

॥ श्री गणेशाय नमः ॥

FLANGES

**Products &
Technical Guide**

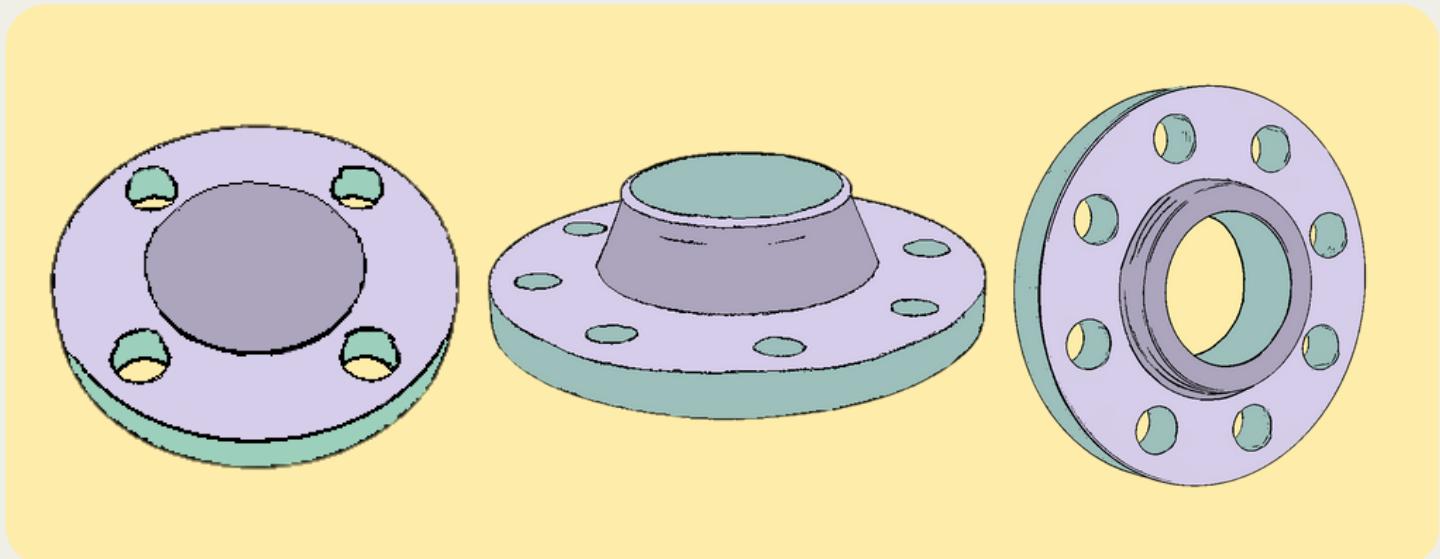


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FLANGES OVERVIEW:

Flanges acting as the perfect handshake between pipes and machinery. Made from sturdy metals, they ensure pipes stay in place like a bouncer at an exclusive club. Whether it's **weld neck**, **slip-on**, or **threaded**, each type knows its role in keeping things **tight and leak-free**. Bolted together with gaskets, they're like the ultimate Lego set for adults, making assembly and maintenance a breeze. Found in the bustling hubs of oil rigs and chemical plants, flanges are the backstage crew making sure the show runs smoothly.

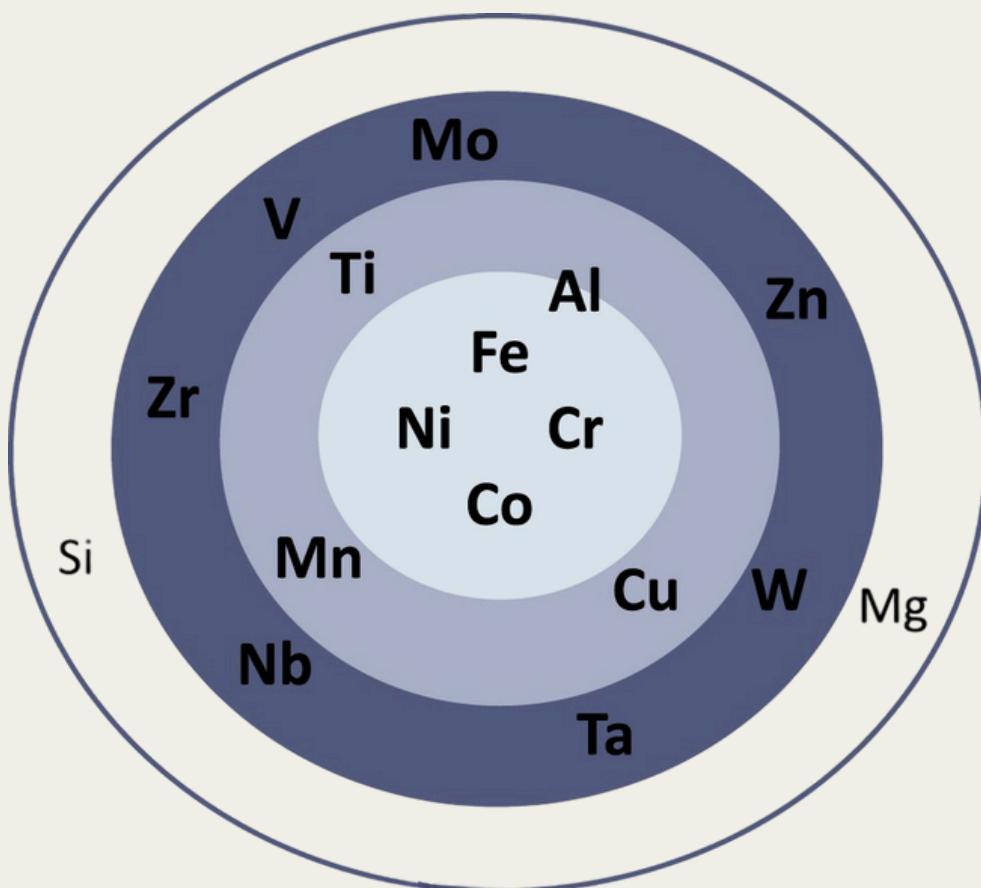
Versatile and indispensable, they ensure that the piping systems across various industries remain efficient and resilient, playing their crucial part in keeping the flow, well, flowing.



MATERIAL OF CONSTRUCTION:

Depending on the application's requirements, common materials include:

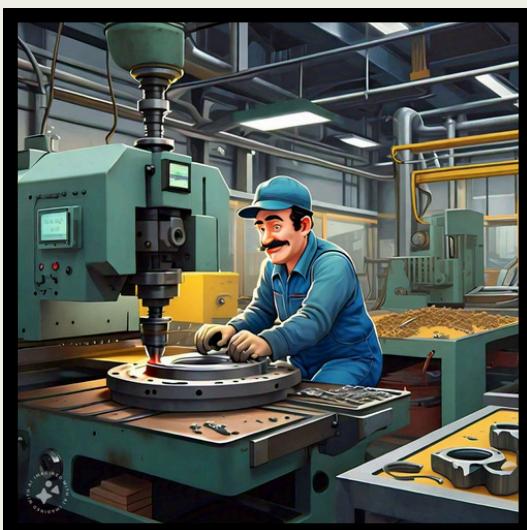
- **Stainless Steel:** Resistant to corrosion, ideal for applications involving corrosive environments.
- **Nickel Alloys:** Extremely resistant to corrosion and high temperatures, used in specialized applications.
- **Duplex Stainless Steel:** Combines the properties of austenitic and ferritic stainless steel, providing excellent strength and corrosion resistance.
- **Alloy Steel:** Provides enhanced mechanical properties, suitable for high-temperature and high-pressure applications.
- **Carbon Steel:** Known for its strength and durability, suitable for high-pressure applications.
- **Titanium:** A strong, lightweight metal known for its high resistance to corrosion and remarkable strength-to-weight ratio.



MANUFACTURING PROCESS:

The manufacturing process of flanges involves several key steps to ensure they meet the required specifications and standards:

- 1. Cutting the Raw Material:** The process begins with cutting the raw material, into blanks based on the flange specifications.
- 2. Forging:** The cut blanks are heated and then forged to shape them into the basic form of the flange. This step involves using a press to deform the metal, enhancing its strength and durability.
- 3. Heat Treatment:** After forging, the flanges undergo heat treatment to improve their mechanical properties, such as toughness and hardness.
- 4. Machining:** The forged flanges are then machined to achieve the precise dimensions and surface finish required. This includes drilling bolt holes and creating the flange face.
- 5. Finishing:** The final step involves finishing processes such as grinding, polishing, and coating to ensure the flanges meet the required standards and are ready for use.
- 6. Inspection and Testing:** The finished flanges are inspected and tested to ensure they meet the necessary quality and performance standards.



TYPES OF FLANGES:



WELD NECK FLANGE

Weld Neck Flanges are renowned for their durability and strength. They feature a long, tapered hub that is butt-welded to the pipe. Their design and construction make them indispensable in maintaining the integrity of high-performance piping systems.

Benefits:

- Strength and Reliability: The design and welding process ensure a strong connection with reduced risk of leaks.
- Stress Distribution: The tapered hub helps distribute stress more evenly, extending the lifespan of the piping system.



SLIP-ON FLANGE

Slip-On Flanges are one of the easiest types to install. They simply slip over the end of the pipe and are then welded both inside and outside to ensure a secure fit. The bore of the slip-on flange is slightly larger than the outer diameter of the pipe it slips over, which makes alignment easier.

Benefits:

- Ease of Installation: The simple design makes them quick and easy to install, reducing labor costs.
- Alignment: The larger bore size allows for better alignment, which is particularly helpful in field conditions.
- Cost-Effective: Typically less expensive than weld neck flanges due to the simpler design and installation process.

TYPES OF FLANGES:



SOCKET-WELD FLANGE

Socket-Weld Flanges are designed for small-diameter, high-pressure pipes. These flanges offer a strong and secure connection by welding the pipe into a recessed area of the flange. The pipe is then fillet welded to the flange around the outer edge, ensuring a robust connection.

Benefits:

- **Leak-Proof:** The socket and weld design provide a leak-proof seal, suitable for high-pressure systems.
 - **Strength:** The welding process creates a strong bond, capable of withstanding significant pressure and thermal expansion.
 - **Easy Installation:** The design allows for easier alignment and installation compared to other flange types.
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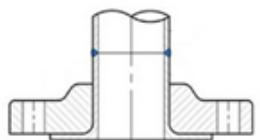
BLIND FLANGE

Blind Flanges are crucial components used to close the ends of piping systems, valves, or pressure vessel openings. They serve as an end cap, ensuring that the flow within the piping system is securely stopped. A simple, flat, round disk with bolt holes around the perimeter.

Benefits:

- **Leak-Proof Seal:** Provides a reliable seal to prevent leaks, making them essential for high-pressure systems.
- **Strength:** Able to withstand significant pressure, ensuring the integrity of the piping system.
- **Ease of Removal:** Can be easily removed to access the piping system for maintenance or expansion.

TYPES OF FLANGES:



LAP JOINT FLANGE

Lap Joint Flanges are versatile and consist of two components: a stub end and a loose backing flange. They are designed to be used with pipes that require frequent disassembly and reassembly.

Benefits:

- Ease of Alignment: The loose backing flange allows for easy alignment during installation, reducing assembly time and effort.
 - Versatile: Suitable for applications where the piping system configuration changes frequently.
 - Cost-Effective: Typically less expensive than other flange types, especially when used with pipes that are less demanding in terms of pressure and temperature.
-



THREADED FLANGE

Threaded Flanges, also known as screwed flanges, are designed to connect pipes with external threads without requiring welding. This makes them particularly useful in situations where welding is impractical or impossible. The face of the flange can be flat or raised to accommodate different types of gaskets and seals.

Benefits:

- No Welding Needed: Easy to install as they don't require welding, which can save time and reduce installation costs.
- Reusable: Can be easily removed and reused, making them ideal for temporary installations.
- Convenient for Maintenance: Simple to assemble and disassemble, facilitating easy maintenance and inspection.

TYPES OF FLANGES:



LONG WELD NECK FLANGE



SWIVEL FLANGE



REDUCING FLANGE



ORFICE FLANGE



RING TYPE JOINT FLANGE



SPECTACLE BLINDS



PLATE FLANGE



SQUARE FLANGE

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Flanges and
Forging?**

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SIZES & DIMENSIONS:

Flange Sizes

Flange sizes are typically specified by the nominal pipe size (NPS) and range from 1/2 inch to over 48 inches. The size indicates the diameter of the pipe that the flange will connect to.

Pressure Ratings

Flanges are also categorized based on their pressure ratings, such as 150, 300, 600, 900, 1500, and 2500 pounds per square inch (psi). Higher pressure ratings indicate thicker flanges and more robust constructions to handle higher pressures.

Standards

Different standards specify flange dimensions, including:

- ANSI/ASME B16.5: Common in North America.
- DIN: Used mainly in Europe.
- JIS: Common in Japan and some Asian countries.
- The British Standard (BS) 10:1962 provides detailed specifications for flanges for pipes,. This standard includes several tables (D, E, F, and H) that outline the dimensions and tolerances for different types of flanges.



FLANGES DIMENSIONS:

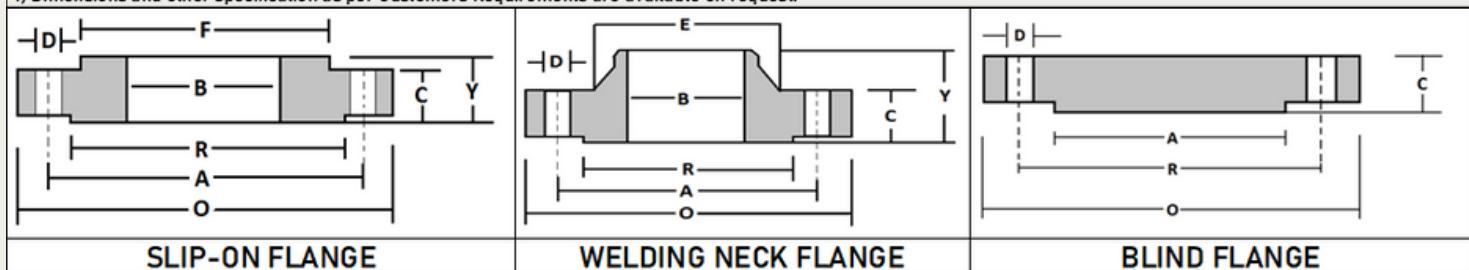
DIMENSIONS OF CLASS 150 FLANGES AS PER ANSI B 16.5

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length through Hub			Dia of Bore		Dia of R/F	Depth of Socket
							S/O & S/W	W/N	L/J	S/O & S/W	L/J		
Inch.	mm	O	A	D	C	E	Y	Y	Y	B	B	R	F
1/2	15	88.90	60.45	15.75	4	11.18	30.23	15.75	47.75	15.75	22.35	22.86	35.05 9.65
3/4	20	98.55	69.85	15.75	4	12.70	38.10	15.75	52.32	15.75	27.69	28.19	42.93 11.18
1	25	107.95	79.25	15.75	4	14.22	49.28	17.53	55.63	17.53	34.54	35.05	50.80 12.70
1-1/4	32	117.35	88.90	15.75	4	15.75	58.67	20.57	57.15	20.57	43.18	43.69	63.50 14.22
1-1/2	40	127.00	98.55	15.75	4	17.27	65.02	22.35	61.98	22.35	49.53	50.04	73.15 15.75
2	50	152.40	120.65	19.05	4	19.05	77.72	25.40	63.50	25.40	61.98	62.48	91.95 17.53
2-1/2	65	177.80	139.70	19.05	4	22.35	90.42	28.45	69.85	28.45	74.68	75.44	104.65 19.05
3	80	190.50	152.40	19.05	4	23.88	107.95	30.23	69.85	30.23	90.68	91.44	127.00 20.57
3-1/2	90	215.90	177.80	19.05	8	23.88	122.17	31.75	71.37	31.75	103.38	104.14	139.70 22.35
4	100	228.60	190.50	19.05	8	23.88	134.87	33.27	76.20	33.27	116.08	116.84	157.23 23.88
5	125	254.00	215.90	22.35	8	23.88	163.58	36.58	88.90	36.58	143.76	144.53	185.67 23.88
6	150	279.40	241.30	22.35	8	25.40	192.02	39.62	88.90	39.62	170.69	171.45	215.90 26.92
8	200	342.90	298.45	22.35	8	28.45	246.13	44.45	101.60	44.45	221.49	222.25	269.75 31.75
10	250	406.40	361.95	25.40	12	30.23	304.80	49.28	101.60	49.28	276.35	277.37	323.85 33.27
12	300	482.60	431.80	25.40	12	31.75	365.25	55.63	114.30	55.63	327.15	328.17	381.00 39.62
14	350	533.40	476.25	28.45	12	35.05	400.05	57.15	127.00	79.25	359.16	360.17	412.75 41.40
16	400	596.90	539.75	28.45	16	36.58	457.20	63.50	127.00	87.38	410.46	411.23	469.90 44.45
18	450	635.00	577.85	31.75	16	39.62	504.95	68.33	139.70	96.77	461.77	462.28	533.40 49.28
20	500	698.50	635.00	31.75	20	42.93	558.80	73.15	144.53	103.12	513.08	514.35	584.20 54.10
22	550	749.30	692.15	35.05	20	45.97	615.95	79.50	149.35	107.95	564.39	565.15	641.35 60.45
24	600	812.80	749.3	35.05	20	47.75	663.45	82.55	152.40	111.25	615.95	615.95	692.15 63.50

1) All Dimensions are in mm 2) Welding Neck Flange Bore to be specified by the purchaser

3) Flanges Except Lap Joint will be furnished with (1.6 mm) Raised Face, which is included in Thickness (C) and Length through hub (Y).

4) Dimensions and other specification as per Customers Requirements are available on request.



DIMENSIONS OF CLASS 300 FLANGES AS PER ANSI B 16.5

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length through Hub			Dia of Bore		Dia of R/F	Depth of Socket
							S/O & S/W	W/N	L/J	S/O & S/W	L/J		
Inch.	mm	O	A	D	C	E	Y	Y	Y	B	B	R	F
1/2	15	95.25	66.55	15.75	4.00	14.22	38.10	22.35	52.32	22.35	22.35	22.86	35.05 9.65
3/4	20	117.35	82.55	19.05	4.00	15.75	47.75	25.40	57.15	25.40	27.69	28.19	42.93 11.18
1	25	123.95	88.90	19.05	4.00	17.53	53.85	26.92	61.98	26.92	34.54	35.05	50.80 12.70
1-1/4	32	133.35	98.55	19.05	4.00	19.05	63.50	26.92	65.02	26.92	43.18	43.69	63.50 14.22
1-1/2	40	155.45	114.30	22.35	4.00	20.57	69.85	30.23	68.33	30.23	49.53	50.04	73.15 15.75
2	50	165.10	127.00	19.05	8.00	22.35	84.07	33.27	69.85	33.27	61.98	62.48	91.95 17.53
2-1/2	65	190.50	149.35	22.35	8.00	25.40	100.08	38.10	76.20	38.10	74.68	75.44	104.65 19.05
3	80	209.55	168.15	22.35	8.00	28.45	117.35	42.93	79.25	42.93	90.68	91.44	127.00 20.57
3-1/2	90	228.60	184.15	22.35	8.00	30.23	133.35	44.45	81.03	44.45	103.38	104.14	139.70 -
4	100	254.00	200.15	22.35	8.00	31.75	146.05	47.75	85.85	47.75	116.08	116.84	157.23 -
5	125	279.40	234.95	22.35	8.00	35.05	177.80	50.80	98.55	50.80	143.76	144.53	185.67 -
6	150	317.50	269.75	22.35	12.00	36.58	206.25	52.32	98.55	52.32	170.69	171.45	215.90 -
8	200	381.00	330.20	25.40	12.00	41.15	260.35	61.98	111.25	61.98	221.49	222.25	269.75 -
10	250	444.50	387.35	28.45	16.00	47.75	320.55	66.55	117.35	95.25	276.35	277.37	323.85 -
12	300	520.70	450.85	31.75	16.00	50.80	374.65	73.15	130.05	101.60	327.15	328.17	381.00 -
14	350	584.20	514.35	31.75	20.00	53.85	425.45	76.20	142.75	111.25	359.16	360.17	412.75 -
16	400	647.70	571.50	35.05	20.00	57.15	482.60	82.55	146.05	120.65	410.46	411.23	469.90 -
18	450	711.20	628.65	35.05	24.00	60.45	533.40	88.90	158.75	130.05	461.77	462.28	533.40 -
20	500	774.70	685.80	35.05	24.00	63.50	587.25	95.25	162.05	139.70	513.08	514.35	584.20 -
22	550	838.20	742.95	41.40	24.00	66.80	641.35	101.60	165.10	146.05	564.39	565.15	641.35 -
24	600	914.40	812.80	41.40	24.00	69.85	701.55	106.43	168.15	152.40	615.95	615.95	692.15 -

1) All Dimensions are in mm 2) Welding Neck Flange Bore to be specified by the purchaser

3) Flanges Except Lap Joint will be furnished with (1.6 mm) Raised Face, which is included in Thickness (C) and Length through hub (Y).

4) Dimensions and other specification as per Customers Requirements are available on request.

FLANGES DIMENSIONS:

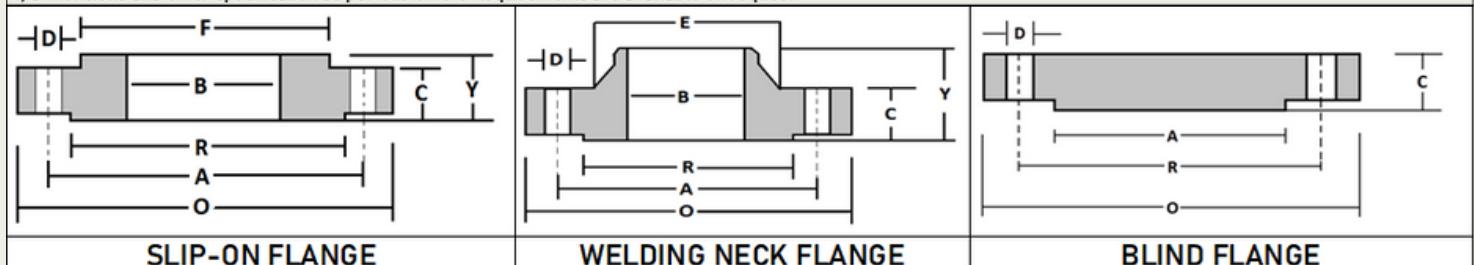
DIMENSIONS OF CLASS 400 FLANGES AS PER ANSI B 16.5

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length through Hub			Dia of Bore		Dia of R/F	Depth of Socket
							S/O & S/W	W/N	L/J	S/O & S/W	L/J		
Inch.	mm	O	A	D	C	E	Y	Y	Y	B	R	R	F
1/2	15	95.25	66.55	15.75	4.00	14.22	38.10	22.35	52.32	22.35	22.35	22.86	35.05
3/4	20	117.35	82.55	19.05	4.00	15.75	47.75	25.40	57.15	25.40	27.69	28.19	42.93
1	25	123.95	88.90	19.05	4.00	17.53	53.85	26.92	61.98	26.92	34.54	35.05	50.80
1-1/4	32	133.35	98.55	19.05	4.00	20.57	63.50	28.45	66.55	28.45	43.18	43.69	63.50
1-1/2	40	155.45	114.30	22.35	4.00	22.35	69.85	31.75	69.85	31.75	49.53	50.04	73.15
2	50	165.10	127.00	19.05	8.00	25.40	84.07	36.58	73.15	36.58	61.98	62.48	91.95
2-1/2	65	190.50	149.35	22.35	8.00	28.45	100.08	41.15	79.25	41.15	74.68	75.44	104.65
3	80	209.55	168.15	22.35	8.00	31.75	117.35	45.97	82.55	45.97	90.68	91.44	127.00
3-1/2	90	228.60	184.15	25.40	8.00	35.05	133.35	49.28	85.85	49.28	103.38	104.14	139.70
4	100	254.00	200.15	25.40	8.00	35.05	146.05	50.80	88.90	50.80	116.08	116.84	157.23
5	125	279.40	234.95	25.40	8.00	38.10	177.80	53.85	101.60	53.85	143.76	144.53	185.67
6	150	317.50	269.75	25.40	12.00	41.15	206.25	57.15	103.12	57.15	170.69	171.45	215.90
8	200	381.00	330.20	28.45	12.00	47.75	260.35	68.33	117.35	68.33	221.49	222.25	269.75
10	250	444.50	387.35	31.75	16.00	53.85	320.55	73.15	123.95	101.60	276.35	277.37	323.85
12	300	520.70	450.85	35.05	16.00	57.15	374.65	79.25	136.65	107.95	327.15	328.17	381.00
14	350	584.20	514.35	35.05	20.00	60.45	425.45	84.07	149.35	117.35	359.16	360.17	412.75
16	400	647.70	571.50	38.10	20.00	63.50	482.60	93.73	152.40	127.00	410.46	411.23	469.90
18	450	711.20	628.65	38.10	24.00	66.55	533.40	98.55	165.10	136.65	461.77	462.28	533.40
20	500	774.70	685.80	41.15	24.00	69.85	587.25	101.60	168.15	146.05	513.08	514.35	584.20
22	550	838.20	742.95	44.45	24.00	73.15	641.35	107.95	171.45	152.40	564.39	565.15	641.35
24	600	914.40	812.80	47.75	24.00	76.20	701.55	114.30	174.75	158.75	615.95	615.95	692.15

1) All Dimensions are in mm 2) Welding Neck Flange Bore to be specified by the purchaser

3) Flanges Except Lap Joint will be furnished with (1.6 mm) Raised Face, which is Included in Thickness (C) and Length through hub (Y).

4) Dimensions and other specification as per Customers Requirements are available on request.



DIMENSIONS OF CLASS 600 FLANGES AS PER ANSI B 16.5

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length through Hub			Dia of Bore		Dia of R/F	Depth of Socket
							S/O & S/W	W/N	L/J	S/O & S/W	L/J		
Inch.	mm	O	A	D	C	E	Y	Y	Y	B	R	R	F
1/2	15	95.25	66.55	15.75	4	14.22	38.10	22.35	52.32	22.35	22.35	22.86	35.05
3/4	20	117.35	82.55	19.05	4	15.75	47.75	25.40	57.15	25.40	27.69	28.19	42.93
1	25	123.95	88.90	19.05	4	17.53	53.85	26.92	61.98	26.92	34.54	35.05	50.80
1-1/4	32	133.35	98.55	19.05	4	20.57	63.50	28.45	66.55	28.45	43.18	43.69	63.50
1-1/2	40	155.45	114.30	22.35	4	22.35	69.85	31.75	69.85	31.75	49.53	50.04	73.15
2	50	165.10	127.00	19.05	8	25.40	84.07	36.58	73.15	36.58	61.98	62.48	91.95
2-1/2	65	190.50	149.35	22.35	8	28.45	100.08	41.15	79.25	41.15	74.68	75.44	104.65
3	80	209.55	168.15	22.35	8	31.75	117.35	45.97	82.55	45.97	90.68	91.44	127.00
3-1/2	90	228.60	184.15	25.40	8	35.05	133.35	49.28	85.85	49.28	103.38	104.14	139.70
4	100	273.05	215.90	25.40	8	38.10	152.40	53.85	101.60	53.85	116.08	116.84	157.23
5	125	330.20	266.70	28.45	8	44.45	188.98	60.45	114.30	60.45	143.76	144.53	185.67
6	150	355.60	292.10	28.45	12	47.75	222.25	66.55	117.35	66.55	170.69	171.45	215.90
8	200	419.10	349.25	31.75	12	55.63	273.05	76.20	133.35	76.20	221.49	222.25	269.75
10	250	508.00	431.80	35.05	16	63.50	342.90	85.85	152.40	111.25	276.35	277.37	323.85
12	300	558.80	488.95	35.05	20	66.55	400.05	91.95	155.45	117.35	327.15	328.17	381.00
14	350	603.25	527.05	38.10	20	69.85	431.80	93.73	165.10	127.00	359.16	360.17	412.75
16	400	685.80	603.25	41.15	20	76.20	495.30	106.43	177.80	139.70	410.46	411.23	469.90
18	450	742.95	654.05	44.45	20	82.55	546.10	117.35	184.15	152.40	461.77	462.28	533.40
20	500	812.80	723.90	44.45	24	88.90	609.60	127.00	190.50	165.10	513.08	514.35	584.20
22	550	869.95	778.00	44.45	24	95.25	666.75	133.35	196.85	174.75	564.39	565.15	641.35
24	600	939.80	838.20	50.80	24	101.60	717.55	139.70	203.20	184.15	615.95	615.95	692.15

1) All Dimensions are in mm 2) Welding Neck Flange Bore to be specified by the purchaser

3) Flanges Except Lap Joint will be furnished with (1.6 mm) Raised Face, which is Included in Thickness (C) and Length through hub (Y).

4) Dimensions and other specification as per Customers Requirements are available on request.

FLANGES DIMENSIONS:

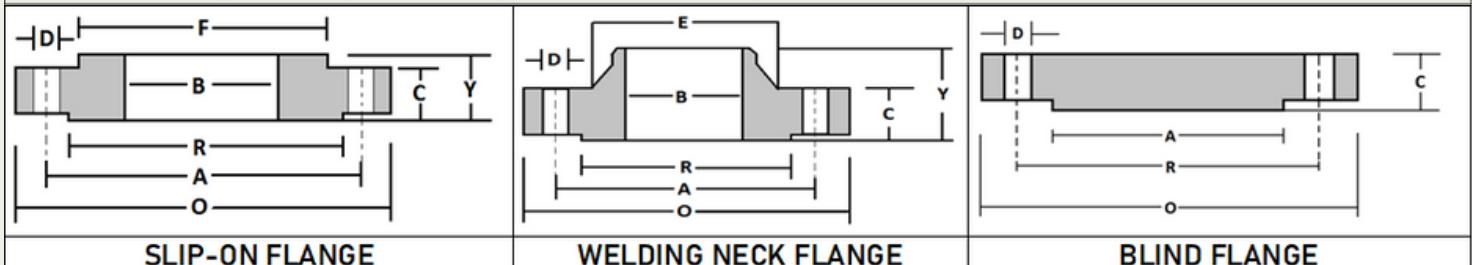
DIMENSIONS OF CLASS 900 FLANGES AS PER ANSI B 16.5

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length through Hub			Dia of Bore		Dia of R/F	Depth of Socket	
							C	E	S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B	
Inch.	mm	O	A	D										
Sizes 1/2" Thru 2-1/2" Are Identical To Class 1500.														
3	80	241.30	190.50	25.40	8.00	38.10	127.00	54.10	101.60	54.10	90.68	91.44	127.00	-
4	100	292.10	234.95	31.75	8.00	44.45	158.75	69.85	114.30	69.85	116.08	116.84	157.23	-
5	125	349.25	279.40	35.05	8.00	50.80	190.50	79.50	127.00	79.50	143.76	144.53	185.67	-
6	150	381.00	317.50	31.75	12.00	55.63	234.95	85.85	139.70	85.85	170.69	171.45	215.90	-
8	200	469.90	393.70	38.10	12.00	63.50	298.45	101.60	162.05	114.30	221.49	222.25	270.00	-
10	250	546.10	469.90	38.10	16.00	69.85	368.30	107.95	184.15	127.00	276.35	277.37	323.85	-
12	300	609.60	533.40	38.10	20.00	79.50	419.10	117.60	200.15	143.00	327.15	328.17	381.00	-
14	350	641.35	558.80	41.40	20.00	85.85	450.85	130.30	212.85	155.70	359.16	360.17	412.75	-
16	400	704.85	615.95	44.45	20.00	88.90	508.00	133.35	215.90	165.10	410.46	411.23	469.90	-
18	450	787.40	685.80	50.80	20.00	101.60	565.15	152.40	228.60	190.50	461.77	462.28	533.40	-
20	500	857.25	749.30	54.10	20.00	107.95	622.30	158.75	247.65	209.55	513.08	514.35	584.20	-
24	600	1041.40	901.70	66.80	20.00	139.70	749.30	203.20	292.10	266.70	615.95	615.95	692.15	-

1) All Dimensions are in mm 2) Welding Neck Flange Bore to be specified by the purchaser

3) Flanges Except Lap Joint will be furnished with (1.6 mm) Raised Face, which is included in Thickness (C) and Length through hub (Y).

4) Dimensions and other specification as per Customers Requirements are available on request.



SLIP-ON FLANGE

WELDING NECK FLANGE

BLIND FLANGE

DIMENSIONS OF CLASS 1500 FLANGES AS PER ANSI B 16.5

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length through Hub			Dia of Bore		Dia of R/F	Depth of Socket	
							C	E	S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B	
Inch.	mm	O	A	D										
1/2	15	120.65	82.55	22.35	4	22.35	38.10	31.75	60.45	31.75	22.35	22.86	35.05	9.65
3/4	20	130.30	88.90	22.35	4	25.40	44.45	35.05	69.85	35.05	27.69	28.19	42.93	11.18
1	25	149.35	101.60	25.40	4	28.70	52.32	41.40	73.15	41.40	34.54	35.05	50.80	12.70
11/4	32	158.75	111.25	25.40	4	28.70	63.50	41.40	73.15	41.40	43.18	43.69	63.50	14.22
11/2	40	177.80	123.95	28.70	4	31.75	69.85	44.45	82.55	44.45	49.53	50.04	73.15	16.00
2	50	215.90	165.10	25.40	8	38.10	104.90	57.15	101.60	57.15	61.98	62.48	92.20	17.53
21/2	65	244.60	190.50	28.70	8	41.40	123.95	63.50	104.90	63.50	74.68	75.44	104.90	19.05
3	80	266.70	203.20	31.75	8	47.75	133.35	73.15	117.60	73.15	90.68	91.44	127.00	-
4	100	311.15	241.30	35.05	8	54.10	162.05	90.42	123.95	90.42	116.08	116.84	157.23	-
5	125	374.65	292.10	41.40	8	73.15	196.85	104.90	155.70	104.90	143.76	144.53	185.67	-
6	150	393.70	317.50	38.10	12	82.55	228.60	119.13	171.45	119.13	170.69	171.45	215.90	-
8	200	482.60	393.70	44.45	12	92.20	292.10	143.00	212.85	143.00	221.49	222.25	270.00	-
10	250	584.20	482.60	50.80	12	107.95	368.30	158.75	254.00	177.80	276.35	277.37	323.85	-
12	300	673.10	571.50	54.10	16	123.95	450.85	181.10	282.70	219.20	327.15	328.17	381.00	-
14	350	749.30	635.00	35.05	16	133.35	495.30	-	298.45	241.30	-	360.17	412.75	-
16	400	825.50	704.85	41.40	16	146.05	552.45	-	311.15	260.35	-	411.23	469.90	-
18	450	914.40	774.70	47.75	16	162.05	596.90	-	327.15	276.35	-	462.28	533.40	-
20	500	984.25	831.85	79.50	16	177.80	641.35	-	355.60	292.10	-	514.35	584.20	-
24	600	1168.40	990.60	92.20	16	203.20	762.00	-	406.40	330.20	-	615.95	692.15	-

1) All Dimensions are in mm 2) Welding Neck Flange Bore to be specified by the purchaser

3) Flanges Except Lap Joint will be furnished with (1.6 mm) Raised Face, which is included in Thickness (C) and Length through hub (Y).

4) Dimensions and other specification as per Customers Requirements are available on request.

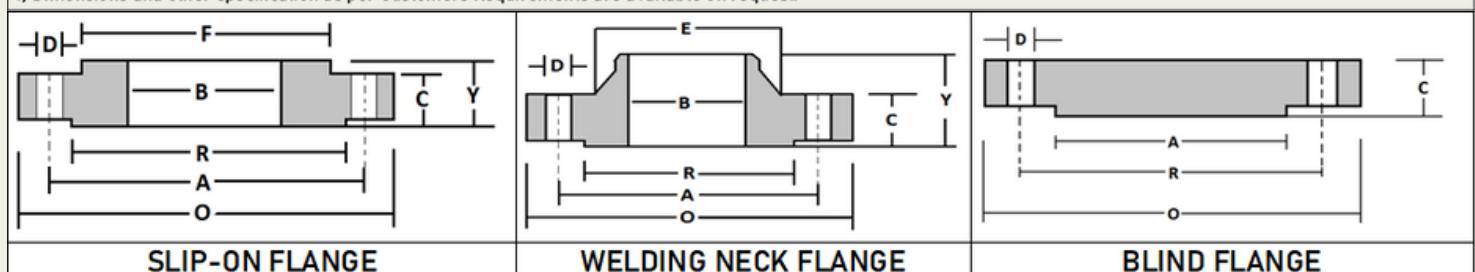
FLANGES DIMENSIONS:

DIMENSIONS OF CLASS 2500 FLANGES AS PER ANSI B 16.5														
Nominal Pipe Size		Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length through Hub			Dia of Bore		Dia of R/F	Depth of Socket
Inch.	mm	O	A	D		C	E	S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B	R	F
1/2	15	133.4	88.9	22.4	4	30.2	42.9	39.6	73.2	39.6	22.4	22.9	35.1	-
3/4	20	139.7	95.3	22.4	4	31.8	50.8	42.9	79.5	42.9	27.7	28.2	42.9	-
1	25	158.8	108.0	25.4	4	35.1	57.2	47.8	88.9	47.8	34.5	35.1	50.8	-
1-1/4	32	184.2	130.3	28.7	4	38.1	73.2	52.3	95.3	52.3	43.2	43.7	63.5	-
1-1/2	40	203.2	146.1	31.8	4	44.5	79.5	60.5	111.3	60.5	49.5	50.0	73.2	-
2	50	235.0	171.5	28.7	8	50.8	95.3	69.9	127.0	69.9	62.0	62.5	92.2	-
2-1/2	65	266.7	196.9	31.8	8	57.2	114.3	79.5	143.0	79.5	74.7	75.4	104.9	-
3	80	304.8	228.6	35.1	8	66.8	133.4	92.2	168.4	92.2	90.7	91.4	127.0	-
4	100	355.6	273.1	41.4	8	76.2	165.1	108.0	190.5	108.0	116.1	116.8	157.2	-
5	125	419.1	323.9	47.8	8	92.2	203.2	130.3	228.6	130.3	143.8	144.5	185.7	-
6	150	482.6	368.3	54.1	8	108.0	235.0	152.4	273.1	152.4	170.7	171.5	215.9	-
8	200	552.5	438.2	54.1	12	127.0	304.8	177.8	317.5	177.8	221.5	222.3	270.0	-
10	250	673.1	539.8	66.8	12	165.1	374.7	228.6	419.1	228.6	276.4	277.4	323.9	-
12	300	762.0	619.3	73.2	12	184.2	441.5	254.0	463.6	254.0	327.2	328.2	381.0	-

1) All Dimensions are in mm 2) Welding Neck Flange Bore to be specified by the purchaser

3) Flanges Except Lap Joint will be furnished with (1.6 mm) Raised Face, which is included in Thickness (C) and Length through hub (Y).

4) Dimensions and other specification as per Customers Requirements are available on request.



FLANGES DIMESNIONS:

**Table D: For Working Steam Pressure
Upto 50 lbs per sq. inch**

Nominal Pipe Size	O.D. of Pipe	Dia of Flange	Dia of Bolt Circle	No. of Bolt	Dia of Bolt	Thickness
1/2"	21.3	95.3	66.7	4	12.7	4.8
3/4"	26.7	101.6	73	4	12.7	4.8
1"	33.4	114.3	82.6	4	12.7	4.8
1.1/4"	42.2	120.7	87.6	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
2.2/1"	73.0	165.1	127	4	15.9	7.9
3"	88.9	184.2	146.1	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	209.6	8	15.9	12.7
6"	168.3	279.4	228.6	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"	323.0	457.2	406.4	12	19.1	15.9
14"	355.6	527.1	469.9	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	22.2	25.4
24"	609.6	825.5	755.7	16	25.4	28.6

**Table E: For Working Steam Pressure
50 lbs and upto 100 lbs per sq. inch**

Nominal Pipe Size	Dia of Flange	Dia of Bolt Circle	No. of Bolt	Dia of Bolt	Thickness
1/2"	95.3	66.7	4	12.7	6.4
3/4"	101.6	73.0	4	12.7	6.4
1"	114.3	82.6	4	12.7	7.1
1.1/4"	120.7	87.3	4	12.7	7.9
1.1/2"	133.4	98.4	4	12.7	8.7
2"	152.4	114.3	4	15.9	9.5
2.2/1"	165.1	127.0	4	15.9	10.3
3"	184.2	146.1	4	15.9	11.1
3.1/2"	203.2	165.1	8	15.9	11.9
4"	215.9	177.8	8	15.9	12.7
5"	254.0	209.6	8	15.9	14.3
6"	279.4	228.6	8	19.1	17.5
7"	304.8	260.4	8	19.1	19.1
8"	336.6	292.1	8	19.1	19.1
9"	368.3	323.9	12	19.1	20.6
10"	406.4	355.6	12	19.1	22.2
12"	457.2	406.4	12	22.2	25.4
14"	527.2	469.9	12	22.2	25.4
16"	577.9	520.7	12	22.2	25.4
18"	641.4	584.2	16	22.2	28.6
20"	704.9	647.4	16	22.2	31.8
24"	825.5	755.7	16	25.4	38.1

**Table F: For Working Steam Pressure
100 lbs and upto 150 lbs per sq. inch**

Nominal Pipe Size	O.D. of Pipe	Dia of Flange	Dia of Bolt Circle	No. of Bolt	Dia of Bolt	Thickness
1/2"	21.3	95.3	66.7	4	12.7	9.5
3/4"	26.7	101.6	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
2.2/1"	73.0	184.2	146.1	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	25.4
9"	244.5	406.4	355.6	12	22.2	25.4
10"	273.0	431.8	381.0	12	22.2	25.4
12"	323.0	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
150 lbs and upto 250 lbs per sq. inch**

Nominal Pipe Size	Dia of Flange	Dia of Bolt Circle	No. of Bolt	Dia of Bolt	Thickness
1/2"	114.3	82.6	4	15.9	12.7
3/4"	114.3	82.6	4	15.9	12.7
1"	120.8	87.3	4	15.9	14.3
1.1/4"	133.4	98.4	4	15.9	17.5
1.1/2"	139.7	104.8	4	15.9	17.5
2"	165.1	127.0	4	15.9	19.1
2.2/1"	184.2	146.1	8	15.9	19.1
3"	203.2	165.1	8	15.9	22.2
3.1/2"	215.9	177.8	8	15.9	22.2
4"	228.6	190.5	8	15.9	25.4
5"	279.4	235.0	8	19.1	28.6
6"	304.8	260.4	12	19.1	28.6
7"	336.6	292.1	12	19.1	31.8
8"	368.3	323.9	12	19.1	31.8
9"	406.4	355.6	12	22.2	34.9
10"	431.8	381.0	12	22.2	34.9
12"	489.0	438.2	16	22.2	38.1
14"	552.5	495.3	16	25.4	41.3
16"	609.6	552.5	20	25.4	44.5
18"	673.1	609.6	20	28.6	47.6
20"	736.6	673.1	24	28.6	50.8
24"	850.9	781.1	25	31.8	57.2

PIPE DIMENSIONS:

STAINLESS STEEL PIPE DIMENSION AS PER ASTM (ANSI B36.19)								
Nominal Bore		Outside Diameter	Sch-5S	Sch-10S	Sch-40S	Sch-80S	Sch-160S	Sch-XXS
mm	inch	mm	Wt. (mm)					
3	1/8	10.3	1.24	1.24	1.73	2.41	-	-
6	1/4	13.7	1.24	1.65	2.24	3.02	-	-
10	3/8	17.1	1.24	1.65	2.31	3.20	-	-
15	1/2	21.3	1.65	2.11	2.77	3.75	4.75	7.47
20	3/4	26.7	1.65	2.11	2.87	3.91	5.54	7.82
25	1	33.4	1.65	2.77	3.38	4.55	6.35	9.09
32	1 1/4	42.2	1.65	2.77	3.58	4.85	6.35	9.70
40	1 1/2	48.3	1.65	2.77	3.68	5.08	7.14	10.16
50	2	60.3	1.65	2.77	3.91	5.54	8.74	11.07
65	2 1/2	73.0	2.11	3.05	5.16	7.01	9.53	14.20
80	3	88.9	2.11	3.05	5.49	7.62	11.10	15.24
100	4	114.3	2.11	3.05	6.02	8.56	13.49	17.12
125	5	141.3	2.77	3.40	6.55	9.53	15.88	19.05
150	6	168.3	2.77	3.40	7.11	10.97	18.20	21.96
200	8	219.1	2.77	3.76	8.18	12.70	23.00	22.23
250	10	273.1	3.40	4.19	9.27	12.70	28.60	25.40
300	12	323.9	3.96	4.57	9.52	12.70	33.32	25.40
350	14	356.6	3.96	4.78	11.13	19.05	35.71	-
400	16	406.4	4.19	4.78	12.70	21.41	40.46	-
450	18	457.2	4.19	4.78	14.27	23.80	45.71	-
500	20	508.0	4.78	5.54	15.09	28.19	49.90	-
600	24	609.6	5.54	6.35	17.48	30.96	50.54	-

CHEMICAL COMPOSITION:

CHEMICAL COMPOSITION OF STAINLESS STEEL										
GRADE	Chemical Analysis (%) Specified									
	C	Si	Mn	P max	S	N	Cr	Mo	Ni	Other
AUSTENITIC	201	≤ 0.15	≤ 1.00	5.50-7.50	0.045	≤ 0.015	0.05-0.25	16.00-18.00	-	3.50-5.50
	202	≤ 0.15	≤ 1.00	7.50-10.50	0.045	≤ 0.015	0.05-0.25	17.00-19.00	-	4.00-6.00
	301	0.05-0.15	≤ 2.00	≤ 2.00	0.045	≤ 0.015	≤ 0.11	16.00-19.00	≤ 0.80	6.00-9.00
	302	≤ 0.15	≤ 0.75	≤ 2.00	0.045	≤ 0.030	≤ 0.10	17.00-19.00	-	8.00-10.00
	303	≤ 0.10	≤ 1.00	≤ 2.00	0.045	0.15-0.35	≤ 0.11	17.00-19.00	-	8.00-1.00 Cu: ≤ 1.00
	304	≤ 0.07	≤ 1.00	≤ 2.00	0.045	≤ 0.015	≤ 0.11	17.50-19.50	-	8.00-10.50
	304L	≤ 0.030	≤ 1.00	≤ 2.00	0.045	≤ 0.015	≤ 0.11	17.50-19.50	-	8.00-10.50
	304H	0.04-0.08	≤ 1.00	≤ 2.00	0.035	≤ 0.015	≤ 0.11	17.00-19.00	-	8.00-11.00
	309S	≤ 0.15	≤ 1.00	≤ 2.00	0.045	≤ 0.015	≤ 0.11	22.00-24.00	-	12.00-14.00
	310S	≤ 0.10	≤ 1.50	≤ 2.00	0.045	≤ 0.015	≤ 0.11	24.00-26.00	-	19.00-22.00
	316	≤ 0.07	≤ 1.00	≤ 2.00	0.045	≤ 0.015	≤ 0.11	16.50-18.50	2.00-2.50	10.00-13.00
	316L	≤ 0.030	≤ 1.00	≤ 2.00	0.045	≤ 0.015	≤ 0.11	16.50-18.50	2.00-2.50	10.00-13.00
	316Ti	≤ 0.08	≤ 1.00	≤ 2.00	0.045	≤ 0.015	-	16.50-18.50	2.00-2.50	10.50-13.50 Ti: 5xC - 0.70
	317L	≤ 0.030	≤ 1.00	≤ 2.00	0.045	≤ 0.015	≤ 0.11	17.50-19.50	3.00-4.00	13.00-16.00
	321	≤ 0.08	≤ 1.00	≤ 2.00	0.045	≤ 0.015	-	17.00-19.00	-	9.00-12.00 Ti: 5xC - 0.70
	347	≤ 0.08	≤ 1.00	≤ 2.00	0.045	≤ 0.015	-	17.00-19.00	-	9.00-12.00 Nb: 10xC - 1.00
DUPLEX	904L	≤ 0.020	≤ 0.70	≤ 2.00	0.030	≤ 0.010	≤ 0.15	19.00-21.00	4.00-5.00	24.00-26.00 Cu:1.20-2.00
	253MA	0.05-0.10	1.10-2.0	≤ 0.80	0.040	≤ 0.030	0.14-0.20	20.00-22.00		10.00-12.00 Ce: 0.03-0.08
FERRITIC	2205	≤ 0.030	≤ 1.00	≤ 2.00	0.035	≤ 0.015	0.10-0.22	21.00-23.00	2.50-3.50	4.50-6.50
	2304	≤ 0.030	≤ 1.00	≤ 2.00	0.035	≤ 0.015	0.05-0.20	22.00-24.00	0.10-0.60	3.50-5.50 Cu:0.10-0.60
	2507	≤ 0.030	≤ 1.00	≤ 2.00	0.035	≤ 0.015	0.24-0.35	24.00-26.00	3.00-4.50	6.00-8.00
	255	≤ 0.030	≤ 0.70	≤ 2.00	0.035	≤ 0.015	0.20-0.30	24.00-26.00	3.00-4.00	6.00-8.00 Cu:1.00-2.50
	2207	≤ 0.030	≤ 1.00	≤ 1.00	0.035	≤ 0.015	0.20-0.30	24.00-26.00	3.00-4.00	6.00-8.00 Cu:0.50-1.00, W-0.50-1.00
MARTENSITIC	409	≤ 0.030	≤ 1.00	≤ 1.00	0.040	≤ 0.015		10.50-12.50		Ti:6x(C+N)-0.65
	430	≤ 0.08	≤ 1.00	≤ 1.00	0.040	≤ 0.015		16.00-18.00		
	430F	≤ 0.12	≤ 1.00	≤ 1.25	0.060	≤ 0.015				
	434	≤ 0.08	≤ 1.00	≤ 1.00	0.040	≤ 0.015		16.00-18.00	0.90-1.40	
PH	410	0.08-0.15	≤ 1.00	≤ 1.50	0.040	≤ 0.015		11.5-13.5		≤ 0.75
	420	0.16-0.25	≤ 1.00	≤ 1.50	0.040	≤ 0.015		12.00-14.00		
	431	0.16-0.25	≤ 1.00	≤ 1.50	0.040	≤ 0.015		15.00-17.00		1.25-2.50
630	≤ 0.07	≤ 0.70	≤ 1.50	0.040	≤ 0.015		15.00-17.00	≤ 0.60	3.00-5.00	Cu:3.00-5.00, Nb:5xC-0.45
	631	≤ 0.09	≤ 0.70	≤ 1.00	0.040	≤ 0.015		16.00-18.00		6.50-7.80 Al:0.70-1.50

CHEMICAL COMPOSITION OF NICKEL ALLOYS										
GRADE	Chemical Analysis (%) Specified									
	C	Si	Mn	Fe	S	Cu	Cr	Mo	Ni	Other
99% Ni	Nickel 200	≤ 0.15	≤ 0.35	≤ 0.35	≤ 0.40	≤ 0.010	≤ 0.25	-	-	≥ 99
	Nickel 201	≤ 0.020	≤ 0.35	≤ 0.35	≤ 0.40	≤ 0.010	≤ 0.25	-	-	≥ 99
Ni-Cu	Monel 400®	0.3 max	0.5 max	2 max	2.5 max	0.024	28-34	-	-	Balance
	Monel R405®	0.3 max	0.5 max	2.00 max	2.50 max	0.025-0.060	28-34	-	-	Balance
	Monel K500®	0.25 max	0.5 max	1.50 max	2.00 max	0.10 max	Balance	-	-	63-70 Al:2.30-3.15, Ti:0.35-0.85
Ni-Cr	Inconel 600®	0.15 max	0.50 max	1.00 max	6.0-10.0	0.015 max	0.50 max	14.0-17.0		72.0 min
	Inconel 601®	0.10 max	0.50 max	1.00 max	Balance	0.015 max	1.00 max	21-25		58-63 Al:1.00-1.70
	Inconel 617®	0.15 max	1.00 max	1.00 max	3.00 max	0.010 max	0.50 max	20.0-24.0	8.00-10.00	48.85-62 Co:10.00-15.00
	Inconel 625®	0.10 max	0.50 max	0.50 max	5.00 max	0.015 max		20.00-23.00	8.00-10.00	58.0 min Nb+Ta:3.15-4.15
	Inconel 718®	0.08 max	0.35 max	0.35 max	Balance	0.015 max	0.30 max	17.00-21.00	2.80-3.30	50.00-55.00 Nb:4.75-5.50, Ti:0.65-1.15
	Inconel X750®	0.08 max	0.50 max	1.00 max	Balance	0.015 max	0.50 max	14.00-17.00		70.00 min Nb:0.70-1.20, Ti:2.25-2.75
	Incoloy 800®	0.10 max	0.50 max	1.50 max	39.50 min	0.015 max		19.00-23.00		30.00-35.00
Ni-Cr-Mo	Incoloy 825®	0.05 max	0.50 max	1.00 max	22.00 min	0.030 max	1.50-3.00	19.50-23.50	2.50-3.50	38.00-46.00 Al:0.20 max, Ti:0.60-1.20
	Hastelloy C22®	0.015 max	0.08 max	0.50 max	2.00-6.00	0.020 max		20.00-22.50	12.50-14.50	Balance W:2.50-3.50, Co:2.50 min
	Hastelloy C276®	0.010 max	0.08 max	1.00 max	4.00-7.00	0.010 max		14.50-16.50	15.00-17.00	57.00 min W:3.40-5.00, Co:2.50 min
	Hastelloy B2®	0.020 max	0.10 max	1.00 max	2.00 max	0.030 max		1.00 max	26.00-30.00	Balance
Hastelloy X	Hastelloy X®	0.15 max	1.00 max	1.00 max	17.00-20.00	0.030 max	0.50 max	20.50-23.00	8.00-10.00	Balance Co:0.50-2.50