

ASME B16.5-2020
(Revision of ASME B16.5-2017)

Pipe Flanges and Flanged Fittings

NPS 1/2 Through NPS 24
Metric/Inch Standard

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

6.2.5 Special Degree Elbows. Special degree elbows ranging from 1 deg to 45 deg, inclusive, shall have the same center-to-contact surface dimensions as 45-deg elbows, and those over 45 deg and up to 90 deg, inclusive, shall have the same center-to-contact surface dimensions as 90-deg elbows. The angle designation of an elbow is its deflection from straight line flow and is also the angle between the flange faces.

6.3 Flat Face Flanges

6.3.1 General. This Standard permits flat face flanges in all classes.

6.3.2 Conversion. A raised face may be removed from a raised face flange to convert it to a flat face flange, provided that the required dimension, t_f , shown in Figure 6 is maintained.

6.3.3 Facing. The flat face flange facing finish shall be in conformance with para. 6.4.5 for the full width of the seating surface for the gasket.

6.4 Flange Facings

(20) **6.4.1 General.** Figure 6 shows dimensional relationships for various flange types and pipe lap facings to be used with lap joints. Table 4 (Table 4C) lists dimensions for facings other than ring joint. Table 5 (Table 5C) lists dimensions for ring joint facings. Classes 150 and 300 pipe flanges and companion flanges of fittings are regularly furnished with 1.5 mm (0.06 in.) raised face, which is in addition to the minimum flange thickness, t_f . Classes 400, 600, 900, 1500, and 2500 pipe flanges and companion flanges of fittings are regularly furnished with 6.4 mm (0.25 in.) raised face, which is in addition to the minimum flange thickness, t_f .

6.4.2 Other Than Lapped Joints. For joints other than lapped joints, the requirements of paras. 6.4.2.1 and 6.4.2.2 shall apply.

6.4.2.1 Raised Face and Tongue Face. In the case of flanges having raised face, tongue, or male face, the minimum flange thickness, t_f , shall be provided, and then the raised face, tongue, or male face shall be added thereto.

6.4.2.2 Grooves. For flanges that have a ring joint, groove, or female face, the minimum flange thickness shall first be provided and then sufficient thickness added thereto so that the bottom of the ring joint groove, or the contact face of the groove or female face, is in the same plane as the flange edge of a full thickness flange.

6.4.3 Lapped Joint Flanges. Lapped joint flanges shall be furnished with flat faces as illustrated in Tables 8, 11, 14, 16, 18, 20, and 22 (Tables 8C, 11C, 14C, 16C, 18C, 20C, and 22C). Lap joint stub ends shall be in accordance with Figure 6 and paras. 6.4.3.1 through 6.4.3.3.

6.4.3.1 Raised Face. The finished thickness of the lap shall be no less than nominal pipe wall thickness.

6.4.3.2 Large Male and Female. The finished height of the male face shall be the greater of the wall thickness of the pipe used or 6.4 mm (0.25 in.). The thickness of lap that remains after machining the female face shall be no less than the nominal wall thickness of pipe used. (20)

6.4.3.3 Tongue and Groove. The thickness of the lap remaining after machining the tongue or groove face shall be no less than the nominal wall thickness of the pipe used.

6.4.3.4 Ring Joint. The thickness of the lap remaining after machining the ring groove shall be no less than the nominal wall thickness of pipe used.

6.4.3.5 Lap Joint Facing Outside Diameters. The outside diameters of the lap for ring joints are shown in Table 5 (Table 5C), dimension K . The outside diameters of laps for large female, large tongue and groove, and small tongue and groove are shown in Table 4 (Table 4C). Small male and female facings for lapped joints are not covered by this Standard.

6.4.4 Blind Flanges. Blind flanges need not be faced in the center if, when this center part is raised, its diameter is at least 25 mm (1 in.) smaller than the inside diameter of fittings of the corresponding pressure class, as given in Tables 9 and 12 (Tables 9C and 12C) or 25 mm (1 in.) smaller than the mating pipe inside diameter. When the center part is depressed, its diameter shall not be greater than the inside diameter of the corresponding pressure class fittings, as given in Tables 9 and 12 (Tables 9C and 12C). Machining of the depressed center is not required.

6.4.5 Flange Facing Finish. Flange facing finishes shall be in accordance with paras. 6.4.5.1 through 6.4.5.3, except that other finishes may be furnished by agreement between the user and the manufacturer. The finish of the gasket contact faces shall be judged by visual comparison with Ra standards (see ASME B46.1) and not by instruments having stylus tracers and electronic amplification.

6.4.5.1 Tongue and Groove and Small Male and Female. The gasket contact surface finish shall not exceed 3.2 μm (125 $\mu\text{in.}$) roughness.

6.4.5.2 Ring Joint. The side wall surface finish of the gasket groove shall not exceed 1.6 μm (63 $\mu\text{in.}$) roughness.

6.4.5.3 Other Flange Facings. Either a serrated concentric or serrated spiral finish having a resultant surface finish from 3.2 μm to 6.3 μm (125 $\mu\text{in.}$ to 250 $\mu\text{in.}$) average roughness shall be furnished. The cutting tool employed should have an approximate 1.5 mm (0.06 in.) or larger radius, and there should be from 1.8 grooves/mm through 2.2 grooves/mm (45 grooves/in. through 55 grooves/in.).