
ASME B16.5
FLANGE



ITE.
INDUSTRIAL TECHNICAL EQUIPMENT

INTRODUCTION



I.T.E. is an Italian company established in 1998 from the merge between 2 companies, one specialized in trading and one in machining activities, both operating in the Oil & Gas field since 1980. I.T.E. is one of the largest Italian and European manufacturers of valves and fittings for the installation of industrial instruments, mainly in O&G and Energy sectors, with a huge production of: **Needle Valves, Instrument Manifolds, Ball Valves, Pots & Siphons, Compression Fittings, Check Valves, Forged Globe Neele Valves, Adapters/Fittings, Fire Sensors, Sampling Systems, Protection Boxes.**

I.T.E. is specialized also on tailor-made solutions, on request complete packages can be provided to meet customer's needs.

I.T.E. is a flexible and customer oriented company, the manufacturing plant is equipped with different CNC machines, automatic welding machines and an automatic warehouse with different semi-finished standard products, this structure allows us to be reliable partner with a fast response to the customer needs.

I.T.E. products are 100% engineered, manufactured, assembled and tested in Italy, all the products have the traceability system so that we are able to provide the best assistance to customers also specially during maintenance activities providing the right product/component.



FAILURE, IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from I.T.E. s.r.l., its authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met. The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by I.T.E. s.r.l. and its subsidiaries at any time without notice.

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FEATURES

This technical catalog presents the comprehensive range of forged industrial flanges manufactured in strict compliance with the international standard ASME B16.5 (NPS 1/2 through NPS 24). This standard represents the global reference for the design, manufacturing, and testing of flanged systems within the chemical, petrochemical, Oil & Gas, and power generation industries. Every component is developed to guarantee maximum structural integrity and perfect operational sealing performance even under the most severe pressure and temperature conditions, minimizing plant downtime and optimizing maintenance lifecycles.

PRODUCT RANGE

Our production encompasses the six fundamental construction types regulated by ASME, available across all primary pressure rating classes (Class 150, 300, 600, 900, 1500, 2500):

Welding Neck (WN): Featuring a tapered hub for butt-welding, ideal for high stress, severe gradients, and thermal cycles.

Slip-On (SO): Designed to slip over the pipe, preferred for quick installation and easy alignment in moderate pressure lines.

Blind (BL): Solid flanges used to blank off the ends of piping systems, valves, or pressure vessel openings.

Socket Welding (SW): Engineered with an internal socket weld, primarily utilized for small-bore, high-pressure applications.

Threaded (TH): Flanges with internal NPT threads allowing joint connection without welding, suitable for hazardous locations.

Lap Joint (LJ): Used in conjunction with a stub end, allowing free rotation for quick bolt hole alignment in frequent-dismantling systems.

FACE FINISHES

Gasket contact surfaces (Raised Face - RF finishes with Spiral Serrated or Smooth Finish phonographic grooves, and Ring Joint - RJ grooves) are precision-machined to ensure the exact roughness profile (Ra) required by international sealing codes.

QUALITY & CERTIFIED TRACEABILITY

All flanges are marked in accordance with ASME B16.5 standards, detailing nominal size, pressure rating, material grade, heat number, and applied code. Each shipment is accompanied by EN 10204 3.1 inspection certificates, ensuring 100% raw material traceability and complete project compliance.



FEATURES

MATERIAL SPECIFICATIONS

CARBON & LOW-TEMPERATURE STEELS - Designed for general, structural, or cryogenic applications where corrosion phenomena are absent or controlled via tailored corrosion allowances:

- ASTM A105: The quintessential standard forged carbon steel grade for ambient and higher-temperature service in pressure systems.
- ASTM A350 LF2 / LF3: Carbon-alloy steels specifically engineered for low-temperature service (down to -46°C for LF2 and -101°C for LF3), requiring strict impact testing to prevent brittle fracture.
- ASTM A266 Gr. 2: Forged carbon steel intended for pressure vessel and boiler components.

STAINLESS STEELS (AUSTENITIC & DUPLEX) - Engineered to withstand chemically aggressive media, intergranular corrosion, pitting, and extreme temperature services (cryogenics or severe thermal environments):

- ASTM A182 F304 / F304L: Standard austenitic stainless steel. The "L" grade (Low Carbon, $C \leq 0.030\%$) minimizes chromium carbide precipitation during welding, preserving corrosion resistance within the Heat Affected Zone (HAZ).
- ASTM A182 F316 / F316L: Molybdenum-bearing grade (2-3%), providing significantly enhanced resistance to chloride pitting and general corrosion compared to 304. Standardly supplied with Dual Certification (F316/316L).
- ASTM A182 F321 / F347: Austenitic grades stabilized with Titanium (F321) or Niobium (F347). Ideal for continuous service within the critical carbide precipitation range (425°C - 815°C).
- ASTM A182 F51 / F53 / F55 (Duplex & Super Duplex): Dual-phase austenitic-ferritic stainless steels. They combine exceptional mechanical strength (yield strength nearly double that of standard austenitic grades) with extraordinary resistance to Stress Corrosion Cracking (SCC) in heavy chloride and sour (H2S) environments.

MATERIAL GROUP	ASTM	GRADE	APPLICATION
Carbon Steel	ASTM A105	A105	Standard ambient/high temperature service.
Low Temp Carbon	ASTM A350	LF2 Class 1	Low-temperature service down to -46°C.
Austenitic Stainless	ASTM A182	F304 / F304L	General corrosion resistance, chemical lines.
	ASTM A182	F316 / F316L	Marine environments, chemical & sour gas lines.
Stabilized Stainless	ASTM A182	F321 / F347	High-temperature operating lines up to 800°C.
Duplex / Super Duplex	ASTM A182	F51 / F53	Severe marine, offshore, and petrochemical lines.

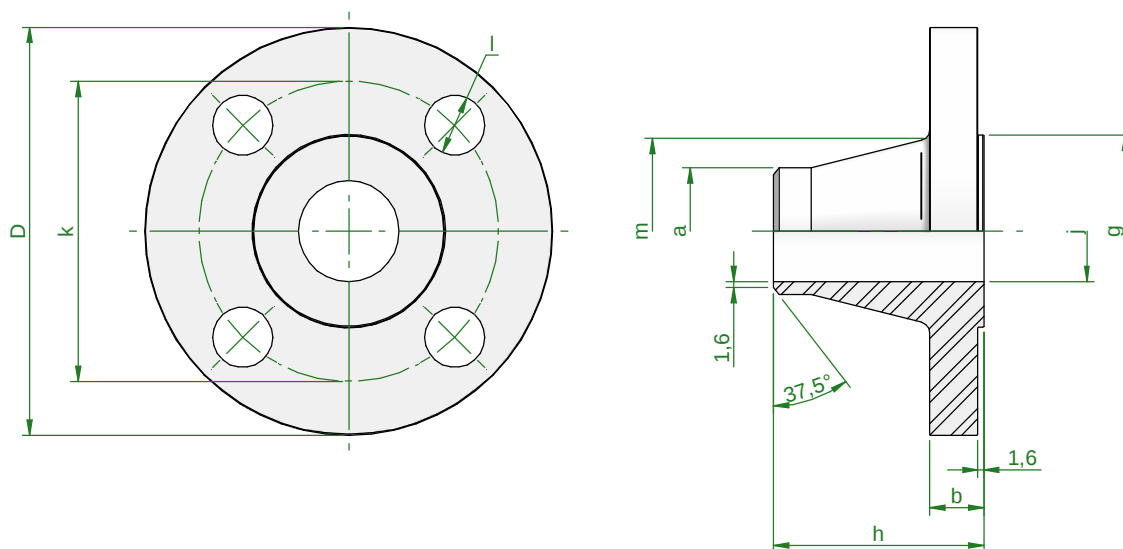
Technical Note:

Low carbon grades (L) are standardly supplied with Dual Certification (e.g., A182 F316/316L), meeting both the low-carbon limits for seamless weldability and the superior mechanical properties of the standard grade.



WELDING NECK

Welding Neck (WN) flanges represent the highest performance standard within the ASME B16.5 framework. They are easily distinguished by their long, tapered hub, which provides a smooth transition of thickness from the flange body to the matching pipe. This specific geometry ensures optimal mechanical stress distribution, drastically minimizing concentration loads at the base of the flange.



Class 150 lb (PN 20)

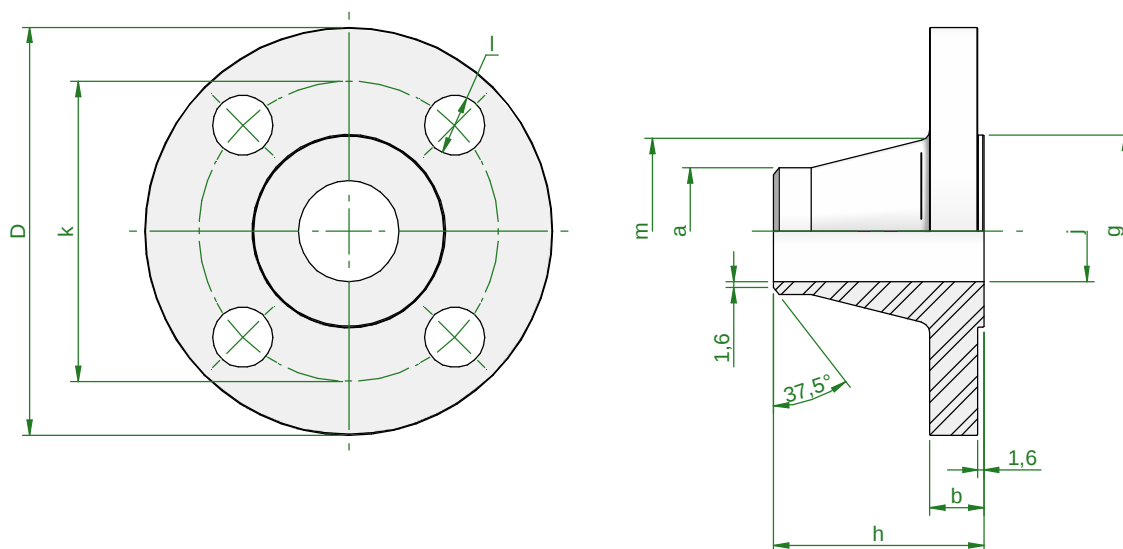
All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	a	j (1)	h	k	holes	l
1/2 "	88,9	11,1	35,0	30,2	21,3	15,7	47,6	60,3	4,0	15,9
3/4 "	98,4	12,7	42,9	38,1	26,7	20,8	52,4	69,8	4,0	15,9
1 "	107,9	14,3	50,8	49,2	33,5	26,7	55,6	79,4	4,0	15,9
1 1/4 "	117,5	15,9	63,5	58,8	42,2	35,1	57,1	88,9	4,0	15,9
1 1/2 "	127,0	17,5	73,0	65,1	48,3	40,9	61,9	98,4	4,0	15,9
2 "	152,4	19,0	92,0	77,8	60,3	52,6	63,5	120,6	4,0	19,0
2 1/2 "	177,8	22,2	104,7	90,5	73,1	62,7	69,8	139,7	4,0	19,0
3 "	190,5	23,8	127,0	107,9	88,9	78,0	69,8	152,4	4,0	19,0
4 "	228,6	23,8	157,2	134,9	114,3	102,4	76,2	190,5	8,0	19,0
5 "	254,0	23,8	185,7	163,5	141,2	128,3	88,9	215,9	8,0	22,2
6 "	279,4	25,4	215,9	192,1	168,4	154,2	88,9	241,3	8,0	22,2
8 "	342,9	28,6	269,8	246,1	219,1	202,7	101,6	298,4	8,0	22,2
10 "	406,4	30,2	323,8	304,8	273,0	254,5	101,6	361,9	12,0	25,4
12 "	482,6	31,7	381,0	365,1	323,8	304,8	114,3	431,8	12,0	25,4
14 "	533,4	34,9	412,7	400,0	355,6	336,5	127,0	476,2	12,0	28,6
16 "	596,9	36,5	469,9	457,2	406,4	387,3	127,0	539,7	16,0	28,6
18 "	635,0	39,7	533,4	504,8	457,2	438,1	139,7	577,8	16,0	31,7
20 "	698,5	42,9	584,2	558,8	508,0	488,9	144,5	635,0	20,0	31,7
24 "	812,8	47,6	692,1	663,6	609,6	590,5	152,4	749,3	20,0	34,9

(1) The internal bore j corresponds to the matching wall thickness of the pipe schedule. Values shown are standard configurations. For high-pressure classes or custom schedules, the bore must be specified by the purchaser. The internal bore is machined to match the inner diameter of the pipe schedule exactly. This seamless alignment eliminates geometric steps, preventing fluid turbulence and minimizing internal erosion and corrosion.



WELDING NECK



Class 300lb (PN 50)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

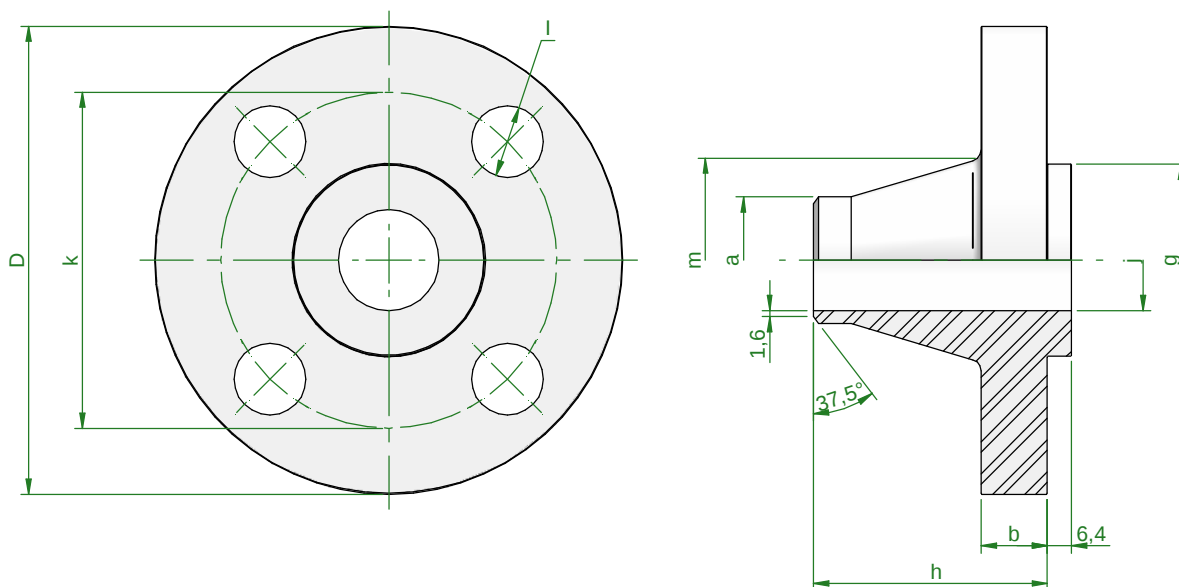
NPS	D	b	g	m	a	j (1)	h	k	holes	l
1/2 "	95,2	14,3	35,0	38,1	21,3	15,7	52,4	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	47,6	26,7	20,8	57,1	82,5	4,0	19,0
1 "	123,8	17,5	50,8	54,0	33,5	26,7	61,9	88,9	4,0	19,0
1 1/4 "	133,3	19,0	63,5	63,5	42,2	35,1	65,1	98,4	4,0	19,0
1 1/2 "	155,6	20,6	73,0	69,8	48,3	40,9	68,3	114,3	4,0	22,4
2 "	165,1	22,2	92,0	84,1	60,3	52,6	69,8	127,0	8,0	19,0
2 1/2 "	190,5	25,4	104,7	100,0	73,1	62,7	76,2	149,2	8,0	22,4
3 "	209,5	28,6	127,0	117,5	88,9	78,0	79,4	168,3	8,0	22,4
4 "	254,0	31,7	157,2	146,0	114,3	102,4	85,7	200,0	8,0	22,4
5 "	279,4	34,9	185,7	177,8	141,2	128,3	98,4	234,9	8,0	22,4
6 "	317,5	36,5	215,9	206,4	168,4	154,2	98,4	269,9	12,0	22,4
8 "	381,0	41,3	269,8	260,3	219,1	202,7	111,1	330,2	12,0	25,4
10 "	444,5	47,6	323,8	320,7	273,0	254,5	117,5	387,3	16,0	28,6
12 "	520,7	50,8	381,0	374,6	323,8	304,8	130,2	450,8	16,0	31,7
14 "	584,2	54,0	412,7	425,4	355,6	336,5	142,9	514,3	20,0	31,7
16 "	647,7	57,1	469,9	482,6	406,4	387,3	146,0	571,5	20,0	35,1
18 "	711,2	60,3	533,4	533,4	457,2	438,1	158,7	628,6	24,0	35,1
20 "	774,7	63,5	584,2	587,4	508,0	488,9	161,9	685,8	24,0	35,1
24 "	914,4	69,8	692,1	701,7	609,6	590,5	168,3	812,8	24,0	41,3

(1) The internal bore j corresponds to the matching wall thickness of the pipe schedule. Values shown are standard configurations. For high-pressure classes or custom schedules, the bore must be specified by the purchaser. The internal bore is machined to match the inner diameter of the pipe schedule exactly. This seamless alignment eliminates geometric steps, preventing fluid turbulence and minimizing internal erosion and corrosion.



WELDING NECK

Welding Neck (WN) flanges represent the highest performance standard within the ASME B16.5 framework. They are easily distinguished by their long, tapered hub, which provides a smooth transition of thickness from the flange body to the matching pipe. This specific geometry ensures optimal mechanical stress distribution, drastically minimizing concentration loads at the base of the flange.



Class 600lb (PN 110)

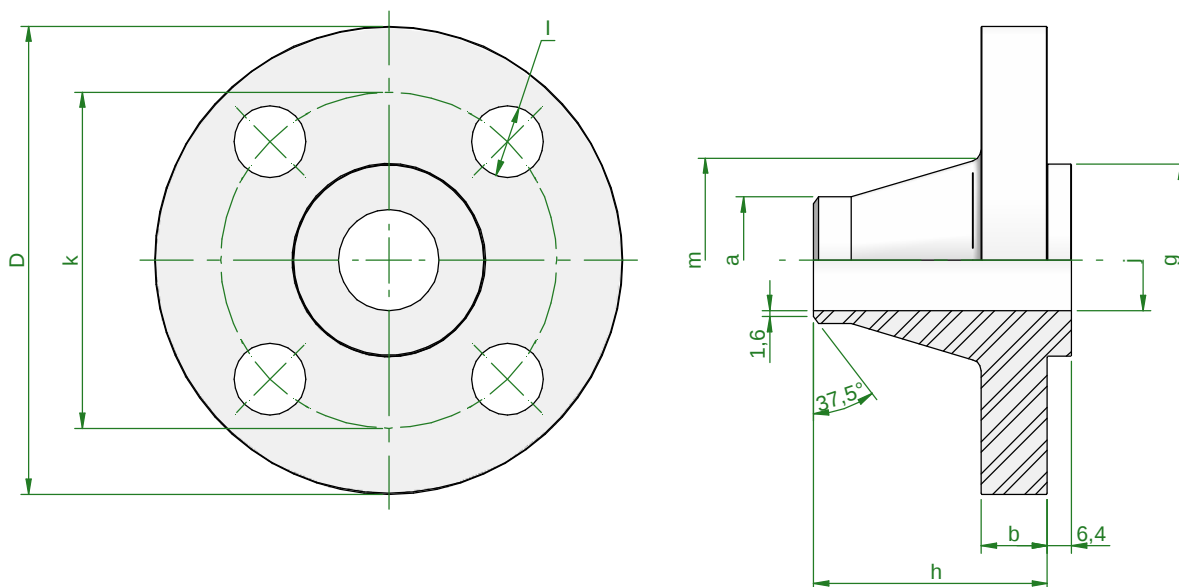
All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	a	j (1)	h	k	holes	l
1/2 "	95,2	14,3	35,0	38,1	21,3	As specified by purchaser	52,4	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	47,6	26,7		57,1	82,5	4,0	19,0
1 "	123,8	17,5	50,8	54,0	33,5		61,9	88,9	4,0	19,0
1 1/4 "	133,3	20,6	63,5	63,5	42,2		66,7	98,4	4,0	19,0
1 1/2 "	155,6	22,2	73,0	69,8	48,3		69,8	114,3	4,0	22,2
2 "	165,1	25,4	92,0	84,1	60,3		73,0	127,0	8,0	19,0
2 1/2 "	190,5	28,6	104,7	100,0	73,1		79,4	149,2	8,0	22,2
3 "	209,5	31,7	127,0	117,5	88,9		82,5	168,3	8,0	22,2
4 "	273,0	38,1	157,2	152,4	114,3		101,6	215,9	8,0	25,4
5 "	330,2	44,4	185,7	188,9	141,2		114,3	266,7	8,0	28,6
6 "	355,6	47,8	215,9	222,2	168,4		117,5	292,1	12,0	28,6
8 "	419,1	55,6	269,8	273,0	219,1		133,3	349,2	12,0	31,7
10 "	508,0	63,5	323,8	342,9	273,0		152,4	431,8	16,0	34,9
12 "	558,8	66,7	381,0	400,0	323,8		155,6	488,9	20,0	34,9
14 "	603,2	69,8	412,7	431,8	355,6		165,1	527,0	20,0	38,1
16 "	685,8	76,2	469,9	495,3	406,4		177,8	603,2	20,0	41,3
18 "	742,9	82,5	533,4	546,1	457,2		184,1	654,0	20,0	44,4
20 "	812,8	88,9	584,2	609,6	508,0		190,5	723,9	24,0	44,4
24 "	939,8	101,6	692,1	717,5	609,6		203,2	838,2	24,0	50,8

(1) The internal bore j corresponds to the matching wall thickness of the pipe schedule. Values shown are standard configurations. For high-pressure classes or custom schedules, the bore must be specified by the purchaser. The internal bore is machined to match the inner diameter of the pipe schedule exactly. This seamless alignment eliminates geometric steps, preventing fluid turbulence and minimizing internal erosion and corrosion.



WELDING NECK



Class 900 (PN 150)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

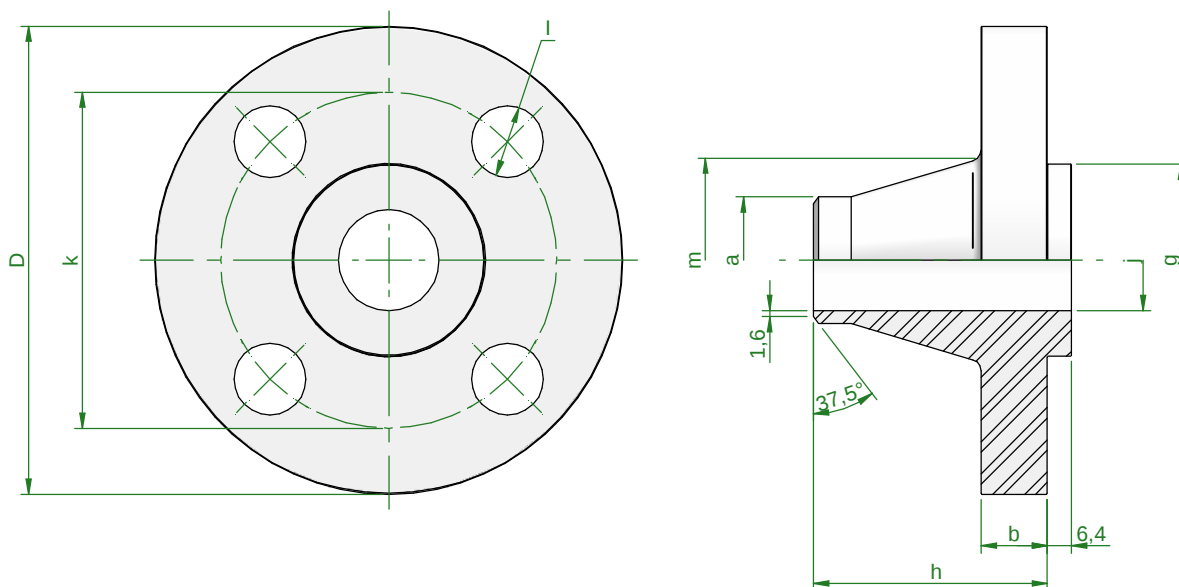
NPS	D	b	g	m	a	j (1)	h	k	holes	l
1/2 "	120,6	22,2	35,0	38,1	21,3	As specified by purchaser	60,3	82,5	4,0	22,2
3/4 "	130,2	25,4	42,9	44,4	26,7		69,8	88,9	4,0	22,2
1 "	149,2	28,6	50,8	52,4	33,5		73,0	101,6	4,0	25,4
1 1/4 "	158,7	28,6	63,5	63,5	42,2		73,0	111,1	4,0	25,4
1 1/2 "	177,8	31,7	73,0	69,8	48,3		82,5	123,8	4,0	28,6
2 "	215,9	38,1	92,0	104,8	60,3		101,6	165,1	8,0	25,4
2 1/2 "	244,5	41,3	104,7	123,8	73,1		104,8	190,5	8,0	28,6
3 "	241,3	38,1	127,0	127,0	88,9		101,6	190,5	8,0	25,4
4 "	292,1	44,4	157,2	158,7	114,3		114,3	234,9	8,0	31,7
5 "	349,2	50,8	185,7	190,5	141,2		127,0	279,4	8,0	34,9
6 "	381,0	55,6	215,9	234,9	168,4		139,7	317,5	12,0	31,7
8 "	469,9	63,5	269,8	298,4	219,1		161,9	393,7	12,0	38,1
10 "	546,1	69,8	323,8	368,3	273,0		184,1	469,9	16,0	38,1
12 "	609,6	79,4	381,0	419,1	323,8		200,0	533,4	20,0	38,1
14 "	641,2	85,7	412,7	450,8	355,6		212,7	558,8	20,0	41,3
16 "	704,8	88,9	469,9	508,0	406,4		215,9	615,9	20,0	44,4
18 "	787,4	101,6	533,4	565,1	457,2		228,6	685,8	20,0	50,8
20 "	857,2	107,9	584,2	622,3	508,0		247,6	749,3	20,0	54,0
24 "	1041,4	139,7	692,1	749,3	609,6		292,1	901,7	20,0	66,7

(1) The internal bore j corresponds to the matching wall thickness of the pipe schedule. Values shown are standard configurations. For high-pressure classes or custom schedules, the bore must be specified by the purchaser. The internal bore is machined to match the inner diameter of the pipe schedule exactly. This seamless alignment eliminates geometric steps, preventing fluid turbulence and minimizing internal erosion and corrosion.



WELDING NECK

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Class 1500 (PN 260)

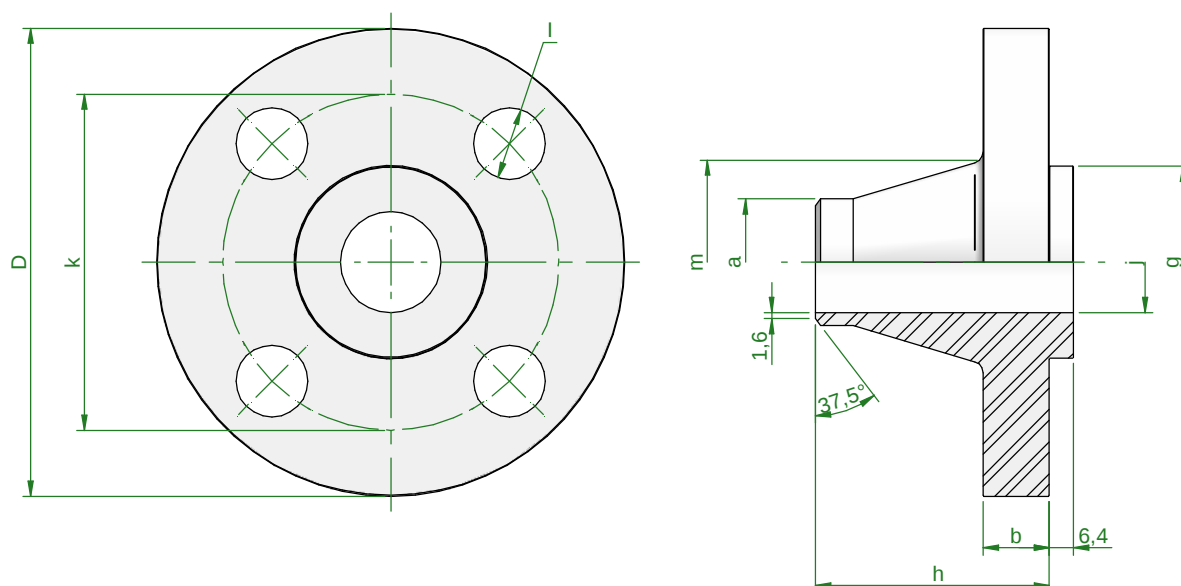
All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	a	j (1)	h	k	holes	l
1/2 "	120,6	22,2	35,0	38,1	21,3	As specified by purchaser	60,3	82,5	4,0	22,2
3/4 "	130,2	25,4	42,9	44,4	26,7		69,8	88,9	4,0	22,2
1 "	149,2	28,6	50,8	52,4	33,5		73,0	101,6	4,0	25,4
1 1/4 "	158,7	28,6	63,5	63,5	42,2		73,0	111,1	4,0	25,4
1 1/2 "	177,8	31,7	73,0	69,8	48,3		82,5	123,8	4,0	28,6
2 "	215,9	38,1	92,0	104,8	60,3		101,6	165,1	8,0	25,4
2 1/2 "	244,5	41,3	104,7	123,8	73,1		104,8	190,5	8,0	28,6
3 "	266,7	47,6	127,0	133,3	88,9		117,5	203,2	8,0	31,7
4 "	311,1	54,0	157,2	161,9	114,3		123,8	241,3	8,0	34,9
5 "	374,6	73,0	185,7	196,8	141,2		155,6	292,1	8,0	41,3
6 "	393,7	82,6	215,9	228,6	168,4		171,5	317,5	12,0	38,1
8 "	482,6	92,1	269,8	292,1	219,1		212,7	393,7	12,0	44,4
10 "	584,2	107,9	323,8	368,3	273,0		254,0	482,6	12,0	50,8
12 "	673,1	123,8	381,0	450,8	323,8		282,5	571,5	16,0	54,0
14 "	749,3	133,4	412,7	495,3	355,6		298,4	635,0	16,0	60,5
16 "	825,6	146,1	469,9	552,4	406,4		311,1	704,8	16,0	66,7
18 "	914,4	161,9	533,4	596,9	457,2		327,0	774,7	16,0	73,0
20 "	984,2	177,8	584,2	641,2	508,0		355,6	831,8	16,0	79,4
24 "	1168,4	203,2	692,1	762,0	609,6		406,4	990,6	16,0	92,1

(1) The internal bore j corresponds to the matching wall thickness of the pipe schedule. Values shown are standard configurations. For high-pressure classes or custom schedules, the bore must be specified by the purchaser. The internal bore is machined to match the inner diameter of the pipe schedule exactly. This seamless alignment eliminates geometric steps, preventing fluid turbulence and minimizing internal erosion and corrosion.



WELDING NECK



Class 2500 (PN 420)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

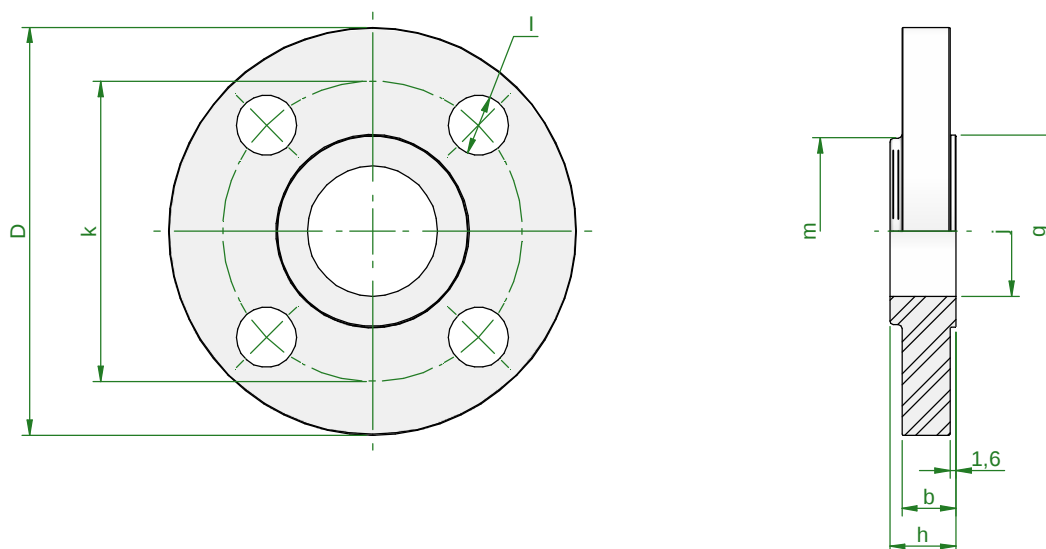
NPS	D	b	g	m	a	j (1)	h	k	holes	l
1/2 "	133,3	30,2	35,0	42,9	21,3	As specified by purchaser	73,0	88,9	4,0	22,2
3/4 "	139,7	31,7	42,9	50,8	26,7		79,4	95,2	4,0	22,2
1 "	158,7	34,9	50,8	57,1	33,5		88,9	107,9	4,0	25,4
1 1/4 "	184,1	38,1	63,5	73,0	42,2		95,2	130,2	4,0	28,6
1 1/2 "	203,2	44,4	73,0	79,4	48,3		111,1	146,0	4,0	31,7
2 "	234,9	50,8	92,0	95,2	60,3		127,0	171,4	8,0	28,6
2 1/2 "	266,7	57,1	104,7	114,3	73,1		142,9	196,8	8,0	31,7
3 "	304,8	66,7	127,0	133,3	88,9		168,3	228,6	8,0	34,9
4 "	355,6	76,2	157,2	165,1	114,3		190,5	273,0	8,0	41,3
5 "	419,1	92,1	185,7	203,2	141,2		228,6	323,8	8,0	47,6
6 "	482,6	107,9	215,9	234,9	168,4		273,5	368,3	8,0	54,0
8 "	552,4	127,0	269,8	304,8	219,1		317,5	438,1	12,0	54,0
10 "	673,1	165,1	323,8	374,6	273,0		419,1	539,7	12,0	66,7
12 "	762,0	184,1	381,0	441,3	323,8		463,5	619,1	12,0	73,0

(1) The internal bore j corresponds to the matching wall thickness of the pipe schedule. Values shown are standard configurations. For high-pressure classes or custom schedules, the bore must be specified by the purchaser. The internal bore is machined to match the inner diameter of the pipe schedule exactly. This seamless alignment eliminates geometric steps, preventing fluid turbulence and minimizing internal erosion and corrosion.



SLIP - ON

Slip-On (SO) flanges are designed to slip over the outside of the pipe prior to welding. The pipe is positioned inside the flange bore slightly back from the sealing face, allowing for execution of a double fillet weld (one internal and one external). This configuration ensures quick installation, easy bolt-hole alignment during assembly, and a lower procurement cost compared to Welding Neck designs.

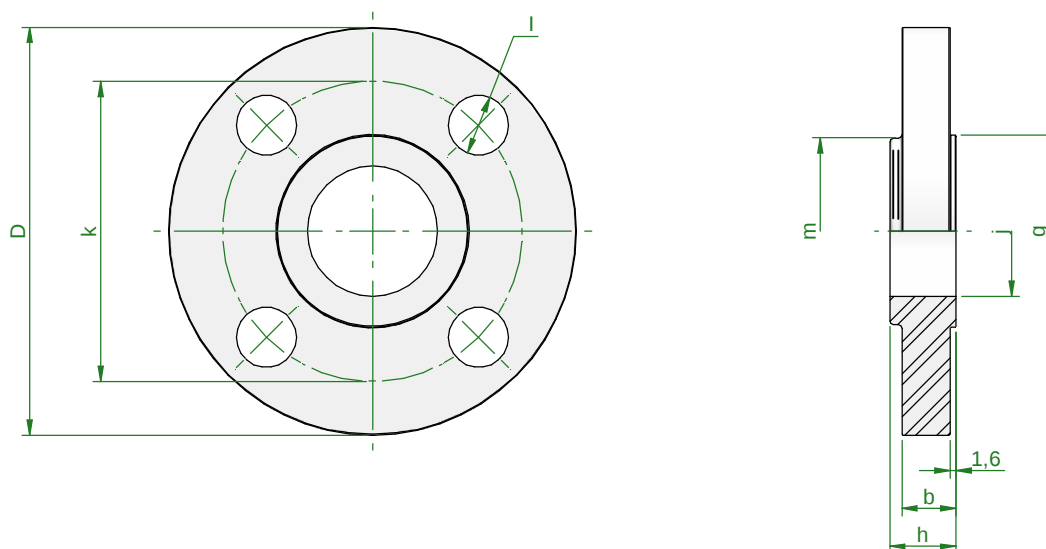


Class 150 (PN 20)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	j (1)	h	k	holes	l
1/2 "	88,9	11,1	35,0	30,2	22,3	15,9	60,3	4,0	15,9
3/4 "	98,4	12,7	42,9	38,1	27,7	15,9	69,8	4,0	15,9
1 "	107,9	14,3	50,8	49,2	34,5	17,5	79,4	4,0	15,9
1 1/4 "	117,5	15,9	63,5	58,8	43,2	20,6	88,9	4,0	15,9
1 1/2 "	127,0	17,5	73,0	65,1	49,5	22,2	98,4	4,0	15,9
2 "	152,4	19,0	92,0	77,8	62,0	25,4	120,6	4,0	19,0
2 1/2 "	177,8	22,2	104,7	90,5	74,7	28,6	139,7	4,0	19,0
3 "	190,5	23,8	127,0	107,9	90,7	30,2	152,4	4,0	19,0
4 "	228,6	23,8	157,2	134,9	116,1	33,3	190,5	8,0	19,0
5 "	254,0	23,8	185,7	163,6	143,8	36,5	215,9	8,0	22,2
6 "	279,4	25,4	215,9	192,1	170,7	39,7	241,3	8,0	22,2
8 "	342,9	28,6	269,8	246,1	221,5	44,4	298,4	8,0	22,2
10 "	406,4	30,2	323,8	304,8	276,3	49,2	361,9	12,0	25,4
12 "	482,6	31,7	381,0	365,1	327,1	55,6	431,8	12,0	25,4
14 "	533,4	34,9	412,7	400,0	359,1	57,1	476,2	12,0	28,6
16 "	596,9	36,5	469,9	457,2	410,5	63,5	539,7	16,0	28,6
18 "	635,0	39,7	533,4	504,8	461,8	68,3	577,8	16,0	31,7
20 "	698,5	42,9	584,2	558,8	513,1	73,0	635,0	20,0	31,7
24 "	812,8	47,6	692,1	663,6	615,9	82,5	749,3	20,0	34,9

(1) The internal bore diameter j is oversized relative to the matching pipe actual outside diameter to facilitate seamless pipe insertion and proper execution of internal/external fillet welds.



Class 300 (PN 50)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

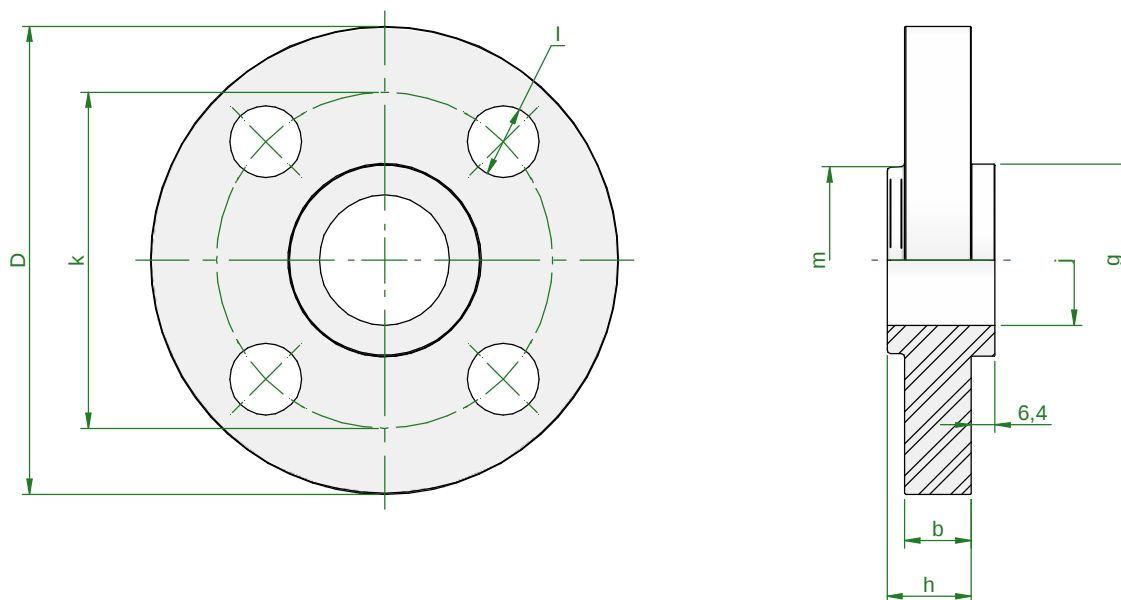
NPS	D	b	g	m	j (1)	h	k	holes	l
1/2 "	95,6	14,3	35,0	38,1	22,3	22,2	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	47,6	27,7	25,4	82,5	4,0	19,0
1 "	123,8	17,5	50,8	54,0	34,5	27,0	88,9	4,0	19,0
1 1/4 "	133,3	19,0	63,5	63,5	43,2	27,0	98,4	4,0	19,0
1 1/2 "	155,6	20,6	73,0	69,8	49,5	30,2	114,3	4,0	22,2
2 "	165,1	22,2	92,0	84,1	62,0	33,3	127,0	8,0	19,0
2 1/2 "	190,5	25,4	104,7	100,0	74,7	38,1	149,2	8,0	22,2
3 "	209,5	28,6	127,0	117,5	90,7	42,9	168,3	8,0	22,2
4 "	254,0	31,7	157,2	146,0	116,1	47,6	200,0	8,0	22,2
5 "	279,4	34,9	185,7	177,8	143,8	50,8	234,9	8,0	22,2
6 "	317,5	36,5	215,9	206,4	170,7	52,4	269,9	12,0	22,2
8 "	381,0	41,3	269,8	260,3	221,5	61,9	330,2	12,0	25,4
10 "	444,5	47,6	323,8	320,7	276,3	66,7	387,3	16,0	28,6
12 "	520,7	50,8	381,0	374,6	327,1	73,0	450,8	16,0	31,7
14 "	584,2	54,0	412,7	425,4	359,1	76,2	514,3	20,0	31,7
16 "	647,7	57,1	469,9	482,6	410,5	82,5	571,5	20,0	34,9
18 "	711,2	60,3	533,4	533,4	461,8	88,9	628,6	24,0	34,9
20 "	774,7	63,5	584,2	584,2	513,1	95,2	685,8	24,0	34,9
24 "	914,4	69,8	692,1	701,7	615,9	106,4	812,8	24,0	41,3

(1) The internal bore diameter j is oversized relative to the matching pipe actual outside diameter to facilitate seamless pipe insertion and proper execution of internal/external fillet welds.



SLIP - ON

Slip-On (SO) flanges are designed to slip over the outside of the pipe prior to welding. The pipe is positioned inside the flange bore slightly back from the sealing face, allowing for execution of a double fillet weld (one internal and one external). This configuration ensures quick installation, easy bolt-hole alignment during assembly, and a lower procurement cost compared to Welding Neck designs.

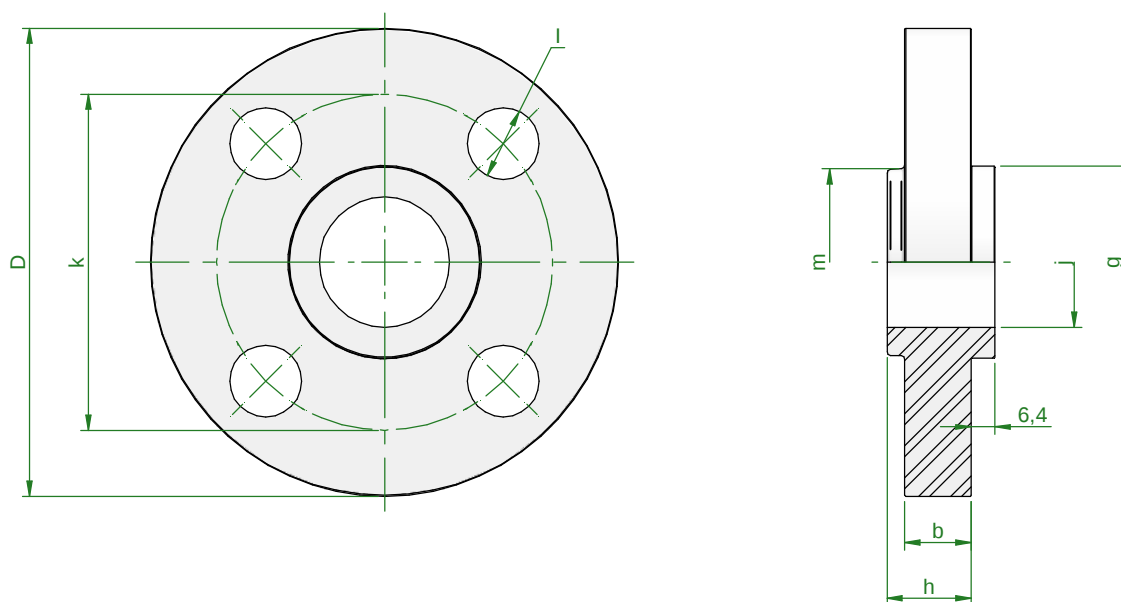


Class 600 (PN 110)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	j (1)	h	k	holes	l
1/2 "	95,2	14,3	35,0	38,1	22,3	22,2	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	47,6	27,7	25,4	82,5	4,0	19,0
1 "	123,8	17,5	50,8	54,0	34,5	27,0	88,9	4,0	19,0
1 1/4 "	133,3	20,6	63,5	63,5	43,2	28,6	98,4	4,0	19,0
1 1/2 "	155,6	22,2	73,0	69,8	49,5	31,7	114,3	4,0	22,2
2 "	165,1	25,4	92,0	84,1	62,0	36,5	127,0	8,0	19,0
2 1/2 "	190,5	28,6	104,7	100,0	74,7	41,3	149,2	8,0	22,2
3 "	209,5	31,7	127,0	117,5	90,7	46,0	168,3	8,0	22,2
4 "	273,0	38,1	157,2	152,4	116,1	54,0	215,9	8,0	25,4
5 "	330,2	44,4	185,7	188,9	143,8	60,3	266,7	8,0	28,6
6 "	355,6	47,8	215,9	222,2	170,7	66,7	292,1	12,0	28,6
8 "	419,1	55,6	269,8	273,0	221,5	76,2	349,2	12,0	31,7
10 "	508,0	63,5	323,8	342,8	276,3	85,7	431,8	16,0	34,9
12 "	558,8	66,7	381,0	400,0	327,1	92,1	488,9	20,0	34,9
14 "	603,2	69,8	412,7	431,8	359,1	93,7	527,0	20,0	38,1
16 "	685,8	76,2	469,9	495,3	410,5	106,4	603,2	20,0	41,3
18 "	742,9	82,5	533,4	546,1	461,8	117,5	654,0	20,0	44,4
20 "	812,8	88,9	584,2	609,6	513,1	127,0	723,9	24,0	44,4
24 "	939,8	101,6	692,1	717,5	615,9	139,7	838,2	24,0	50,8

(1) The internal bore diameter j is oversized relative to the matching pipe actual outside diameter to facilitate seamless pipe insertion and proper execution of internal/external fillet welds.



Class 900 (PN 150)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

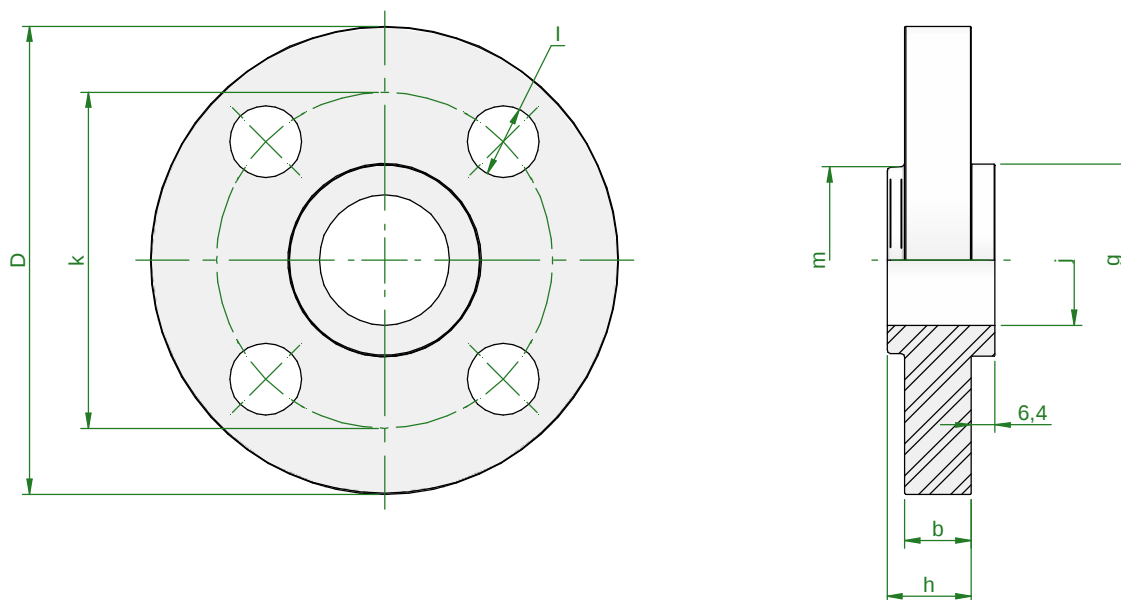
NPS	D	b	g	m	j (1)	h	k	holes	l
1/2 "	120,6	22,2	35,0	38,1	22,3	31,7	82,5	4,0	22,2
3/4 "	130,2	25,4	42,9	44,4	27,7	34,9	88,9	4,0	22,2
1 "	149,2	28,6	50,8	52,5	34,5	41,3	101,6	4,0	25,4
1 1/4 "	158,7	28,6	63,5	63,5	43,2	41,3	111,1	4,0	25,4
1 1/2 "	177,8	31,7	73,0	69,8	49,5	44,4	123,8	4,0	28,6
2 "	215,9	38,1	92,0	104,8	62,0	57,1	165,1	8,0	25,4
2 1/2 "	244,5	41,3	104,7	123,8	74,7	63,5	190,5	8,0	28,6
3 "	241,3	38,1	127,0	127,0	90,7	54,0	190,5	8,0	25,4
4 "	292,1	44,4	157,2	158,7	116,1	69,8	234,9	8,0	31,7
5 "	349,2	50,8	185,7	190,5	143,8	79,4	279,4	8,0	34,9
6 "	381,0	55,6	215,9	234,9	170,7	85,7	317,5	12,0	31,7
8 "	469,9	63,5	269,8	298,4	221,5	101,6	393,7	12,0	38,1
10 "	546,1	69,8	323,8	368,3	276,3	107,9	469,9	16,0	38,1
12 "	609,6	79,4	381,0	419,1	327,1	117,5	533,4	20,0	38,1
14 "	641,2	85,7	412,7	450,8	359,1	130,2	558,8	20,0	41,3
16 "	704,8	88,9	469,9	508,0	410,5	133,3	615,9	20,0	44,4
18 "	787,4	101,6	533,4	565,1	461,8	152,4	685,8	20,0	50,8
20 "	857,2	107,9	584,2	622,3	513,1	158,7	749,3	20,0	54,0
24 "	1041,4	139,7	692,1	749,3	615,9	203,2	901,7	20,0	66,7

(1) The internal bore diameter j is oversized relative to the matching pipe actual outside diameter to facilitate seamless pipe insertion and proper execution of internal/external fillet welds.



SLIP - ON

Slip-On (SO) flanges are designed to slip over the outside of the pipe prior to welding. The pipe is positioned inside the flange bore slightly back from the sealing face, allowing for execution of a double fillet weld (one internal and one external). This configuration ensures quick installation, easy bolt-hole alignment during assembly, and a lower procurement cost compared to Welding Neck designs.

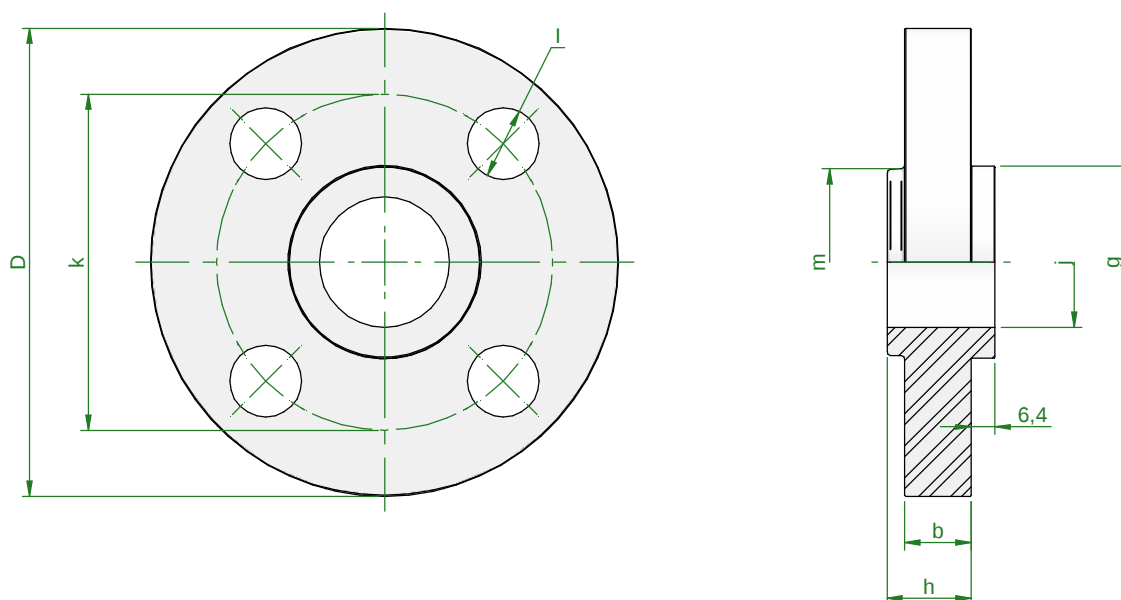


Class 1500 (PN 260)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	j (1)	h	k	holes	l
1/2 "	120,6	22,2	35,0	38,1	22,3	31,7	82,5	4,0	22,2
3/4 "	130,2	25,4	42,9	44,4	27,7	34,9	88,9	4,0	22,2
1 "	149,2	28,6	50,8	52,5	34,5	41,3	101,6	4,0	25,4
1 1/4 "	158,7	28,6	63,5	63,5	43,2	41,3	111,1	4,0	25,4
1 1/2 "	177,8	31,7	73,0	69,8	49,5	44,4	123,8	4,0	28,6
2 "	215,9	38,1	92,0	104,8	62,0	57,1	165,1	8,0	25,4
2 1/2 "	244,5	41,3	104,7	123,8	74,7	63,5	190,5	8,0	28,6
3 "	266,7	47,6	127,0	133,3	90,7	73,0	203,2	8,0	31,7
4 "	311,1	54,0	157,2	161,9	116,1	90,5	241,3	8,0	34,9
5 "	374,6	73,0	185,7	196,8	143,8	104,8	292,1	8,0	41,3
6 "	393,7	82,5	215,9	228,6	170,7	119,1	317,5	12,0	38,1
8 "	482,6	92,1	269,8	292,1	221,5	142,9	393,7	12,0	44,4
10 "	584,2	107,9	323,8	368,0	276,3	158,7	482,6	12,0	50,8
12 "	673,1	123,8	381,0	450,8	327,1	181,0	571,4	16,0	54,0

(1) The internal bore diameter j is oversized relative to the matching pipe actual outside diameter to facilitate seamless pipe insertion and proper execution of internal/external fillet welds.



Class 2500 (PN 420)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

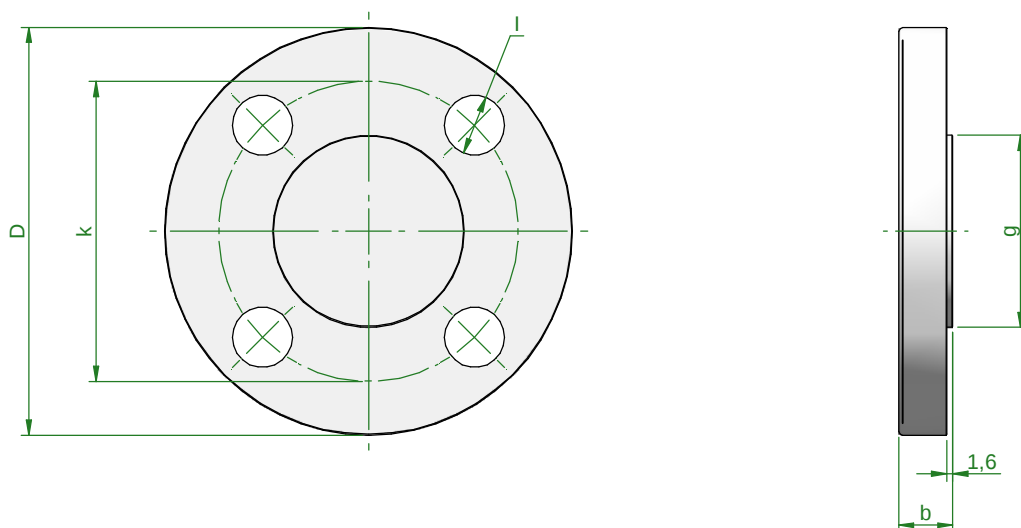
NPS	D	b	g	m	j (1)	h	k	holes	l
1/2 "	133,3	30,2	35,0	42,9	22,3	39,7	88,9	4,0	22,2
3/4 "	139,7	31,7	42,9	50,8	27,7	42,9	95,2	4,0	22,2
1 "	158,7	34,9	50,8	57,1	34,5	47,6	107,9	4,0	25,4
1 1/4 "	184,1	38,1	63,5	73,0	43,2	52,4	130,2	4,0	28,6
1 1/2 "	203,2	44,4	73,0	79,4	49,5	60,3	146,0	4,0	31,7
2 "	234,9	50,8	92,0	95,2	62,0	69,8	171,4	8,0	28,6
2 1/2 "	266,7	57,1	104,7	114,3	74,7	79,4	196,8	8,0	31,7
3 "	304,8	66,7	127,0	133,3	90,7	92,1	228,6	8,0	34,9
4 "	355,6	76,2	157,2	165,1	116,1	107,9	273,0	8,0	41,3
5 "	419,1	92,1	185,7	203,2	143,8	130,2	323,8	8,0	47,6
6 "	482,6	107,9	215,9	234,9	170,7	152,4	368,3	8,0	54,0
8 "	552,4	127,0	269,8	304,8	221,5	177,8	438,1	12,0	54,0
10 "	673,1	165,1	323,8	374,6	276,3	228,6	539,7	12,0	66,7
12 "	762,0	184,1	381,0	441,3	327,1	254,0	619,1	12,0	73,0

(1) The internal bore diameter j is oversized relative to the matching pipe actual outside diameter to facilitate seamless pipe insertion and proper execution of internal/external fillet welds.



BLIND

Blind flanges are solid discs engineered without a center bore, primarily utilized to safely seal or blank off the ends of piping systems, valves, manifolds, or pressure vessel nozzles. They act as a definitive operational end-stop. Their flanged nature, as opposed to a permanent welded closure (like a pipe cap), offers the critical advantage of granting quick and repeatable access to the internal pipeline for future inspections, maintenance operations, flushing, or future system expansions.

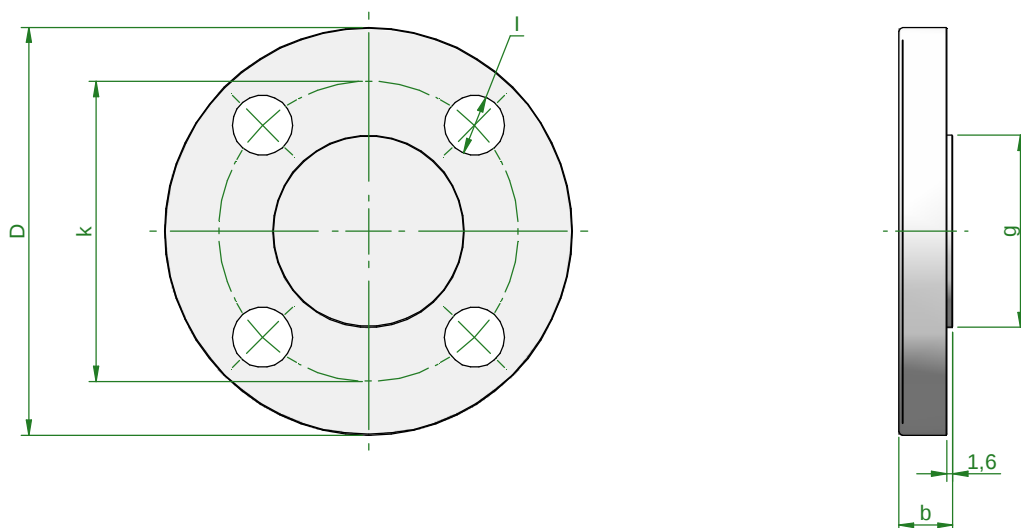


Class 150 (PN 20)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	k	holes	l
1/2 "	88,9	11,1	35,0	60,3	4,0	15,9
3/4 "	98,4	12,7	42,9	69,8	4,0	15,9
1 "	107,9	14,3	50,8	79,4	4,0	15,9
1 1/4 "	117,5	15,9	63,5	88,9	4,0	15,9
1 1/2 "	127,0	17,5	73,0	98,4	4,0	15,9
2 "	152,4	19,0	92,0	120,6	4,0	19,0
2 1/2 "	177,8	22,2	104,7	139,4	4,0	19,0
3 "	190,5	23,8	127,0	152,4	4,0	19,0
4 "	228,6	23,8	157,2	190,5	8,0	19,0
5 "	254,0	23,8	185,7	215,9	8,0	22,2
6 "	279,4	25,4	215,9	241,3	8,0	22,2
8 "	342,9	28,6	269,8	298,4	8,0	22,2
10 "	406,4	30,2	323,8	361,9	12,0	25,4
12 "	482,6	31,7	381,0	431,8	12,0	25,4
14 "	533,4	34,9	412,7	476,2	12,0	28,6
16 "	596,9	36,5	469,9	539,9	16,0	28,6
18 "	635,0	39,7	533,4	577,8	16,0	31,7
20 "	698,5	42,9	584,2	635,0	20,0	31,7
24 "	812,8	47,6	692,1	749,3	20,0	34,9

BLIND



Class 300 (PN 50)

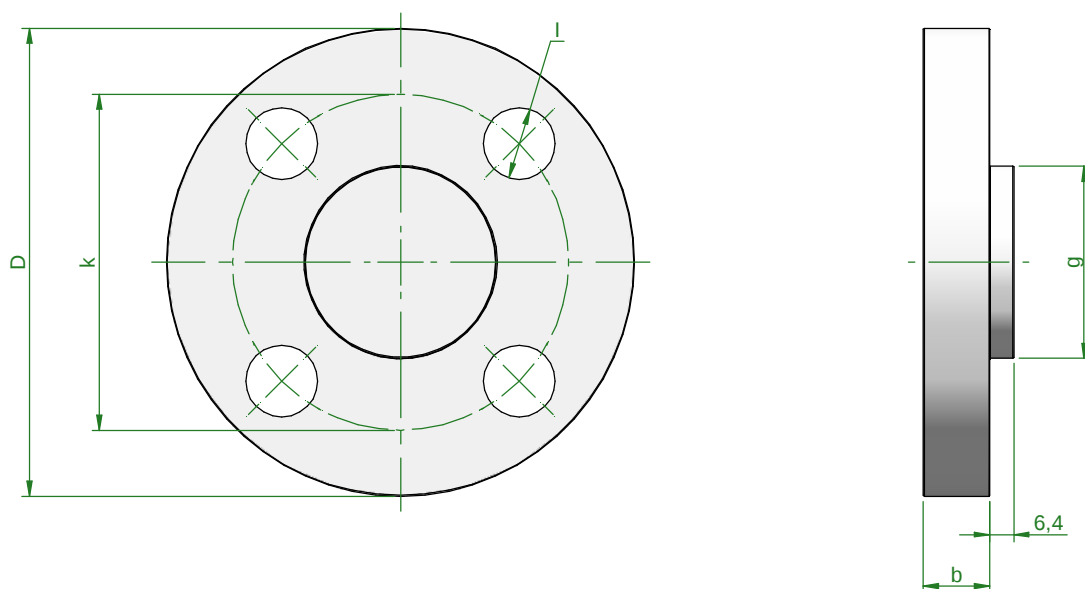
All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	k	holes	l
1/2 "	95,2	14,3	35,0	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	82,5	4,0	19,0
1 "	123,8	17,5	50,8	88,9	4,0	19,0
1 1/4 "	133,3	19,0	63,5	98,4	4,0	19,0
1 1/2 "	155,6	20,6	73,0	114,3	4,0	22,2
2 "	165,1	22,2	92,0	127,0	8,0	19,0
2 1/2 "	190,5	25,4	104,7	149,2	8,0	22,2
3 "	209,5	28,6	127,0	168,3	8,0	22,2
4 "	254,0	31,7	157,2	200,0	8,0	22,2
5 "	279,4	34,9	185,7	234,9	8,0	22,2
6 "	317,5	36,5	215,9	269,9	12,0	22,2
8 "	381,0	41,3	269,8	330,2	12,0	25,4
10 "	444,5	47,6	323,8	387,3	16,0	28,6
12 "	520,7	50,8	381,0	450,8	16,0	31,7
14 "	584,2	54,0	412,7	514,3	20,0	31,7
16 "	647,7	57,1	469,9	571,5	20,0	34,9
18 "	711,2	60,3	533,4	628,6	24,0	34,9
20 "	774,7	63,5	584,2	685,8	24,0	34,9
24 "	914,4	69,8	692,1	812,8	24,0	41,3



BLIND

Blind flanges are solid discs engineered without a center bore, primarily utilized to safely seal or blank off the ends of piping systems, valves, manifolds, or pressure vessel nozzles. They act as a definitive operational end-stop. Their flanged nature, as opposed to a permanent welded closure (like a pipe cap), offers the critical advantage of granting quick and repeatable access to the internal pipeline for future inspections, maintenance operations, flushing, or future system expansions.

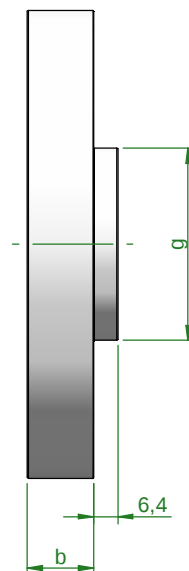
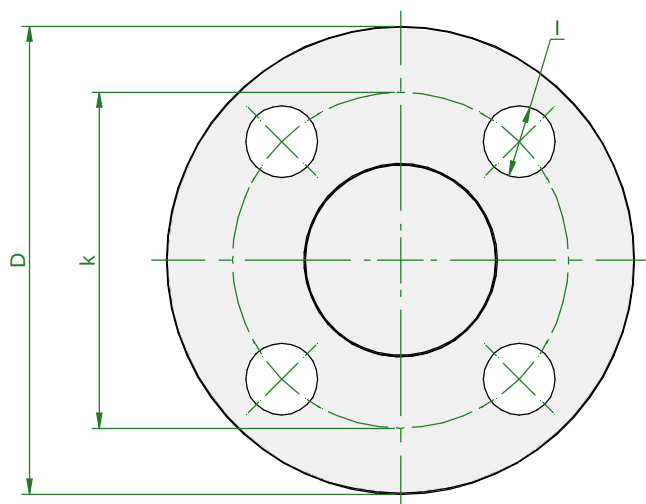


Class 600 (PN 110)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	k	holes	l
1/2 "	95,2	14,3	35,0	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	82,5	4,0	19,0
1 "	123,8	17,5	50,8	88,9	4,0	19,0
1 1/4 "	133,3	20,6	63,5	98,4	4,0	19,0
1 1/2 "	155,6	22,2	73,0	114,3	4,0	22,2
2 "	165,1	25,4	92,0	127,0	8,0	19,0
2 1/2 "	190,5	28,6	104,7	149,2	8,0	22,2
3 "	209,5	31,7	127,0	168,3	8,0	22,2
4 "	273,0	38,1	157,2	215,9	8,0	25,4
5 "	330,2	44,4	185,7	266,7	8,0	28,6
6 "	355,6	47,8	215,9	292,1	12,0	28,6
8 "	419,1	55,6	269,8	349,2	12,0	31,7
10 "	508,0	63,5	323,8	431,8	16,0	34,9
12 "	558,8	66,7	381,0	488,9	20,0	34,9
14 "	603,2	69,8	412,7	527,0	20,0	38,1
16 "	685,8	76,2	469,9	603,2	20,0	41,3
18 "	742,9	82,5	533,4	654,0	20,0	44,4
20 "	812,8	88,9	584,2	723,9	24,0	44,4
24 "	939,8	101,6	692,1	838,2	24,0	50,8

BLIND



Class 900 (PN 150)

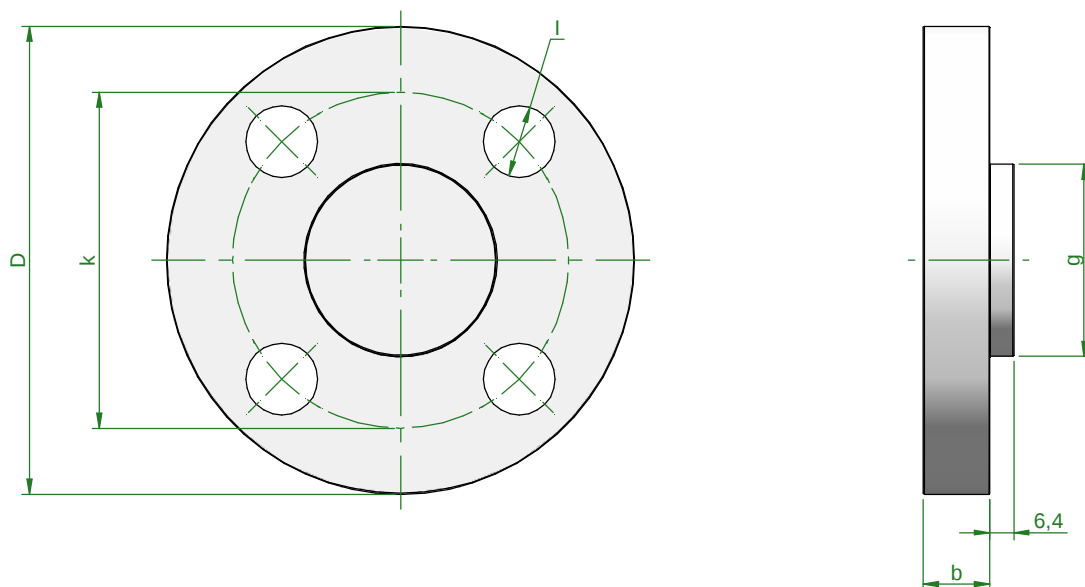
All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	k	holes	l
1/2 "	120,6	22,2	35,0	82,5	4,0	22,2
3/4 "	130,2	25,4	42,9	88,9	4,0	22,2
1 "	149,2	28,6	50,8	101,6	4,0	25,4
1 1/4 "	158,7	28,6	63,5	111,1	4,0	25,4
1 1/2 "	177,8	31,7	73,0	123,8	4,0	28,6
2 "	215,9	38,1	92,0	165,1	8,0	25,4
2 1/2 "	244,5	41,3	104,7	190,5	8,0	28,6
3 "	241,3	38,1	127,0	190,5	8,0	25,4
4 "	292,1	44,4	157,2	234,9	8,0	31,7
5 "	349,2	50,8	185,7	279,4	8,0	34,9
6 "	381,0	55,6	215,9	317,5	12,0	31,7
8 "	469,9	63,5	269,8	393,7	12,0	38,1
10 "	546,1	69,8	323,8	469,9	16,0	38,1
12 "	609,6	79,4	381,0	533,4	20,0	38,1
14 "	641,2	85,7	412,7	558,8	20,0	41,3
16 "	704,8	88,9	469,9	615,9	20,0	44,4
18 "	787,4	101,6	533,4	685,8	20,0	50,8
20 "	857,2	107,9	584,2	749,3	20,0	54,0
24 "	1041,4	139,7	692,1	901,7	20,0	66,7



BLIND

Blind flanges are solid discs engineered without a center bore, primarily utilized to safely seal or blank off the ends of piping systems, valves, manifolds, or pressure vessel nozzles. They act as a definitive operational end-stop. Their flanged nature, as opposed to a permanent welded closure (like a pipe cap), offers the critical advantage of granting quick and repeatable access to the internal pipeline for future inspections, maintenance operations, flushing, or future system expansions.

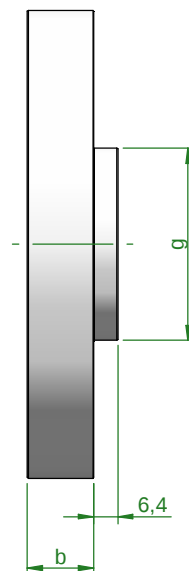
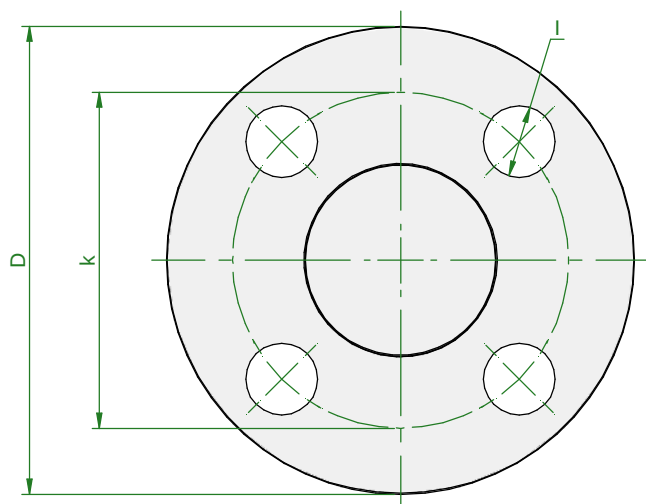


Class 1500 (PN 260)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	k	holes	l
1/2 "	120,6	22,2	35,0	82,5	4,0	22,2
3/4 "	130,2	25,4	42,9	88,9	4,0	22,2
1 "	149,2	28,6	50,8	101,6	4,0	25,4
1 1/4 "	158,7	28,6	63,5	111,1	4,0	25,4
1 1/2 "	177,8	31,7	73,0	123,8	4,0	28,6
2 "	215,9	38,1	92,0	165,1	8,0	25,4
2 1/2 "	244,5	41,3	104,7	190,5	8,0	28,6
3 "	266,7	47,6	127,0	203,2	8,0	31,7
4 "	311,1	54,0	157,2	241,3	8,0	34,9
5 "	374,6	73,0	185,7	292,1	8,0	41,3
6 "	393,7	82,5	215,9	317,5	12,0	38,1
8 "	482,6	92,1	269,8	393,7	12,0	44,4
10 "	584,2	107,9	323,8	482,6	12,0	50,8
12 "	673,1	123,8	381,0	571,5	16,0	54,0
14 "	749,3	133,3	412,7	635,0	16,0	60,5
16 "	825,5	146,0	469,9	704,8	16,0	66,7
18 "	914,4	161,9	533,4	774,7	16,0	73,0
20 "	984,2	177,8	584,2	831,8	16,0	79,4
24 "	1168,4	203,2	692,1	990,6	16,0	92,1

BLIND



Class 2500 (PN 420)

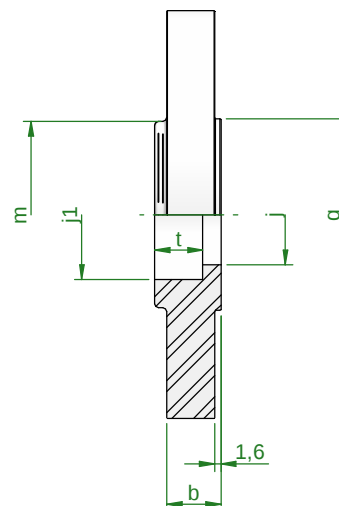
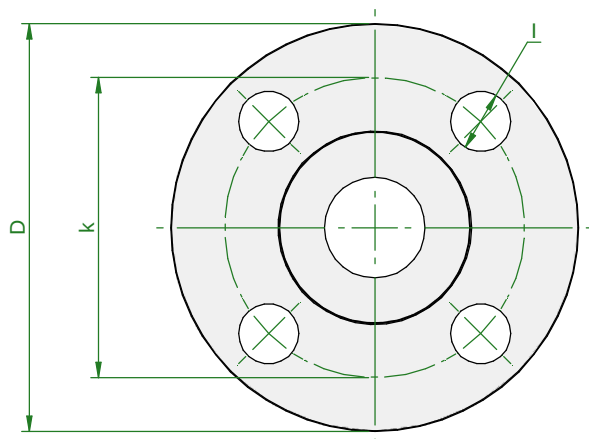
All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	k	holes	l
1/2 "	133,3	30,2	35,0	88,9	4,0	22,2
3/4 "	139,7	31,7	42,9	95,2	4,0	22,2
1 "	158,7	34,9	50,8	107,9	4,0	25,4
1 1/4 "	184,1	38,1	63,5	130,2	4,0	28,6
1 1/2 "	203,2	44,4	73,0	146,0	4,0	31,7
2 "	234,9	50,8	92,0	171,4	8,0	28,6
2 1/2 "	266,7	57,1	104,7	196,8	8,0	31,7
3 "	304,8	66,7	127,0	228,6	8,0	34,9
4 "	355,6	76,2	157,2	273,0	8,0	41,3
5 "	419,1	92,1	185,7	323,8	8,0	47,6
6 "	482,6	107,9	215,9	368,3	8,0	54,0
8 "	552,4	127,0	269,8	438,1	12,0	54,0
10 "	673,1	165,1	323,8	539,7	12,0	66,7
12 "	762,0	184,1	381,0	619,1	12,0	73,0



SOCKET WELDING

Socket Welding (SW) flanges feature an engineered internal socket to receive the pipe end. The pipe is inserted into the socket until it bottom-rests against an internal integral shoulder, and it is then secured via a single fillet weld at the outer hub. The internal shoulder is precision-machined to align the flange's fluid bore seamlessly with the pipe's internal diameter, ensuring a smooth hydraulic profile with minimal flow turbulence.



Class 150 (PN 20) All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	h	t	j1	j (1)	k	holes	l
1/4 "	88,9	11,1	35,0	30,2	15,9	9,5	14,7	9,1	60,3	4,0	15,9
3/8 "	88,9	11,1	35,0	30,2	15,9	9,5	18,3	12,4	60,3	4,0	15,9
1/2 "	88,9	11,1	35,0	30,2	15,9	9,5	22,3	15,7	60,3	4,0	15,9
3/4 "	98,4	12,7	42,9	38,1	15,9	11,1	27,7	20,8	69,8	4,0	15,9
1 "	107,9	14,3	50,8	49,2	17,5	12,7	34,5	26,7	79,4	4,0	15,9
1 1/4 "	117,5	15,9	63,5	58,8	20,6	14,3	43,2	35,1	88,9	4,0	15,9
1 1/2 "	127,0	17,5	73,0	65,1	22,2	15,9	49,5	40,9	98,4	4,0	15,9
2 "	152,4	19,0	92,0	77,8	25,4	17,5	62,0	52,6	120,6	4,0	19,0
2 1/2 "	177,8	22,2	104,7	90,5	28,6	19,0	74,7	62,7	139,7	4,0	19,0
3 "	190,5	23,8	127,0	107,9	30,2	20,6	90,7	78,0	152,4	4,0	19,0

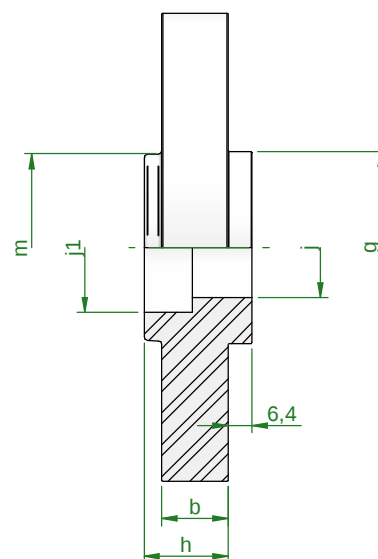
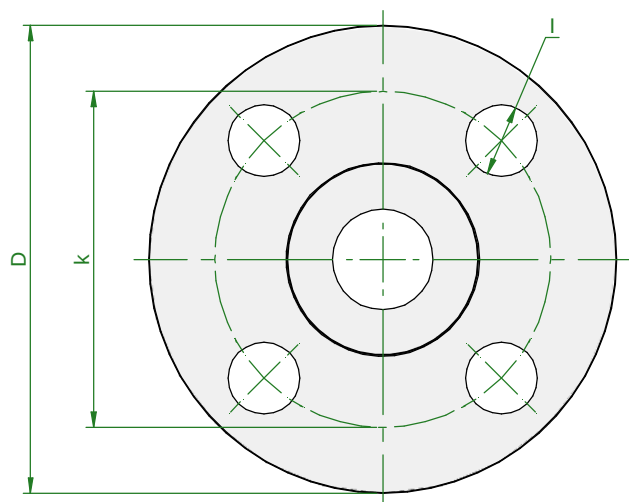
Class 300 (PN 50)

NPS	D	b	g	m	h	t	j1	j (1)	k	holes	l
1/4 "	95,2	14,3	35,0	38,1	22,2	9,5	14,7	9,1	66,7	4,0	15,9
3/8 "	95,2	14,3	35,0	38,1	22,2	9,5	18,3	12,4	66,7	4,0	15,9
1/2 "	95,2	14,3	35,0	38,1	22,2	9,5	22,3	15,7	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	47,6	25,4	11,1	27,7	20,8	82,5	4,0	19,0
1 "	123,8	17,5	50,8	54,0	27,0	12,7	34,5	26,7	88,9	4,0	19,0
1 1/4 "	133,3	19,0	63,5	63,5	27,0	14,3	43,2	35,1	98,4	4,0	19,0
1 1/2 "	155,6	20,6	73,0	69,8	30,2	15,9	49,5	40,9	114,3	4,0	22,2
2 "	165,1	22,2	92,0	84,1	33,3	17,5	62,0	52,7	127,0	8,0	19,0
2 1/2 "	190,5	25,4	104,7	100,0	38,1	19,1	74,7	62,7	149,2	8,0	22,2
3 "	209,5	28,6	127,0	117,5	42,9	20,6	90,7	78,0	168,3	8,0	22,2

(1) The internal bore j corresponds to the matching wall thickness of the pipe schedule. Values shown are standard configurations. For high-pressure classes or custom schedules, the bore must be specified by the purchaser. The internal bore is machined to match the inner diameter of the pipe schedule exactly. This seamless alignment eliminates geometric steps, preventing fluid turbulence and minimizing internal erosion and corrosion.



SOCKET WELDING



Class 600 (PN 110) All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	h	t	j1	j (1)	k	holes	l
1/4 "	95,2	14,3	35,0	38,1	22,2	9,5	14,7	7,6	66,7	4,0	15,9
3/8 "	95,2	14,3	35,0	38,1	22,2	9,5	18,3	10,7	66,7	4,0	15,9
1/2 "	95,2	14,3	35,0	38,1	22,2	9,5	22,3	14,0	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	47,6	25,4	11,1	27,7	18,8	82,5	4,0	19,0
1 "	123,8	17,5	50,8	54,0	27,0	12,7	34,5	24,4	88,9	4,0	19,0
1 1/4 "	133,3	20,6	63,5	63,5	28,6	14,3	43,2	32,5	98,4	4,0	19,0
1 1/2 "	155,6	22,2	73,0	69,8	31,7	15,9	49,5	38,1	114,3	4,0	22,2
2 "	165,1	25,4	92,0	84,1	36,5	17,5	62,0	49,3	127,0	8,0	19,0
2 1/2 "	190,5	28,6	104,7	100,0	41,3	19,1	74,7	58,9	149,2	8,0	22,2
3 "	209,5	31,7	127,0	117,5	46,0	20,6	90,7	73,7	168,3	8,0	22,2

Class 900/1500 (PN 150/260)

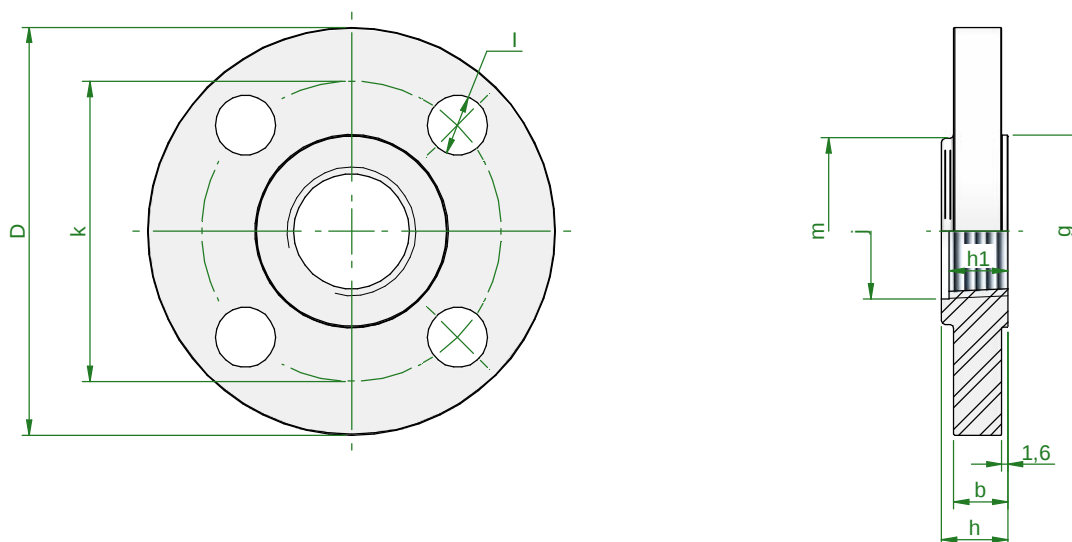
NPS	D	b	g	m	h	t	j1	j (1)	k	holes	l
1/2 "	120,7	22,2	35,0	38,1	31,8	9,5	22,3	As specified by purchaser	82,5	4,0	22,2
3/4 "	130,2	25,4	42,9	44,5	34,9	11,1	27,7		88,9	4,0	22,2
1 "	149,2	28,6	50,8	52,4	41,3	12,7	34,5		101,6	4,0	25,4
1 1/4 "	158,8	28,6	63,5	63,5	41,3	14,3	43,2		111,1	4,0	25,4
1 1/2 "	177,8	31,8	73,0	69,9	44,5	15,9	49,5		123,8	4,0	28,6
2 "	215,9	38,1	92,0	104,8	57,2	17,5	62,0		165,1	8,0	25,4
2 1/2 "	244,5	41,3	104,7	123,8	63,5	19,1	74,7		190,5	8,0	28,6

(1) The internal bore j corresponds to the matching wall thickness of the pipe schedule. Values shown are standard configurations. For high-pressure classes or custom schedules, the bore must be specified by the purchaser. The internal bore is machined to match the inner diameter of the pipe schedule exactly. This seamless alignment eliminates geometric steps, preventing fluid turbulence and minimizing internal erosion and corrosion.



THREADED FLANGES

Threaded flanges feature an internal bore machined with a tapered female thread in strict compliance with the ASME B1.20.1 (NPT) standard. They are joined to the piping network by screwing them directly onto the male-threaded end of the pipe. The primary advantage of this design is the complete absence of any welding during installation. This makes them the preferred and mandatory choice for highly hazardous areas with explosion or fire risks (where hot work is strictly banned) and in plants where post-weld heat treatments are unfeasible.



Class 150 lb (PN 20)

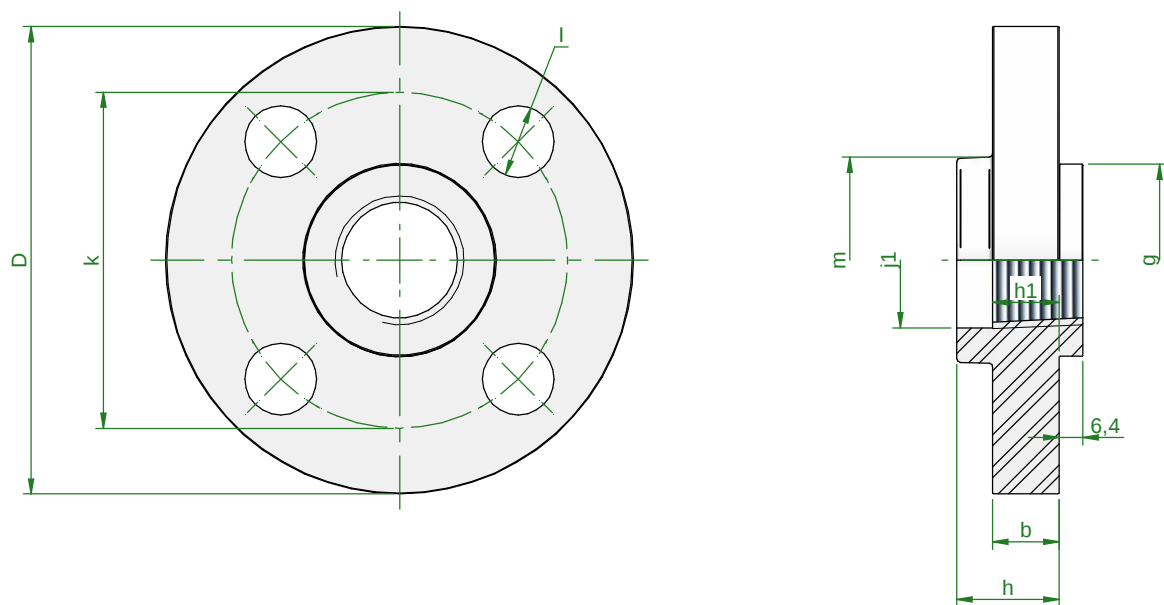
All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	h1	j1	h	k	holes	l
1/2 "	88,9	11,1	35,0	30,2	15,9	23,6	15,9	60,3	4,0	15,9
3/4 "	98,4	12,7	42,9	38,1	15,9	29,0	15,9	69,8	4,0	15,9
1 "	107,9	14,3	50,8	49,2	17,5	35,8	17,5	79,4	4,0	15,9
1 1/4 "	117,5	15,9	63,5	58,8	20,6	44,5	20,6	88,9	4,0	15,9
1 1/2 "	127,0	17,5	73,0	65,1	22,2	50,6	22,2	98,4	4,0	15,9
2 "	152,4	19,0	92,0	77,8	25,4	63,5	25,4	120,6	4,0	19,0
2 1/2 "	177,8	22,2	104,7	90,5	28,6	76,2	28,6	139,7	4,0	19,0
3 "	190,5	23,8	127,0	107,9	30,2	92,2	30,2	152,4	4,0	19,0

Class 300 (PN 50)

NPS	D	b	g	m	h1	j1	h	k	holes	l
1/2 "	95,2	14,3	35,0	38,1	15,9	23,6	22,2	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	47,6	15,9	29,0	25,4	82,5	4,0	19,0
1 "	123,8	17,5	50,8	54,0	17,5	35,8	27,0	88,9	4,0	19,0
1 1/4 "	133,3	19,0	63,5	63,5	20,6	44,5	27,0	98,4	4,0	19,0
1 1/2 "	155,6	20,6	73,0	69,8	22,2	50,6	30,2	114,3	4,0	22,2
2 "	165,1	22,2	92,0	84,1	28,6	63,5	33,3	127,0	8,0	19,0
2 1/2 "	190,5	25,4	104,7	100,0	31,7	76,2	38,1	149,2	8,0	22,2
3 "	209,5	28,6	127,0	117,5	31,7	92,2	42,9	168,3	8,0	22,2

THREADED FLANGES



Class 600 lb (PN 110)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	g	m	h1	j1	h	k	holes	l
1/2 "	95,2	14,3	35,0	38,1	15,9	23,6	22,2	66,7	4,0	15,9
3/4 "	117,5	15,9	42,9	47,6	15,9	29,0	25,4	82,5	4,0	19,0
1 "	123,8	17,5	50,8	54,0	17,5	35,8	27,0	88,9	4,0	19,0
1 1/4 "	133,3	20,6	63,5	63,5	20,6	44,5	28,6	98,4	4,0	19,0
1 1/2 "	155,6	22,2	73,0	69,8	22,2	50,6	31,7	114,3	4,0	22,2
2 "	165,1	25,4	92,0	84,1	28,6	63,5	36,5	127,0	8,0	19,0
2 1/2 "	190,5	28,6	104,7	100,0	31,7	76,2	41,3	149,2	8,0	22,2
3 "	209,5	31,7	127,0	117,5	34,9	92,2	46,0	168,3	8,0	22,2

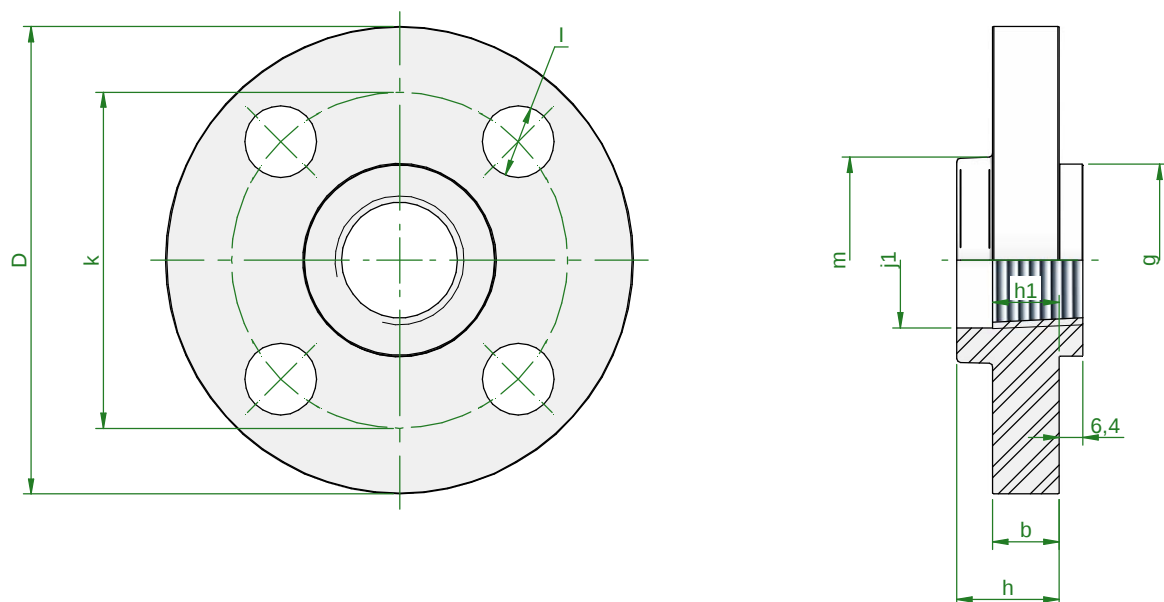
Class 900 (PN 150)

NPS	D	b	g	m	h1	j1	h	k	holes	l
1/2 "	120,6	22,2	35,0	38,1	22,2	23,6	31,7	82,5	4,0	22,2
3/4 "	130,2	25,4	42,9	44,4	25,4	29,0	34,9	88,9	4,0	22,2
1 "	149,2	28,6	50,8	52,4	28,6	35,8	41,3	101,6	4,0	25,4
1 1/4 "	158,7	28,6	63,5	63,5	30,2	44,5	41,3	111,1	4,0	25,4
1 1/2 "	177,8	31,7	73,0	69,8	31,7	50,6	44,4	123,8	4,0	28,6
2 "	215,9	38,1	92,0	104,8	38,1	63,5	57,1	165,1	8,0	25,4
2 1/2 "	244,5	41,3	104,7	123,8	47,6	76,2	63,5	190,5	8,0	28,6
3 "	241,3	38,1	127,0	127,0	41,3	92,2	54,0	190,5	8,0	25,4



THREADED FLANGES

Threaded flanges feature an internal bore machined with a tapered female thread in strict compliance with the ASME B1.20.1 (NPT) standard. They are joined to the piping network by screwing them directly onto the male-threaded end of the pipe. The primary advantage of this design is the complete absence of any welding during installation. This makes them the preferred and mandatory choice for highly hazardous areas with explosion or fire risks (where hot work is strictly banned) and in plants where post-weld heat treatments are unfeasible.



Class 1500 lb (PN 260)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

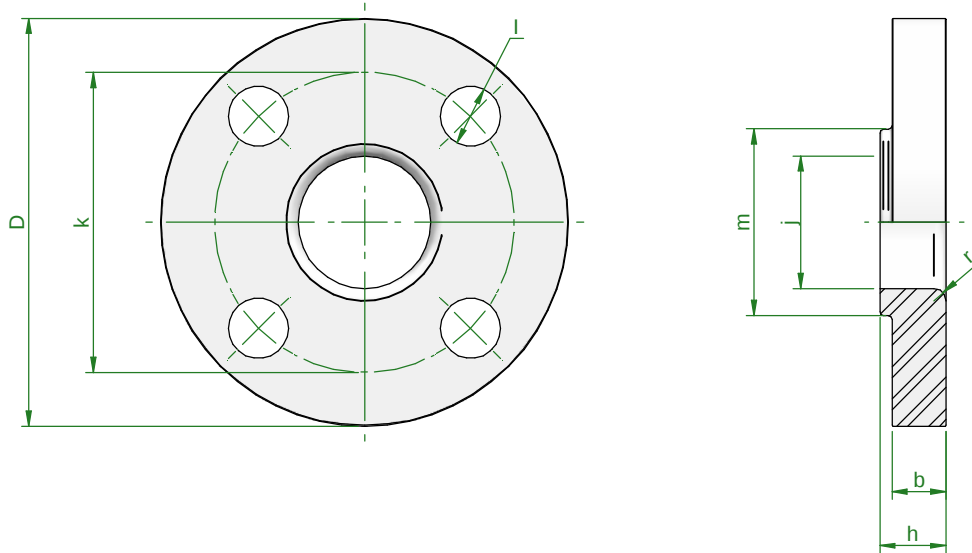
NPS	D	b	g	m	h1	j1	h	k	holes	l
1/2 "	120,6	22,2	35,0	38,1	22,2	23,6	31,7	82,5	4,0	22,2
3/4 "	130,2	25,4	42,9	44,4	25,4	29,0	34,9	88,9	4,0	22,2
1 "	149,2	28,6	50,8	52,4	28,6	35,8	41,3	101,6	4,0	25,4
1 1/4 "	158,7	28,6	63,5	63,5	30,2	44,5	41,3	111,1	4,0	25,4
1 1/2 "	177,8	31,7	73,0	69,8	31,7	50,6	44,4	123,8	4,0	28,6
2 "	215,9	38,1	92,0	104,8	38,1	63,5	57,1	165,1	8,0	25,4
2 1/2 "	244,5	41,3	104,7	123,8	47,6	76,2	63,5	190,5	8,0	28,6
3 "	266,7	47,6	127,0	133,3	50,8	92,2	73,0	203,2	8,0	31,7

Class 2500 (PN 420)

NPS	D	b	g	m	h1	j1	h	k	holes	l
1/2 "	133,3	30,2	35,0	42,9	28,6	23,6	39,7	88,9	4,0	22,2
3/4 "	139,7	31,7	42,9	50,8	31,7	29,0	42,9	95,2	4,0	22,2
1 "	158,7	34,9	50,8	57,1	34,9	35,8	47,6	107,9	4,0	25,4
1 1/4 "	184,1	38,1	63,5	73,0	38,1	44,5	52,4	130,2	4,0	28,6
1 1/2 "	203,2	44,4	73,0	79,4	44,4	50,6	60,3	146,0	4,0	31,7
2 "	234,9	50,8	92,0	95,2	50,8	63,5	69,8	171,4	8,0	28,6
2 1/2 "	266,7	57,1	104,7	114,3	57,1	76,2	79,4	196,8	8,0	31,7
3 "	304,8	66,7	127,0	133,3	63,5	92,2	92,1	228,6	8,0	34,9

LAP JOINT

Lap Joint (LJ) flanges are uniquely engineered to operate in conjunction with a matching butt-welded piping component known as a Stub End. Unlike conventional configurations, the Lap Joint flange itself is never directly welded or secured to the pipe; instead, it remains entirely free to rotate over the Stub End's barrel. The joint sealing pressure is applied through the studbolts, forcing the flange hub against the back face of the stub end, which securely compresses the gasket.



Class 150 (PN 20)

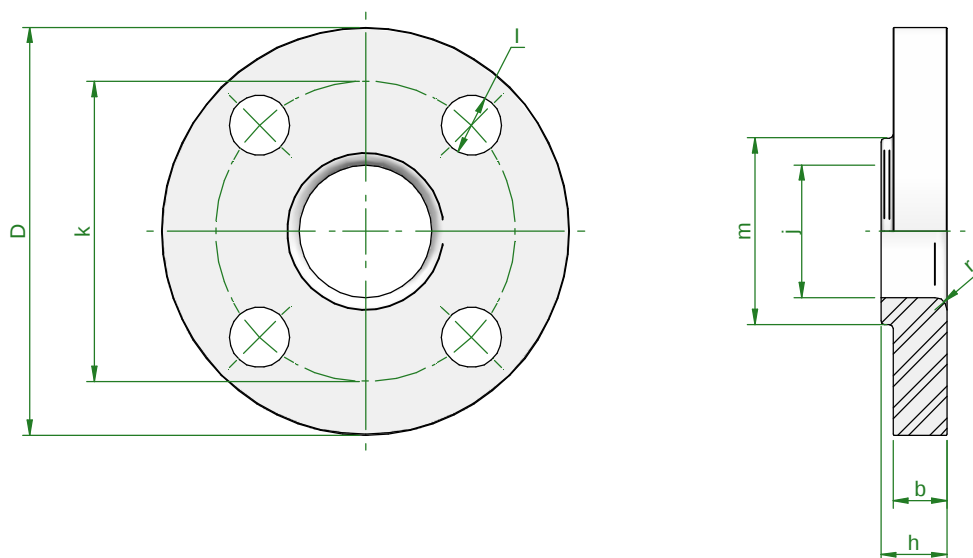
All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	m	j	h	r	k	holes	l
1/2 "	88,9	11,1	30,2	22,9	15,9	3,2	60,3	4,0	15,9
3/4 "	98,4	12,7	38,1	28,2	15,9	3,2	69,8	4,0	15,9
1 "	107,9	14,3	49,2	35,1	17,5	3,2	79,4	4,0	15,9
1 1/4 "	117,5	15,9	58,8	43,7	20,6	4,8	88,9	4,0	15,9
1 1/2 "	127,0	17,5	65,1	50,0	22,2	6,4	98,4	4,0	15,9
2 "	152,4	19,0	77,8	62,5	25,4	7,9	120,6	4,0	19,0
2 1/2 "	177,8	22,2	90,5	75,4	28,6	7,9	139,7	4,0	19,0
3 "	190,5	23,8	107,9	91,4	30,2	9,5	152,4	4,0	19,0
4 "	228,6	23,8	134,9	116,8	33,3	11,1	190,5	8,0	19,0
5 "	254,0	23,8	163,5	144,5	36,5	11,1	215,9	8,0	22,2
6 "	279,4	25,4	192,1	171,4	39,7	12,7	241,3	8,0	22,2
8 "	342,9	28,6	246,1	222,2	44,4	12,7	298,4	8,0	22,2
10 "	406,4	30,2	304,8	277,4	49,2	12,7	361,9	12,0	25,4
12 "	482,6	31,7	365,1	328,2	55,6	12,7	431,8	12,0	25,4
14 "	533,4	34,9	400,0	360,2	79,4	12,7	476,2	12,0	28,6
16 "	596,9	36,5	457,2	411,2	87,3	12,7	539,7	16,0	28,6
18 "	635,0	39,7	504,8	462,3	96,8	12,7	577,8	16,0	31,7
20 "	698,5	42,9	558,8	514,3	103,2	12,7	635,0	20,0	31,7
24 "	812,8	47,6	663,6	615,9	111,1	12,7	749,3	20,0	34,9



LAP JOINT

Lap Joint (LJ) flanges are uniquely engineered to operate in conjunction with a matching butt-welded piping component known as a Stub End. Unlike conventional configurations, the Lap Joint flange itself is never directly welded or secured to the pipe; instead, it remains entirely free to rotate over the Stub End's barrel. The joint sealing pressure is applied through the studbolts, forcing the flange hub against the back face of the stub end, which securely compresses the gasket.



Class 300 (PN 50)

All dimensions are in millimeters (mm) unless otherwise specified. Nominal Pipe Size (NPS) is stated in inches.

NPS	D	b	m	j	h	r	k	holes	l
1/2 "	95,2	14,3	38,1	22,9	22,2	3,2	66,7	4,0	15,9
3/4 "	117,5	15,9	47,6	28,2	25,4	3,2	82,5	4,0	19,0
1 "	123,8	17,5	54,0	35,1	27,0	3,2	88,9	4,0	19,0
1 1/4 "	133,3	19,0	63,5	43,7	27,0	4,8	98,4	4,0	19,0
1 1/2 "	155,6	20,6	69,8	50,0	30,2	6,4	114,3	4,0	22,2
2 "	165,1	22,2	84,1	62,5	33,3	7,9	127,0	8,0	19,0
2 1/2 "	190,5	25,4	100,0	75,4	38,1	7,9	149,2	8,0	22,2
3 "	209,5	28,6	117,5	91,4	42,9	9,5	168,3	8,0	22,2
4 "	254,0	31,7	146,0	116,8	47,6	11,1	200,0	8,0	22,2
5 "	279,4	34,9	177,8	144,5	50,8	11,1	234,9	8,0	22,2
6 "	317,5	36,5	206,4	171,4	52,4	12,7	269,9	12,0	22,2
8 "	381,0	41,3	260,3	222,2	61,9	12,7	330,2	12,0	25,4
10 "	444,5	47,6	320,7	277,4	95,2	12,7	387,3	16,0	28,6
12 "	520,7	50,8	374,6	328,2	101,6	12,7	450,8	16,0	31,7
14 "	584,2	54,0	425,4	360,2	111,1	12,7	514,3	20,0	31,7
16 "	647,7	57,1	482,6	411,2	120,6	12,7	571,5	20,0	34,9
18 "	711,2	60,3	533,4	462,3	130,2	12,7	628,6	24,0	34,9
20 "	774,7	63,5	587,4	514,3	139,7	12,7	685,8	24,0	34,9
24 "	914,4	69,8	701,7	615,9	152,4	12,7	812,8	24,0	41,3

In compliance with the ASME B16.5 international standard, all components must meet strict geometric manufacturing tolerances to guarantee absolute interchangeability and mechanical integrity of flanged joints on site.

DIMENSIONAL TOLERANCES

PARAMETER	SIZE RANGE	TOLERANCES (MM)
D - Outside Diameter	NPS ≤ 24" (Ext. ≤ 610 mm)	± 1,6 mm
b - Flange Thickness	NPS ≤ 18"	+ 3,2 mm / - 0 mm
	NPS ≥ 20"	+ 4,8 mm / - 0 mm
j - Inside Diameter (WN)	NPS ≤ 10"	± 0,8 mm
	NPS 12" ÷ 18"	± 1,6 mm
	NPS ≥ 20"	+ 3,2 mm / - 1,6 mm
j - Inside Diameter (SO, SW, TH)	NPS ≤ 10"	+ 0,8 mm / - 0 mm
	NPS ≥ 12"	+ 1,6 mm / - 0 mm
g - Gasket Face Raised Face	1,6 mm (RF Face)	± 0,8 mm
	6,4 mm (RF & RJ Grooves)	± 0,5 mm
m - Hub Diameter at Base	NPS ≤ 12"	± 1,6 mm
	NPS ≥ 14"	± 3,2 mm
a - Hub Diam. at Welding End	NPS ≤ 5	+ 2,4 mm / - 0,8 mm
	NPS ≥ 6"	+ 4,0 mm / - 0,8 mm
h - Length through Hub (WN)	NPS ≤ 4"	± 1,6 mm
	NPS 5" ÷ 10"	± 1,6 mm
	NPS ≥ 12"	+ 3,2 mm / - 4,8 mm
h- Length through Hub (SO, TH, SW)	NPS ≤ 10"	± 1,6 mm
	NPS ≥ 12"	± 3,2 mm
Drilling / Bolt Circle & Spacing	k - Bolt Circle Diameter	± 1,6 mm
	Adjacent bolt hole spacing	± 0,8 mm
	Bore Eccentricity	NPS ≤ 2 ½": 0,8 mm max
		NPS ≥ 3": 1,6 mm max

All numerical tolerances displayed are strictly compliant with the tolerance section of the ASME B16.5 standard. For parameters highlighted or extended beyond the core standard, company internal quality control and testing specifications shall apply.



GASKET SURFACE

The surface configuration of the gasket seating area is a critical factor governing the hermetic integrity and safety of flanged connections. In strict compliance with the international ASME B16.5 standard, the mechanical finishes applied to the Raised Face (RF) are engineered to optimize interaction with the gasket material. The microscopic profile of grooves and peaks is designed to exert high localized compression, locking the gasket firmly into position and preventing structural blowout under operational pressures and thermal stresses.

SERRATION TYPES

Serrated Spiral Finish (Stock Finish)

Characterized by a continuous helical groove produced by a uniform, synchronized feed of the turning tool from the center outward. It represents the default international manufacturing standard (Stock Finish), perfectly optimized to maximize mechanical grip on spiral wound and expanded graphite gaskets.

Smooth Finish

Executed utilizing controlled-geometry tooling and reduced tool-feed rates to achieve a finer, highly accurate roughness profile ($3,2 \mu\text{m Ra}$). It is specifically designated for accommodating thin or soft matrix metallic gaskets, mitigating the risk of micro-leakage pathways across the serrations.

Concentric Serrated Finish

Composed of independent, closed circular grooves without any helical continuity, machined utilizing a 90° pointed tool. It is highly recommended for high-pressure services involving low-molecular-density gases (e.g., Hydrogen), completely eliminating potential longitudinal leakage pathways.

FINISH TYPE	ROUGHNESS Ra μm	CODE	TOOL RADIUS	FEED RATE (mm/rev)
Spiral Serrated	12,5	R4	r=1,6	a=0,80
Spiral Serrated	6,3	R4	r=1,6	a=0,57
Spiral Serrated	5	R9	r=1,6	a=0,51
Smooth Finish	3,2	R1	r=1,6	a=0,40
Concentric	DEPTH 0,4	R0	TIP 90°	PITCH 0,80

OIL & GAS SECTOR GUIDELINES

Within petrochemical, refining, and offshore upstream applications, the Standard Serrated Spiral Finish (Stock Finish) with a roughness profile ranging from 3.2 to $6.3 \mu\text{m Ra}$ stands as the primary preferred industry engineering standard. This specific configuration ensures optimum penetration of the spiral wound gasket's graphite core into the metallic flange crests. For severe services, highly volatile media, or high-pressure hydrogen networks, our Engineering Department remains available to evaluate concentric serrated profiles to effectively minimize joint permeability coefficients.

Flanges featuring a Raised Face (RF) sealing profile strictly require gaskets dimensioned to cover exclusively the surface of the machined raised hub. These components, designated as "Ring Type" or "Inside Bolt Circle" (IBC) gaskets, seat entirely within the bolt hole circle, utilizing the studbolts themselves as a structural guide for geometric centering over the RF area.

Spiral Wound Gaskets (ASME B16.20)

The definitive standard across the Oil & Gas industry for medium to high-pressure regimes (Class 150 through Class 1500). Constructed from an alternate winding of V-shaped metallic strips and expanded graphite filler layers. The solid outer metallic centering ring centers itself against the bolts, ensuring flawless positioning of the sealing element over the RF facing.



The Ring Joint (RJ) sealing framework represents the most advanced engineering layout for containing critical media under extreme operational constraints. Engineered in strict compliance with ASME B16.5 and ASME B16.20 standards, this configuration requires the precision machining of a deep, tapered, trapezoidal groove into the flange face. Joint tightness is achieved via the controlled plastic deformation of a solid metallic ring gasket compressed within the groove walls. This pure metal-to-metal engagement guarantees outstanding structural stability against pressure fluctuations, steep thermal gradients, and external pipeline tensile loads.

RJ GROOVE FACINGS

GROOVE GEOMETRY & SURFACE FINISH

To ensure flawless mechanical mating and prevent microscopic leakage paths, the groove flank surfaces (machined at a standard 23° angle) demand a highly stringent surface finish profile. In accordance with official manufacturing registers, the maximum allowable surface roughness is restricted to 1.6 µm Ra. Every single groove is uniquely identified by a standardized alphanumeric code (ranging from R11 to R105) directly corresponding to the flange's Nominal Pipe Size (NPS) and pressure rating class.

COMPATIBLE GASKET PROFILES

Octagonal Profile:

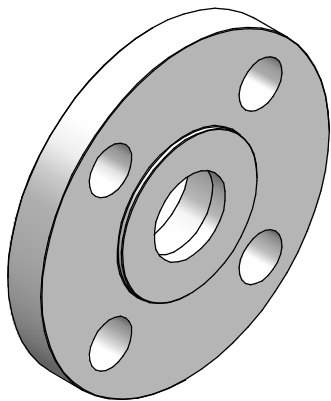
Represents the modern, preferred geometric configuration. It provides a highly localized, linear contact area that maximizes specific sealing efficiency under equivalent studbolt torque loads.

Oval Profile:

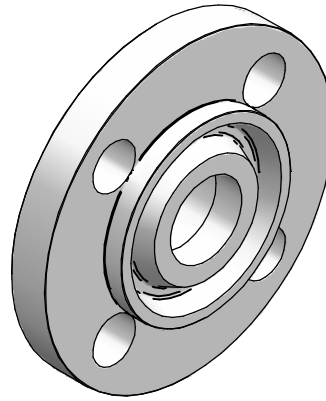
Traditional design featuring a curved contact surface. The trapezoidal grooves machined on our flanges are fully universal, guaranteeing seamless sealing compatibility with oval-cross-section rings as well.

OIL & GAS SECTOR GUIDELINES

Ring Joint (RJ) connections constitute the mandatory engineering specification across upstream Oil & Gas, petrochemical, and offshore applications for high pressure ratings (Class 900, 1500, and 2500 lb) or process lines operating at temperatures exceeding 450°C. Utilizing this technology completely eliminates the chemical and thermal degradation risks inherent to polymer or graphite-based gaskets, ensuring maximum operational runtime and environmental protection against fugitive emissions.



RAISED FACE



RING JOINT



RJ GASKET SELECTIONS MATRIX

This centralized matrix provides an immediate cross-reference to identify the standardized ring identification number (Ring No.) according to ASME B16.5. This layout is specifically engineered to streamline quick verification on the shop floor, procurement tracking, and quality control operations.

NPS	CLASSE 150	CLASSE 300	CLASSE 600	CLASSE 900	CLASSE 1500	CLASSE 2500
1/2"	-	R11	R11	(R12)	R12	R13
3/4"	-	R13	R13	(R14)	R14	R16
1"	R15	R16	R16	(R16)	R18	R18
1 1/4"	R17	R18	R18	(R21)	R21	R21
1 1/2"	R19	R20	R20	(R23)	R23	R23
2"	R22	R23	R23	(R24)	R24	R26
2 1/2"	R25	R26	R26	(R27)	R27	R28
3"	R29	R31	R31	R31	R35	R32
4"	R36	R37	R37	R37	R39	R38
5"	R40	R41	R41	R41	R44	R42
6"	R43	R45	R45	R45	R46	R47
8"	R48	R49	R49	R49	R50	R51
10"	R52	R53	R53	R53	R54	R55
12"	R56	R57	R57	R57	R58	R60
14"	R59	R61	R61	R62	R63	-
16"	R64	R65	R65	R66	R67	-
18"	R68	R69	R69	R70	R71	-
20"	R72	R73	R73	R74	R75	-
24"	R76	R77	R77	R78	R79	-

TECHNICAL NOTES

1 - Small-Bore Class 900 Specifications:

The ASME B16.5 standard does not cover independent layouts for Class 900 flanges within the NPS 1/2" through 2 1/2" envelope. For these small-bore diameters, global engineering practices mandate the direct adoption of Class 1500 components. The ring numbers listed in parentheses (R12 R27) denote the matching structural Class 1500 ring gasket to be integrated.

2 - Unified Machining (Class 300 / 400 / 600):

Pressure ratings 300, 400, and 600 are structurally mirror-aligned, sharing identical ring codes throughout the entire size envelope up to NPS 24

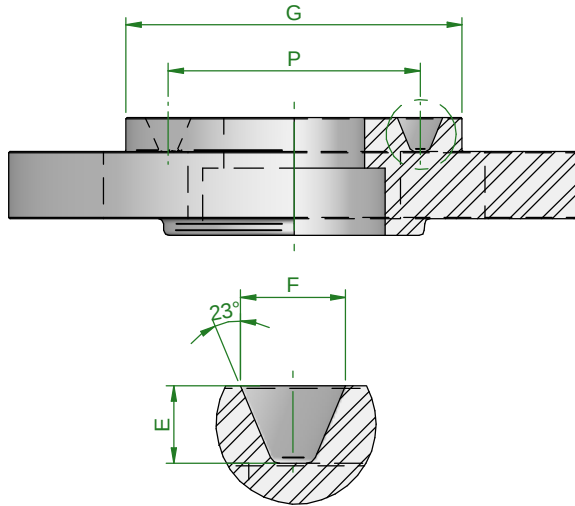
3 - High-Diameter Divergence:

Note that for large-bore piping networks such as NPS 24", the standard enforces unique ring geometries moving from low-pressure Class 150 (R76) up to Class 300/600 (R77), and critical services Class 900 (R78) through Class 1500 (R79).



RJ GROOVE MACHINING SPECIFICATIONS

This section centralizes shop-floor execution data for all Ring Joint grooves covered by ASME B16.5 up to size NPS 24", indexed progressively by Ring No. The integration of the raised portion diameter (G) allows operators to perform both the face roughing and the trapezoidal groove finishing within a single lathe cycle, completely eliminating the need for external reference lookups.



TOLERANCES		
Parameter	Dimension	Tolerance
P - Pitch Diameter	Any value	±0,15 mm
F - Groove Width	Any value	±0,20 mm
E - Groove Depth	Any value	+0,40 mm/-0 mm
Groove Angle	23°	±0,5° (±30')
R - Bottom Radius	R≤1,6 mm	+0,80 mm/-0 mm
R - Bottom Radius	R>1,6 mm	±0,80 mm
G - Raised Face Ø	Any value	±0,80 mm

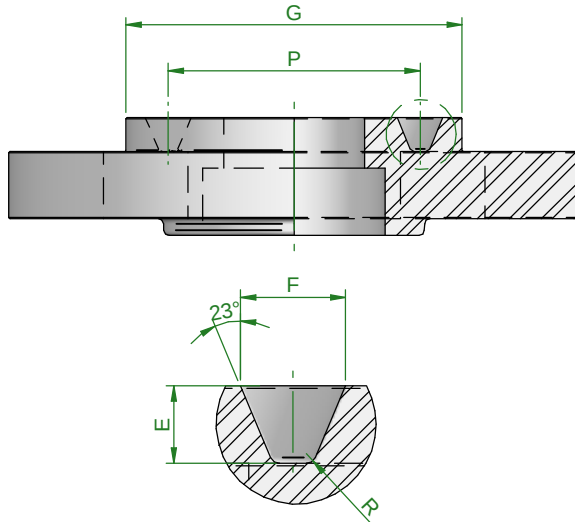
RING NO.	P	F	E	R	G 150 lbs	G 300/600 lbs	G 900 lbs	G 1500 lbs	G 2500 lbs
R11	34,1	7,1	5,6	0,8	-	50,8	-	-	-
R12	39,7	8,7	6,4	0,8	-	-	60,3	60,3	-
R13	42,9	8,7	6,4	0,8	-	63,5	-	-	65,1
R14	44,4	8,7	6,4	0,8	-	-	66,7	66,7	-
R15	47,6	8,7	6,4	0,8	63,5	-	-	-	-
R16	50,8	8,7	6,4	0,8	-	69,8	71,4	71,4	73,0
R17	57,1	8,7	6,4	0,8	73	-	-	-	-
R18	60,3	8,7	6,4	0,8	-	79,4	81,0	81,0	82,5
R19	65,1	8,7	6,4	0,8	82,5	-	-	-	-
R20	68,3	8,7	6,4	0,8	-	90,5	92,1	92,1	-
R21	72,2	11,9	7,9	0,8	-	-	-	-	101,6
R22	82,5	8,7	6,4	0,8	101,6	-	-	-	-
R23	82,5	11,9	7,9	0,8	-	107,9	-	-	114,3
R24	95,2	11,9	7,9	0,8	-	-	123,8	123,8	-
R25	101,6	8,7	6,4	0,8	120,6	-	-	-	-
R26	101,6	11,9	7,9	0,8	-	127	-	-	133,3
R27	107,9	11,9	7,9	0,8	-	-	136,5	136,5	-
R28	111,1	13,5	9,5	1,6	-	-	-	-	149,2
R29	114,3	8,7	6,4	0,8	133,3	-	-	-	-
R31	123,8	11,9	7,9	0,8	-	146	155,6	-	-
R32	127	13,5	9,5	1,6	-	-	-	-	168,3
R33	131,8	8,7	6,4	0,8	154	-	-	-	-
R34	131,8	11,9	7,9	0,8	-	158,7	-	-	-
R35	136,5	11,9	7,9	0,8	-	-	-	168,5	-

The operator must cross-check the raised face diameter "G" based on the specific pressure Class stamped on the raw forging before starting any machining. Please note that the groove flank angle must strictly measure 23°±30' with a surface roughness finish bounded under 1.6µm Ra, which is a critical threshold required to facilitate cold plastic deformation of the ring gasket.



RJ GROOVE MACHINING SPECIFICATIONS

This section centralizes shop-floor execution data for all Ring Joint grooves covered by ASME B16.5 up to size NPS 24", indexed progressively by Ring No. The integration of the raised portion diameter (G) allows operators to perform both the face roughing and the trapezoidal groove finishing within a single lathe cycle, completely eliminating the need for external reference lookups.



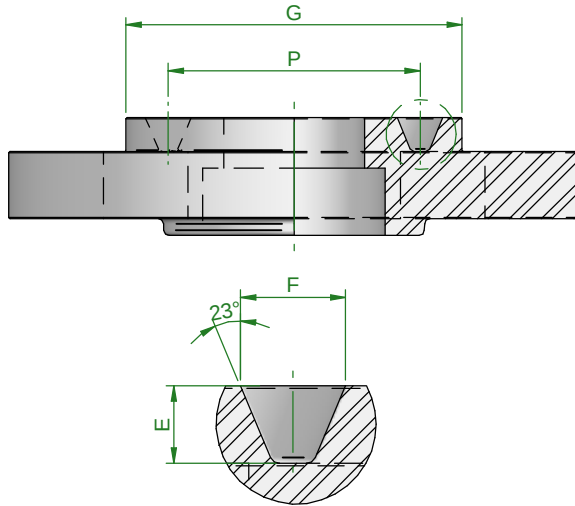
TOLERANCES		
Parameter	Dimension	Tolerance
P - Pitch Diameter	Any value	±0,15 mm
F - Groove Width	Any value	±0,20 mm
E - Groove Depth	Any value	+0,40 mm/-0 mm
Groove Angle	23°	±0,5° (±30')
R - Bottom Radius	R≤1,6 mm	+0,80 mm/-0 mm
R - Bottom Radius	R>1,6 mm	±0,80 mm
G - Raised Face Ø	Any value	±0,80 mm

RING NO.	P	F	E	R	G 150 lbs	G 300/600 lbs	G 900 lbs	G 1500 lbs	G 2500 lbs
R36	149,2	8,7	6,4	0,8	171,4	-	-	-	-
R37	149,2	11,9	7,9	0,8	-	174,6	181,0	-	-
R38	157,2	16,7	11,1	1,6	-	-	-	-	203,2
R39	161,9	11,9	7,9	0,8	-	-	-	193,7	-
R40	171,4	8,7	6,4	0,8	193,7	-	-	-	-
R41	181	11,9	7,9	0,8	-	209,5	215,9	-	-
R42	190,5	19,8	12,7	1,6	-	-	-	-	241,3
R43	193,7	8,7	6,4	0,8	219,1	-	-	-	-
R44	193,7	11,9	7,9	0,8	-	-	-	228,6	-
R45	211,1	11,9	7,9	0,8	-	241,3	241,3	-	-
R46	211,1	13,5	9,5	1,6	-	-	-	247,6	-
R47	228,6	19,8	12,7	1,6	-	-	-	-	279,4
R48	247,6	8,7	6,4	0,8	273	-	-	-	-
R49	269,9	11,9	7,9	0,8	-	301,6	308,0	-	-
R50	269,9	16,7	11,1	1,6	-	-	-	317,5	-
R51	279,4	23	14,3	1,6	-	-	-	-	339,7
R52	304,8	8,7	6,4	0,8	330,2	-	-	-	-
R53	323,8	11,9	7,9	0,8	-	355,6	361,9	-	-
R54	323,8	16,7	11,1	1,6	-	-	-	371,5	-
R55	342,9	30,2	17,5	2,4	-	-	-	-	425,4
R56	381	8,7	6,4	0,8	406,4	-	-	-	-
R57	381	11,9	7,9	0,8	-	412,7	419,1	-	-
R58	381	23	14,3	1,6	-	-	-	438,1	-
R59	396,9	8,7	6,4	0,8	425,4	-	-	-	-

The operator must cross-check the raised face diameter "G" based on the specific pressure Class stamped on the raw forging before starting any machining. Please note that the groove flank angle must strictly measure 23°±30' with a surface roughness finish bounded under 1.6µm Ra, which is a critical threshold required to facilitate cold plastic deformation of the ring gasket.



RJ GROOVE MACHINING SPECIFICATIONS



TOLERANCES		
Parameter	Dimension	Tolerance
P - Pitch Diameter	Any value	±0,15 mm
F - Groove Width	Any value	±0,20 mm
E - Groove Depth	Any value	+0,40 mm/-0 mm
Groove Angle	23°	±0,5° (±30')
R - Bottom Radius	R≤1,6 mm	+0,80 mm/-0 mm
R - Bottom Radius	R>1,6 mm	±0,80 mm
G - Raised Face Ø	Any value	±0,80 mm

RING NO.	P	F	E	R	G 150 lbs	G 300/600 lbs	G 900 lbs	G 1500 lbs	G 2500 lbs
R60	406,4	33,3	17,5	2,4	-	-	-	-	495,3
R61	419,1	11,9	7,9	0,8	-	457,2	-	-	-
R62	419,1	16,7	11,1	1,6	-	-	466,7	-	-
R63	419,1	27	15,9	2,4	-	-	-	488,9	-
R64	454	8,7	6,4	0,8	482,6	-	-	-	-
R65	469,9	11,9	7,9	0,8	-	508	-	-	-
R66	469,9	16,7	11,1	1,6	-	-	523,9	-	-
R67	469,9	30,2	17,5	2,4	-	-	-	546,1	-
R68	517,5	8,7	6,4	0,8	546,1	-	-	-	-
R69	533,4	11,9	7,9	0,8	-	574,7	-	-	-
R70	533,4	19,8	12,7	1,6	-	-	593,7	-	-
R71	533,4	30,2	17,5	2,4	-	-	-	612,8	-
R72	558,8	8,7	6,4	0,8	596,9	-	-	-	-
R73	584,2	13,5	9,5	1,6	-	635	-	-	-
R74	584,2	19,8	12,7	1,6	-	-	647,7	-	-
R75	584,2	33,3	17,5	2,4	-	-	-	673,1	-
R76	673,1	8,7	6,4	0,8	711,2	-	-	-	-
R77	692,1	16,7	11,1	1,6	-	749,3	-	-	-
R78	692,1	27	15,9	2,4	-	-	771,5	-	-
R79	692,1	36,5	20,6	2,4	-	-	-	793,7	-
R80	615,9	8,7	6,4	0,8	647,7	-	-	-	-
R81	635	15,1	11,1	1,6	-	685,8	-	-	-

The operator must cross-check the raised face diameter "G" based on the specific pressure Class stamped on the raw forging before starting any machining. Please note that the groove flank angle must strictly measure 23°±30' with a surface roughness finish bounded under 1.6µm Ra, which is a critical threshold required to facilitate cold plastic deformation of the ring gasket.



STUDBOLTS

MATING

REGISTERS

The structural integrity, operational safety, and leak-tightness of a flanged connection under severe service conditions depend strictly on the precise sizing, load distribution, and preloading of the fastening elements. In absolute compliance with international ASME B16.5 and ASME B18.2.1 standards, this section of the catalog centralizes the technical specifications for the heavy-duty studbolts recommended across our entire flange product range.

ASME B16.5 BOLTING SPECIFICATION CLASS 150 - 300 - 600 lb

To streamline the engineering workflow for Piping Designers and to accelerate procurement and on-site assembly operations, the following registers uniquely define for each Nominal Pipe Size (NPS) and Pressure Class:

- The exact quantity of studbolts required per single joint;
- The nominal thread diameter (expressed in inches);
- The precise length of the studbolt body, rigorously differentiated according to the flange sealing face configuration (RF - Raised Face or RJ - Ring Joint).

Utilizing this unified mating matrix eliminates technical ambiguities during Material Take-Off (MTO) compilation, ensuring maximum structural reliability and sealing performance against thermal stresses and operational pressure surges.

NPS	RATING CLASS 150 Qty × Ø" × L_RF / L_RJ	RATING CLASS 300 Qty × Ø" × L_RF / L_RJ	RATING CLASS 600 Qty × Ø" × L_RF / L_RJ
1/2"	4×1/2"×60/-	4×1/2"×65/75	4×1/2"×75/75
3/4"	4×1/2"×65/-	4×5/8"×75/85	4×5/8"×85/85
1"	4×1/2"×65/75	4×5/8"×75/85	4×5/8"×85/85
1 1/4"	4×1/2"×70/85	4×5/8"×85/95	4×5/8"×90/90
1 1/2"	4×1/2"×70/85	4×3/4"×90/100	4×3/4"×110/110
2"	4×5/8"×85/95	8×5/8"×90/100	8×5/8"×110/110
2 1/2"	4×5/8"×90/100	8×3/4"×100/115	8×3/4"×120/120
3"	4×5/8"×90/100	8×3/4"×110/120	8×3/4"×125/125
4"	8×5/8"×90/100	8×3/4"×115/125	8×7/8"×145/145
5"	8×3/4"×100/115	8×3/4"×120/135	8×1"×165/165
6"	8×3/4"×100/115	12×3/4"×125/140	12×1"×170/170
8"	8×3/4"×110/120	12×7/8"×140/150	12×1 1/8"×195/195
10"	12×7/8"×120/135	16×1"×165/175	16×1 1/4"×215/215
12"	12×7/8"×125/140	16×1 1/8"×185/195	20×1 1/4"×220/220
14"	12×1"×140/150	20×1 1/8"×195/210	20×1 3/8"×235/235
16"	16×1"×145/160	20×1 1/4"×215/230	20×1 1/2"×255/255
18"	16×1 1/8"×160/170	24×1 1/4"×220/240	20×1 5/8"×275/275
20"	20×1 1/8"×170/185	24×1 1/4"×235/255	24×1 5/8"×290/290
24"	20×1 1/4"×190/205	24×1 1/2"×275/290	24×1 7/8"×330/335



STUDBOLTS MATING REGISTERS

ASME B16.5 BOLTING SPECIFICATION CLASS 900- 1500 - 2500 lb

- Small-Bore Class 900 Flanges: Per ASME B16.5, independent bolting dimensions and drilling templates for Class 900 ratings do not exist for sizes ranging from 1/2" through 2 1/2". For these small-bore configurations, Class 1500 values must be utilized.
- Length Calculation: Studbolt lengths listed in millimeters are measured from first effective thread to first effective thread, excluding chamfered end points, rounded according to standard annex practices.
- Thread Threading Series: Thread configurations up to 1" diameter follow the coarse thread series (UNC), whereas diameters strictly above 1" adopt the constant pitch series 8-UN (8 threads per inch), fulfilling international heavy-duty petrochemical and upstream specifications

NPS	RATING CLASS 900 Qty × Ø" × L_RF / L_RJ	RATING CLASS 1500 Qty × Ø" × L_RF / L_RJ	RATING CLASS 2500 Qty × Ø" × L_RF / L_RJ
1/2"	(See Class 1500)	4×3/4"×110/110	4×3/4"×120/120
3/4"	(See Class 1500)	4×3/4"×115/115	4×7/8"×135/135
1"	(See Class 1500)	4×7/8"×125/125	4×1"×150/150
1 1/4"	(See Class 1500)	4×1"×140/140	4×1 1/8"×170/170
1 1/2"	(See Class 1500)	4×1 1/8"×150/150	4×1 1/4"×185/185
2"	(See Class 1500)	8×7/8"×145/145	8×1"×185/185
2 1/2"	(See Class 1500)	8×1"×165/165	8×1 1/8"×215/215
3"	8×7/8"×140/140	8×1 1/4"×185/185	8×1 1/4"×240/240
4"	8×1 1/8"×170/170	8×1 1/2"×215/215	8×1 1/2"×275/275
5"	8×1 1/4"×195/195	8×1 3/8"×240/240	8×1 3/4"×325/325
6"	12×1 1/8"×195/195	12×1 3/8"×265/265	8×2"×380/380
8"	12×1 3/8"×220/220	12×1 5/8"×300/300	12×2"×430/435
10"	16×1 3/8"×235/235	12×1 7/8"×335/335	12×2 1/2"×535/540
12"	20×1 3/8"×255/255	16×2"×385/395	12×2 3/4"×610/620
14"	20×1 1/2"×275/280	16×2 1/4"×430/440	-
16"	20×1 5/8"×290/290	16×2 1/2"×485/495	-
18"	20×1 7/8"×330/330	16×2 3/4"×535/550	-
20"	20×2"×355/360	16×3"×595/615	-
24"	24×2 1/2"×445/450	16×3 1/2"×710/735	-



HOW TO ORDER

				F	S	W	1	5	0	0	-	1	2	-	S	1	R	J	
TYPE																			
FWN	WELDING NECK																		
FLB	BLIND																		
FLP	LAP JOINT																		
FSW	SOCKET WELD																		
FTH	THREADED																		
FSO	SLIP-ON																		
CLASS (LBS)																			
150	ANSI 150																		
300	ANSI 300																		
600	ANSI 600																		
900	ANSI 900																		
1500	ANSI 1500																		
2500	ANSI 2500																		
DIMENSION NPS																			
04	1/4"	80	5"																
06	3/8"	96	6"																
08	1/2"	128	8"																
12	3/4"	160	10"																
16	1"	192	12"																
20	1 1/4"	224	14"																
24	1 1/2"	256	16"																
32	2"	288	18"																
48	3"	320	20"																
64	4"	384	24"																
MATERIAL																			
A1	ASTM A182 GR. F11 CLASS 2																		
A2	ASTM A182 Gr. F22 Cl.3																		
A3	ASTM A182 GR. F91																		
C1	ASTM A105 CARBON STEEL FORGINGS																		
C2	ASTM A350 GR. LF2 CLASS 1																		
D1	ASTM A182 GR. F51 (UNS S31803)																		
D2	ASTM A182 GR. F53 (UNS S32750)																		
D3	ASTM A182 GR. F55 (UNS S32760)																		
N1	ASTM B564 UNS N06625 (GR. 625)																		
N2	ASTM B564 UNS N04400																		
N3	ASTM B564 N10276																		
N6	ASTM A182 F44																		
S1	ASTM A182 GR. F316/F316L DUAL CERTIFIED																		
S2	ASTM A182 GR. F304/F304L DUAL CERTIFIED																		
FACE																			
RJ	RING JOINT																		
R0	RAISED FACE CONCENTRIC SERRATED																		
R1	RAISED FACE SMOOTH FINISH																		
R4	RAISED FACE STOCK FINISH																		
R9	RAISED FACE SPIRAL SERRATED																		
F0	FLAT FACE CONCENTRIC SERRATED																		
F1	FLAT FACE SMOOTH FINISH																		
F4	FLAT FACE STOCK FINISH																		
F9	FLAT FACE SPIRAL SERRATED																		



ORDERING INFORMATION

Dear Customer, in order to guarantee absolute geometric and metallurgical compliance of the ordered components and to prevent any delay within the manufacturing cycle, we kindly request you to complete or verify this technical checklist prior to final order submission. The correct configuration of each single parameter ensures flawless components interchangeability within your piping network.

Nominal Size & Pressure Class

☐ Has the correct Nominal Pipe Size been specified according to the ASME B16.5 standard (NPS 2",3")?

☐ Has the correct pressure rating class been designated (Class 150, 300, 400, 600, 900, 1500, 2500 lb)?

Flange Configuration Type

☐ Has the required mechanical flange type been indicated based on the application layout (e.g., Welding Neck - WN, Slip-On - SO, Blind - BL, Socket Welding - SW, Threaded - THD)?

Flange Facing & Surface Finish

☐ Has the correct mating face geometry been selected relative to the plant gaskets (RF - Raised Face, RJ - Ring Joint, or FF - Flat Face)?

☐ In case of RF facing: Has the required roughness profile been defined (e.g., standard Stock Finish 3.2 ÷ 6.3 µm Ra or Smooth Finish 3.2 µm Ra)

☐ In case of RJ facing: Has it been verified that the designated ring code (Ring No. ranging from R11 to R81) strictly matches the unified selection matrix?

Piping Mating Dimensions

☐ Only for Welding Neck (WN) flanges: Has the target pipe thickness or wall schedule been designated (Pipe Schedule, e.g., Sch. 40, Sch. 80, Sch. STD, Sch. XS) to perform the correct welding hub counterbore?

☐ Only for Threaded (THD) flanges: Has the requested thread standard been specified (NPT per ASME B1.20.1 or Gas/BSP per ISO 7-1)?

Material Grade & Certification Standard

☐ Has the exact metallurgical designation been specified in accordance with ASTM/ASME standards (e.g., ASTM A105 for carbon steel, ASTM A182 F316L/F304L for stainless steels, A350 LF2 for low-temperature services)?

☐ Have any supplemental testing requirements been highlighted (e.g., impact testing, volumetric/surface NDT checks) or specific regulatory standards (e.g., NACE MR0175 / ISO 15156 compliance for sour services)?

Mating Kit Integration

☐ Has the requirement for matching studbolts and nuts been cross-checked, based on the quantity, diameter, and length computed in Chapter 6 of the catalog?

To automate internal data logging and accelerate order entry within our ERP framework, every single component will be coded by compounding the parameters verified above according to our standardized corporate coding sequence (e.g., TYPE-NPS-CLASS-FACING-SCH-MATERIAL). Our Engineering Department remains fully available to validate special custom layouts or designs exceeding standard dimensional boundaries.





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