

ASME B16.5 Class 600 Flange Dimensions (NPS 1/2 to NPS 24)

Raised-face weld-neck flange — outside diameter O, bolt circle, bolt hole, stud size, flange thickness tf

ASME B16.5 Class 600 is the high-pressure step in the B16.5 range, used for 60 – 100 bar service in oil, gas, chemical, refinery and offshore piping. The class number fixes the bolt pattern, so a Class 600 NPS 4 flange from any maker shares the same 275 mm outside diameter, 215.9 mm bolt circle and eight 7/8-inch studs. The values below are the nominal ASME B16.5 raised-face (RF) weld-neck dimensions across the standard NPS 1/2 to NPS 24 range, cross-checked between two independent reference tables.

NPS	OD O (mm)	Bolt circle (mm)	Bolt hole (mm)	No. of bolts	Stud size	Flange tf (mm)
1/2	95	66.7	15.7	4	1/2	22.4
3/4	115	82.6	19.1	4	5/8	25.4
1	125	88.9	19.1	4	5/8	27.7
1-1/4	135	101.6	19.1	4	5/8	28.4
1-1/2	155	114.3	22.4	4	3/4	31.8
2	165	127	19.1	8	5/8	31.8
2-1/2	190	149.4	22.4	8	3/4	35.1
3	210	168.3	22.4	8	3/4	38.1
4	275	215.9	25.4	8	7/8	44.5
5	330	266.7	28.4	8	1	50.8
6	355	292.1	28.4	12	1	55.6
8	420	349.3	31.8	12	1-1/8	63.5
10	510	431.8	34.9	16	1-1/4	69.9
12	560	489	34.9	20	1-1/4	76.2
14	605	527.1	38.1	20	1-3/8	82.6
16	685	603.3	41.3	20	1-1/2	88.9
18	745	654.1	44.5	20	1-5/8	101.6
20	815	723.9	44.5	24	1-5/8	108
24	940	838.2	50.8	24	1-7/8	120.7

Bolt holes are drilled 1/8 in larger than the stud (ASME B16.5 §5.3.4) so a 3/4 in stud takes a 22.4 mm (7/8 in) hole and a 1-1/4 in stud takes a 34.9 mm (1-3/8 in) hole. Class 600 keeps four studs to NPS 1-1/2, steps to eight at NPS 2, to twelve at NPS 6, then to sixteen at NPS 10, twenty at NPS 12 – 18 and twenty-four at NPS 20 and above. The flange thickness tf is the disc thickness excluding the raised face and the weld-neck hub.

Reading the dimensions

- O — flange outside diameter, the overall diameter of the flange disc.
- Bolt circle (BCD / PCD) — the circle through the stud-hole centres. This is the number to lay out drilling against and the single most important number for matching a mating flange.
- Number of bolts — always a multiple of four and equally spaced, so the flange can be turned in quarter steps; both mating flanges share the same count.
- Bolt hole — the drilled hole diameter, 1/8 in larger than the stud so two flanges line up. Values above are in millimetres; the inch equivalent is (stud + 1/8) in.
- Stud size — the diameter of the stud bolt. Class 600 studs are ASTM A193 B7 for most services and A193 B16 or B8 for high-temperature or corrosive service. Use the full set.
- tf — flange disc thickness excluding the raised face (RF pad, 1.6 mm) and the weld-neck hub.

Selecting and matching

A Class 600 flange will not mate to a Class 300 or Class 900 flange of the same NPS — the outside diameter, bolt circle and hole count differ so the joint cannot be made up. Class 600 is however dimensionally identical to Class 400 in the B16.5 range at NPS 3 and above (they share the same OD, bolt circle and hole pattern), which is why B16.5 combines the two on the same fabrication drawing above NPS 3. Confirm all four of pressure class, NPS, bolt circle and bolt pattern before ordering. The dimensions above are for the raised-face weld-neck (WN) flange; blind (BL), slip-on (SO), threaded (Threaded) and lap-joint (LJ) Class 600 flanges to B16.5 share the same O, bolt circle, bolt hole, bolt count and stud size — only the hub geometry and face vary.

Reference compiled by cBallast from ASME B16.5 (Pipe Flanges and Flanged Fittings, current edition) and cross-checked against two

independent reference tables (Wermac ASME B16.5 Class 600 and piping-world Class 600). Dimensions are nominal and provided for identification and cross-reference; confirm against the controlling standard and the specific flange maker's current data sheet before manufacture or procurement. All trademarks are the property of their respective owners.

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