.50	10.00	12.92	12.94	4.75	

The following charts are for reference use only. They are based upon older piping systems. Refer to current specifications when designing new systems

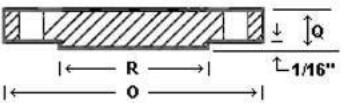
Dimensions for Class 300 Flanges



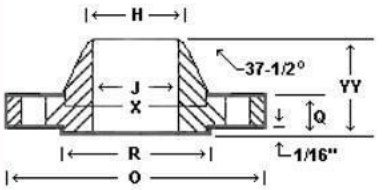
LAP JOINT



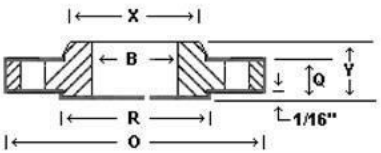
SOCKET



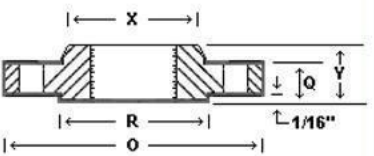
BLIND



WELDING NECK



SLIP ON



THREADED

Nom. Pipe Size (inches)	O	Q*	R	X	No. and** Dia of Bolt Holes	Bolt Circle Dia.	YY*	H	J	Y*	B	R	YV	BB	Z	C	T
1/2	3.75	0.56	1.38	1.50	4-0.62	2.62	2.06	0.84	0.62	0.88	0.88	0.12	0.88	0.90	0.38	0.93	0.62
3/4	4.62	0.62	1.69	1.88	4-0.75	3.25	2.25	1.05	0.82	1.00	1.09	0.12	1.00	1.11	0.44	1.14	0.62
1	4.88	0.69	2.00	2.12	4-0.75	3.50	2.44	1.32	1.05	1.06	1.36	0.12	1.06	1.38	0.50	1.41	0.69
11/4	5.25	0.75	2.50	2.50	4-0.75	3.88	2.56	1.66	1.38	1.06	1.70	0.19	1.06	1.72	0.56	1.75	0.81
11/2	6.12	0.81	2.88	2.75	4-0.88	4.50	2.69	1.90	1.61	1.19	1.95	0.25	1.19	1.97	0.62	1.99	0.88
2	6.50	0.88	3.62	3.31	8-0.75	5.00	2.75	2.38	2.07	1.31	2.44	0.31	1.31	2.46	0.69	2.50	1.12
21/2	7.50	1.00	4.12	3.94	8-0.88	5.88	3.00	2.88	2.47	1.50	2.94	0.31	1.50	2.97	0.75	3.00	1.25
3	8.25	1.12	5.00	4.62	8-0.88	6.62	3.12	3.50	3.07	1.69	3.57	0.38	1.69	3.60	0.81	3.63	1.25
31/2	9.00	1.19	5.50	5.25	8-0.88	7.25	3.19	4.00	3.55	1.75	4.07	0.38	1.75	4.10		4.13	1.44
4	10.00	1.25	6.19	5.75	8-0.88	7.88	3.38	4.50	4.03	1.88	4.57	0.44	1.88	4.60		4.63	1.44
5	11.00	1.38	7.31	7.00	8-0.88	9.25	3.88	5.56	5.05	2.00	5.66	0.44	2.00	5.69		5.69	1.69
6	12.50	1.44	8.50	8.12	12-0.88	10.62	3.88	6.63	6.07	2.06	6.72	0.50	2.06	6.75		6.75	1.81
8	15.00	1.62	10.62	10.25	12-1.00	13.00	4.38	8.63	7.98	2.44	8.72	0.50	2.44	8.75		8.75	2.00
10	17.50	1.88	12.75	12.62	16-1.12	15.25	4.62	10.75	10.02	2.62	10.88	0.50	3.75	10.92		10.88	2.19
12	20.50	2.00	15.00	14.75	16-1.25	17.75	5.12	12.75	12.00	2.88	12.88	0.50	4.00	12.92		12.94	2.38
14	23.00	2.12	16.25	16.75	20-1.25	20.25	5.62	14.00	To Be Specified by Purchaser	3.00	14.14	0.50	4.38	14.18		14.19	2.50
16	25.50	2.25	18.50	19.00	20-1.38	22.50	5.75	16.00		3.25	16.16	0.50	4.75	16.19		16.19	2.69
18	28.00	2.38	21.00	21.00	24-1.38	24.75	6.25	18.00		3.50	18.18	0.50	5.12	18.20		18.19	2.75
20	30.50	2.50	23.00	23.12	24-1.38	27.00	6.38	20.00		3.75	20.20	0.50	5.50	20.25		20.19	2.88
24	36.00	2.75	27.25	27.62	24-1.62	32.00	6.62	24.00		4.19	24.25	0.50	6.00	24.25		24.19	3.25

The following charts are for reference use only. They are based upon older piping systems. Refer to current specifications when designing new systems

CONTACT DETAIL

KANTILAL JAIN : +91-9869013695

RAJ JAIN : +91-9588239316 (SALES MANAGER)

RISHABH JAIN: +91-9833427693/8104186980
(SALES MANAGER)

EMAIL:
SALESHEAD.RJ@EMPEXSTAINLESS.COM
SALES@EMPEXSTAINLESS.COM
EMPEX.STAINLESS@GMAIL.COM

FOR EXPORT: EXPORT.EMPEX@GMAIL.COM