

Weld Neck Flange — ASME B16.5 Class 400

ANSI / ASME B16.5 Class 400 welding neck raised face (WNRF) flanges · NPS ½" to 24" · Carbon steel ASTM A105, stainless steel ASTM A182 F304 / F316, alloy steel

ASME B16.5 CLASS 400 WELD NECK FLANGE

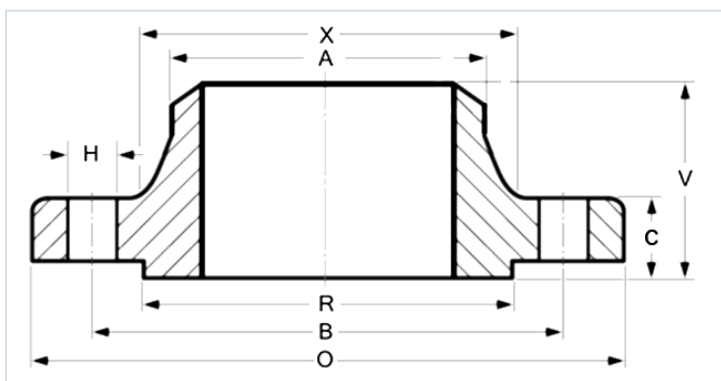
A weld neck flange (welding neck flange, WN or WNRF) is a forged pipe flange with a long tapered hub that is butt-welded to the pipe. The hub transfers stress gradually from flange to pipe, giving the highest strength and fatigue resistance of all ASME B16.5 flange types. Class 400 sits between Class 300 and Class 600 for medium-pressure process, steam and refinery piping; in NPS ½ – 3½ it shares Class 600 dimensions.

TESCO Steel & Engineering manufactures ASME B16.5 Class 400 weld neck flanges in Mumbai, India, ½" to 24", RF or RTJ, bored to the pipe schedule.

KEY FEATURES

- **Full ASME B16.5 compliance** — dimensions, tolerances, facing finish and marking to ASME B16.5-2020.
- **Tapered hub, butt-weld end** — 37.5° bevel, 1.6 mm land; preferred for high-stress, cyclic and critical service.
- **Bore to schedule** — STD, XS, Sch 40, 80, 160 or XXS bore to match the mating pipe.
- **Materials and certification** — ASTM A105, A350 LF2, A182 F304/F316/F321, F11/F22, duplex; EN 10204 3.1 certificates.

WELD NECK FLANGE DIMENSIONAL DRAWING



SPECIFICATION SUMMARY

Product	Weld neck flange (welding neck, WN / WNRF), forged
Standard	ASME B16.5 (formerly ANSI B16.5)
Pressure class	Class 400 (400 lb / #400)
Size range	NPS ½" – 24" (DN 15 – DN 600)
Facing	Raised face (RF) 7 mm (¼") standard; RTJ on request
Face finish	Serrated, 125 – 250 µin Ra (3.2 – 6.3 µm) per ASME B16.5
Bore	Specified to pipe schedule (STD / Sch 40 shown in table)
Weld end	37.5° ± 2.5° bevel, 1.6 ± 0.8 mm root face, per ASME B16.25
Materials	ASTM A105 / A105N; A350 LF2; A182 F304/L, F316/L, F321; A182 F11, F22, F91; duplex F51 / F53

O Flange outside diameter	C Flange thickness (excl. 7 mm RF)
X Hub diameter at base	A Hub diameter at bevel (= pipe OD)
R Raised face diameter, 7 mm high	V Length through hub (incl. RF)
B Bolt circle diameter (PCD)	H Bolt hole diameter
Bore To pipe schedule (not dimensioned)	Bevel 37.5° ± 2.5°, 1.6 mm land

Weld Neck Flange ASME B16.5 Class 400 (WNRF)

Dimension chart in mm · NPS ½ – 24

ASME B16.5 CLASS 400 WELD NECK FLANGE DIMENSIONS (MM)

ASME B16.5 · CLASS 400 WELD NECK FLANGE · RAISED FACE · DIMENSIONS IN MM												21 sizes
NPS	O	C	X	A	Bore	R	V	B	Bolting			Weight
inch	OD	Thick.	Hub Ø base	Hub Ø bevel	STD	RF Ø	Length thru hub	Bolt circle	No.	H · Hole Ø	Stud	kg approx.
1/2"	95	14.3	38	21.3	15.8	35	52	66.7	4	15.9	1/2"	0.9
3/4"	115	15.9	48	26.7	20.9	43	57	82.6	4	19.1	5/8"	1.8
1"	125	17.5	54	33.4	26.6	51	62	88.9	4	19.1	5/8"	1.8
1 1/4"	135	20.7	64	42.2	35.1	64	67	98.4	4	19.1	5/8"	2.7
1 1/2"	155	22.4	70	48.3	40.9	73	70	114.3	4	22.2	3/4"	3.6
2"	165	25.4	84	60.3	52.5	92	73	127.0	8	19.1	5/8"	5.4
2 1/2"	190	28.6	100	73.0	62.7	105	79	149.2	8	22.2	3/4"	8.2
3"	210	31.8	117	88.9	77.9	127	83	168.3	8	22.2	3/4"	10.4
3 1/2"	230	35.0	133	101.6	90.1	140	86	184.2	8	25.4	7/8"	11.8
4"	255	35.0	146	114.3	102.3	157	89	200.0	8	25.4	7/8"	15.9
5"	280	38.1	178	141.3	128.2	186	102	235.0	8	25.4	7/8"	19.5
6"	320	41.3	206	168.3	154.1	216	103	269.9	12	25.4	7/8"	25.9
8"	380	47.7	260	219.1	202.7	270	117	330.2	12	28.6	1"	40.4
10"	445	54.0	321	273.1	254.5	324	124	387.4	16	31.8	1 1/8"	56.7
12"	520	57.2	375	323.9	303.2	381	137	450.8	16	35.0	1 1/4"	79.4
14"	585	60.4	425	355.6	336.5	413	149	514.4	20	35.0	1 1/4"	104
16"	650	63.5	483	406.4	387.4	470	152	571.5	20	38.1	1 3/8"	134
18"	710	66.7	533	457.2	438.2	533	165	628.6	24	38.1	1 3/8"	159
20"	775	69.9	587	508.0	489.0	584	168	685.8	24	41.3	1 1/2"	193
22"	840	73.1	641	558.8	539.8	641	171	743.0	24	44.5	1 5/8"	229
24"	915	76.2	702	609.6	590.6	692	175	812.8	24	47.7	1 3/4"	281

- All dimensions in millimetres per ASME B16.5-2020 Tables 12 and 13 (metric). Thickness C excludes the 7 mm raised face; length through hub V includes it. NPS ½ – 3½ Class 400 flanges use Class 600 dimensions per ASME B16.5.
- Bore shown for STD / Schedule 40 pipe; flanges are supplied bored to the schedule specified on the order (XS, Sch 80, 160, XXS).
- Studs per ASME B16.5 Table B1; hole Ø is 3 mm larger than the stud. Hub Ø at bevel A equals pipe OD (ASME B36.10M). Weights approximate, carbon steel, STD bore.

WELD NECK VS OTHER FLANGE TYPES

Weld neck (WN)	Tapered hub, butt weld; highest strength — critical, cyclic and high-temperature lines
Slip-on (SO)	Fillet welded over pipe; lower cost; lower fatigue strength
Socket weld (SW)	Small bore ≤ NPS 2, fillet weld
Blind (BL)	Closes the end of a flanged line

APPLICATIONS

Oil & gas and refinery piping · petrochemical plants · power generation · water treatment and desalination · shipbuilding and offshore · HVAC, fire protection and utility piping · pump, valve and vessel connections.

Also known as: ANSI B16.5 400 lb WNRF flange · 400# welding neck flange · ASME/ANSI 400 raised face weld neck flange (≈ PN 63).

Weld Neck Flange ASME B16.5 Class 400 (WNRF)

Materials · Pressure–temperature ratings · Quality · FAQ

WELD NECK FLANGE MATERIALS

Carbon steel	ASTM A105 / A105N (most common); A694 F42 – F70 for pipeline service
Low-temperature CS	ASTM A350 LF2 Cl.1 / Cl.2, LF3
Stainless steel	ASTM A182 F304 / F304L, F316 / F316L, F321, F347, F310
Alloy steel	ASTM A182 F1, F5, F9, F11, F12, F22, F91
Duplex / super duplex	ASTM A182 F51 (UNS S31803 / S32205), F53 (S32750), F55 (S32760)
Nickel & copper alloys	Monel 400, Inconel 600 / 625, Hastelloy C276, Cu-Ni 90/10 & 70/30 — on request
Equivalent EN / DIN grades	P250GH (1.0460), 1.4301, 1.4401, 1.4404, 1.4571 on request

PRESSURE–TEMPERATURE RATINGS

PRESSURE–TEMPERATURE RATING	Class 400 BAR, ASME B16.5 TABLE 2		
	Group 1.1 A105 / A350 LF2	Group 2.1 A182 F304	Group 2.2 A182 F316
Temperature °C			
–29 to 38	68.1	66.2	66.2
100	62.1	56.3	57.6
150	60.1	51.3	52.7
200	58.4	47.6	49.0
250	55.9	44.5	45.9
300	53.1	42.2	43.5
350	50.1	40.4	41.7
400	46.3	39.2	40.6
450	38.4	38.4	39.2

Working pressure in bar (gauge) from ASME B16.5-2020 Tables 2-1.1, 2-2.1 and 2-2.2. Confirm for the specific material group, bolting and gasket.

QUALITY & DOCUMENTATION

- Forged from certified billets / bars; normalised, quenched-and-tempered or solution-annealed per material specification.
- Manufactured under an ISO 9001:2015 quality management system; marking per ASME B16.5 and MSS SP-25.
- EN 10204 3.1 material test certificates with chemical analysis, mechanical properties and heat-number traceability; 3.2 with third-party endorsement on request.
- Dimensional inspection to ASME B16.5 tolerances; face finish checked per MSS SP-6.
- NDT (UT / MPI / DPT), PMI for stainless and alloy grades, IBR, NACE MR0175 / ISO 15156 and PED compliance on request.

FREQUENTLY ASKED QUESTIONS

What does Class 400 mean on a weld neck flange?

Class 400 is the ASME B16.5 pressure–temperature rating class. For carbon steel A105 it allows 68.1 bar at up to 38 °C, falling with temperature (see table). It is often written 400 lb or 400#.

Is ANSI B16.5 the same as ASME B16.5?

Yes — ASME B16.5 is the current designation of the former ANSI B16.5 standard. Note that Class 400 flanges NPS ½ – 3½ are dimensionally identical to Class 600 and are usually supplied as such.

What bore should I specify?

Specify the pipe schedule (e.g. Sch 40, Sch 80) or wall thickness so the flange bore and bevel match the pipe for a sound butt weld.

Which gasket and bolts are used with a Class 400 RF flange?

Spiral wound (ASME B16.20) gaskets are standard for Class 400; A193 B7 / A194 2H studs and nuts, B8M / 8M for stainless flanges.

ORDERING INFORMATION

Specify: quantity · size (NPS) · ASME B16.5 Class 400 weld neck · facing (RF / FF / RTJ) · bore / pipe schedule · material grade · certification (3.1 / 3.2, NACE, IBR, PED) · surface protection (anti-rust oil, paint, galvanising).