

ASME B16.48-1997

STEEL LINE BLANKS

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**



The American Society of
Mechanical Engineers

A N A M E R I C A N N A T I O N A L S T A N D A R D

STEEL LINE BLANKS

ASME B16.48-1997

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FOREWORD

(This Foreword is not part of ASME B16.48-1997.)

In July 1993 the American Society of Mechanical Engineers (ASME) B16 Committee gave to its Subcommittee C the assignment to convert the API 590 Steel Line Blanks Standard into an ASME standard. The American Petroleum Institute no longer publishes the API 590 Standard.

These line blanks were designed in accordance with the rules of ASME B31.3-1987 Edition. Materials and relevant footnotes have been added following the ASME format.

The B16 Committee operates under procedures accredited by the American National Standards Institute (ANSI). Following approval by the Standards Committee and ASME, approval as an American National Standard was given by ANSI on March 12, 1997.

All requests for interpretations or suggestions for revisions should be sent to the Secretary, B16 Committee, The American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.

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STEEL LINE BLANKS

1 SCOPE

1.1 General

This Standard covers pressure-temperature ratings, materials, dimensions, tolerances, marking, and testing for operating line blanks in sizes NPS $\frac{1}{2}$ through NPS 24 for installation between ASME B16.5 flanges in the 150, 300, 600, 900, 1500, and 2500 pressure classes. The dimensions are suitable for blanks made of materials listed in Table 1.

1.2 Definitions

1.2.1 Figure 8 Blank. A figure 8 blank (also called a spectacle blank) is a pressure retaining plate with one solid end and one open end connected with a web or tie bar (see Fig. 1).

1.2.2 Paddle Blank. A paddle blank is similar to the solid end of a figure 8 blank (with handle) and is generally used in conjunction with a paddle spacer in large sizes (see Fig. 1).

1.2.3 Paddle Spacer. A paddle spacer is similar to the open end of a figure 8 blank (with a handle) and is generally used in conjunction with a paddle blank (see Fig. 1).

1.3 References

1.3.1 Referenced Standards. Standards and specifications adopted by reference in this Standard are shown in Annex A, which is part of this Standard. It is not considered practical to identify the specific edition of each standard and specification in the individual references. Instead, the specific edition reference is identified in Annex A.

1.3.2 Codes and Standards. Steel line blanks used under the jurisdiction of the ASME Boiler and Pressure Vessel Code, the ASME Code for Pressure Piping, or a governmental regulation are subject to the limitations of that code or regulation. This includes any maximum temperature limitation, or rule governing the use of a material at low temperature, or provisions for operation at a pressure exceeding the pressure-temperature ratings in this Standard.

1.4 Quality Systems

Nonmandatory requirements relating to the product manufacturer's Quality System Program are described in Annex B.

2 PRESSURE-TEMPERATURE RATINGS

2.1 Pressure Classes

Line blanks covered by this Standard are for the following pressure classes: 150, 300, 600, 900, 1500, and 2500 as listed in ASME B16.5.

2.2 Pressure-Temperature Ratings

Pressure-temperature ratings are those listed in ASME B16.5 for the material groups corresponding to the listed materials in Table 1.

2.3 Ratings

Ratings are the maximum allowable working gauge pressure at the temperature shown in Table 2 of ASME B16.5 for the appropriate material and pressure class. For intermediate temperatures, linear interpolation between temperatures within a pressure class is permitted by ASME B16.5.

3 DESIGN

3.1 Handle

The handle or web (tie bar) may be integral or attached to the line blank or spacer. The web and its attachment shall be capable of supporting the weight of the blank or spacer in all orientations without permanent deformation to the web.

3.2 Edge Preparation

Machining, flame, plasma or saw cutting, or press punching are acceptable methods for forming the inside and outside diameters of line blanks and spacers. Finished surfaces shall be free of projections that would interfere with gasket seating.

TABLE 1 BLANK CONSTRUCTION MATERIALS
ASTM Materials

| Material Group | Forgings | Plate | Castings |
|----------------|-------------------------|--|--------------------|
| 1.1 | A 105 (1) | A 515 Gr. 70 (1) A 516 Gr. 70 (1)(2) A 537 Cl. 1 (3) | A 216 Gr. WCB (1) |
| 1.7 | A 182 Gr. F2 (4) | A 204 Gr. C (5) | ... |
| 1.9 | A 182 Gr. F11 Cl. 2 (6) | A 387 Gr. 11 Cl. 2 (7) | A 217 Gr. WC6 (8) |
| 1.10 | A 182 Gr. F22 Cl. 3 (7) | A 387 Gr. 22 Cl. 2 (7) | A 217 Gr. WC9 (8) |
| 1.13 | A 182 Gr. F5 | ... | ... |
| 2.1 | A 182 Gr. F304 (9) | A 240 Gr. 304 (9) | A 351 Gr. CF8 (9) |
| 2.2 | A 182 Gr. F316 (9) | A 240 Gr. 316 (9) | A 351 Gr. CF8M (9) |
| 2.4 | A 182 Gr. F321 (4) | A 240 Gr. 321 (4) | ... |
| 2.5 | A 182 Gr. F347 (4) | A 240 Gr. 347 (4) | A 351 Gr. CF8C (9) |

NOTES:

- (1) Upon prolonged exposure to temperatures above 800°F, the carbide phase of carbon steel may be converted to graphite. Permissible but not recommended for prolonged service above 800°F.
- (2) Not to be used over 850°F.
- (3) Not to be used over 700°F.
- (4) Not to be used above 1000°F.
- (5) Upon prolonged exposure to temperatures above 875°F, the carbide phase of carbon-molybdenum steel may be converted to graphite. Permissible but not recommended for prolonged service above 875°F.
- (6) Permissible but not recommended for prolonged use above 1100°F. Use normalized and tempered material only.
- (7) Permissible but not recommended for prolonged use above 1100°F.
- (8) Not to be used over 1100°F. Use normalized and tempered material only.
- (9) At temperatures over 1000°F, use the material only when the carbon content is 0.04% or higher.

3.3 Facing

3.3.1 Raised Face Joint Blanks. The gasket seating surface finish and dimensions for raised face line blanks shall be in accordance with ASME B16.5. A raised face may be specified at the option of the purchaser. The height of the raised faces shall be in addition to the thicknesses listed in Tables 2 through 7.

3.3.2 Female Ring-Joint Blanks. Female ring-joint grooves shall be shaped with the groove side wall surface finish not rougher than 63 μ in. Ra max. Roughness shall be determined in accordance with ANSI/ASME B46.1.

3.3.3 Male Ring-Joint Blanks. The gasket shape (ring) for male ring-joint blanks shall not be rougher than 63 μ in. Ra. Roughness shall be determined in accordance with ANSI/ASME B46.1.

4 DIMENSIONS**4.1 General**

Dimensions shall be in accordance with Tables 2 through 19 of this Standard.

4.1.1 Tolerances. Tolerances for facings shall be in accordance with ASME B16.5. Thickness tolerances are:

| | |
|--------------------|-------------|
| NPS 18 and smaller | +0.12 -zero |
| NPS 20 and larger | +0.19 -zero |

4.2 Openings

(a) For NPS $\frac{1}{2}$, NPS $\frac{3}{4}$, and NPS 1 in all raised face classes, the inside diameter is equal to standard weight welding neck flange bore.

(b) For NPS $1\frac{1}{4}$ and larger in Classes 150 and 300 raised face, the inside diameter is equal to the pipe outside diameter.

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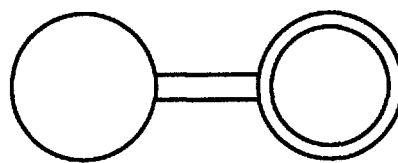
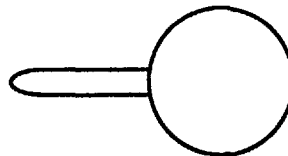
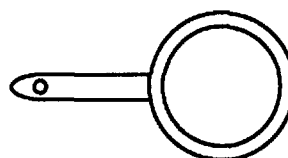


Figure 8 Blank



Paddle Blank



Paddle Spacer

FIG. 1 STEEL LINE BLANKS

(c) For NPS $1\frac{1}{4}$ and larger in Classes 600 and 900 raised face, the inside diameter is equal to Schedule 10S welding neck flange bore.

(d) For Class 1500 raised face, the inside diameter is equal to Schedule 40 welding neck flange bore.

(e) For Class 2500 raised face, the inside diameter is equal to Schedule 40 through NPS 6, Schedule 60 for NPS 8 and NPS 10, and Schedule 80 for NPS 12.

(f) For all ring-joint blanks, the inside diameter is equal to the pipe outside diameter.

(g) Dimensions are based upon concentric installation of spiral wound gaskets with inner rings as required by ASME B16.20 and conform to the maximum permitted bore of ASME B16.5 welding neck flanges described in Table 16 of ASME B16.20.

5 MATERIALS

Table 1 lists the materials that are covered by this Standard for the manufacture of line blanks conforming to the dimensions in Tables 2 through 19 and the pressure ratings identified in para. 2.

Criteria for the selection of materials is not within the scope of this Standard.

6 MARKING

6.1 General

Line blanks conforming to this Standard shall be marked as follows:

- (a) B16
- (b) nominal size (NPS)
- (c) nominal pressure class
- (d) material, specification, and grade or class
- (e) manufacturer's name or trademark
- (f) ring number (if applicable)

The B16 designation is applied to indicate conformance with this standard.

6.2 Marking Method

The marking shall be applied by steel stamping on the web (tie bar) or handle. Where space is limited, marking may be stamped on the outside edge of the blind portion of blanks, but in no case on the gasket surface.

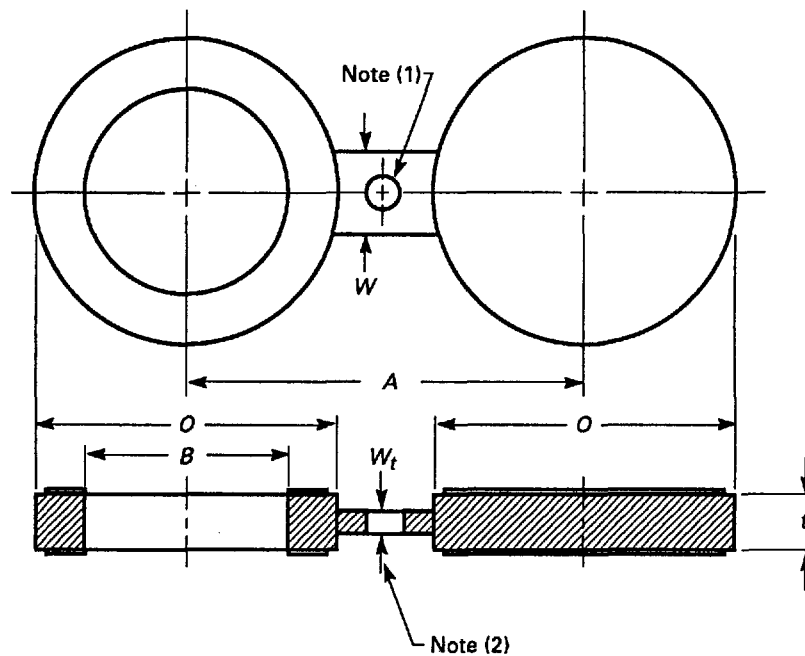
7 VISUAL IDENTIFICATION

Paddle spacer handles shall have a single $\frac{1}{2}$ in. minimum diameter hole located near the outer end. This hole serves as a remote visual indicator (and indicates that this is a paddle spacer and has an open bore).

Caution: Paddle blanks shall not be supplied with indicator or bolt holes.

8 TESTING

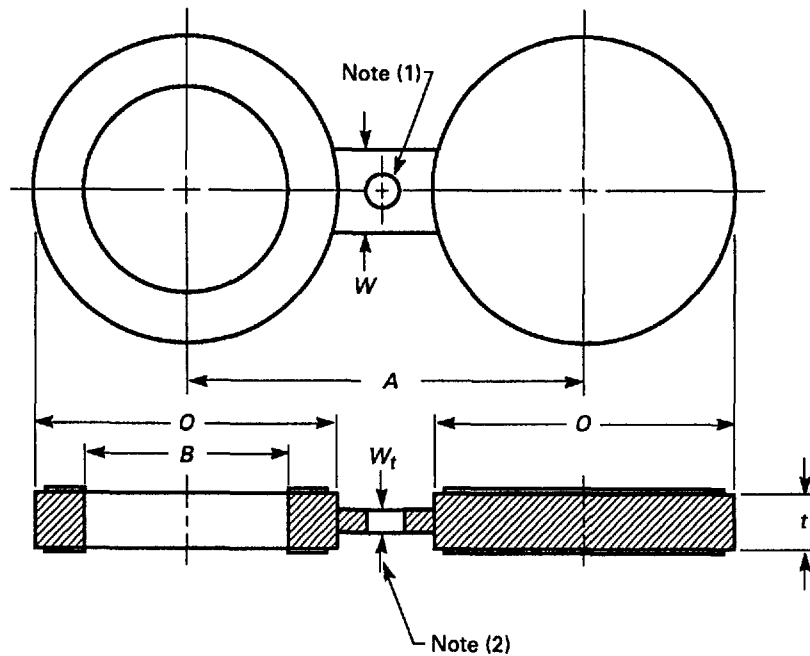
Line blanks are not required to be hydrostatically tested. Line blanks may be subjected to system hydrostatic tests at a pressure not to exceed 1.5 times the 100°F rating rounded off to the next higher 25 psi. Testing at any higher pressure is the responsibility of the user, subject to the requirements of the applicable code or regulation.

**TABLE 2 DIMENSIONS OF CLASS 150 RAISED FACE FIGURE 8 BLANKS**

| NPS | Inside Diameter <i>B</i> , in. | Outside Diameter <i>O</i> , in. | Centerline Dimension <i>A</i> , in. | Thickness <i>t</i> , in. | Web Width <i>W</i> , in. |
|-------|-----------------------------------|------------------------------------|--|-----------------------------|-----------------------------|
| 1/2 | 0.62 | 1.75 | 2.38 | 0.12 | 1.50 |
| 3/4 | 0.82 | 2.12 | 2.75 | 0.12 | 1.50 |
| 1 | 1.05 | 2.50 | 3.12 | 0.12 | 1.50 |
| 1 1/4 | 1.66 | 2.88 | 3.50 | 0.25 | 1.50 |
| 1 1/2 | 1.90 | 3.25 | 3.88 | 0.25 | 1.50 |
| 2 | 2.38 | 4.00 | 4.75 | 0.25 | 2.00 |
| 2 1/2 | 2.88 | 4.75 | 5.50 | 0.25 | 2.00 |
| 3 | 3.50 | 5.25 | 6.00 | 0.25 | 2.50 |
| 3 1/2 | 4.00 | 6.25 | 7.00 | 0.38 | 2.50 |
| 4 | 4.50 | 6.75 | 7.50 | 0.38 | 2.50 |
| 5 | 5.56 | 7.62 | 8.50 | 0.38 | 3.00 |
| 6 | 6.62 | 8.62 | 9.50 | 0.50 | 3.00 |
| 8 | 8.62 | 10.88 | 11.75 | 0.50 | 3.00 |
| 10 | 10.75 | 13.25 | 14.25 | 0.62 | 4.00 |
| 12 | 12.75 | 16.00 | 17.00 | 0.75 | 4.00 |
| 14 | 14.00 | 17.62 | 18.75 | 0.75 | 4.25 |
| 16 | 16.00 | 20.12 | 21.25 | 0.88 | 4.25 |
| 18 | 18.00 | 21.50 | 22.75 | 1.00 | 4.50 |
| 20 | 20.00 | 23.75 | 25.00 | 1.12 | 4.75 |
| 24 | 24.00 | 28.12 | 29.50 | 1.25 | 5.50 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum, except when t is less than 0.25 in., W_t shall equal t (see para. 3.1).

**TABLE 3 DIMENSIONS OF CLASS 300 RAISED FACE FIGURE 8 BLANKS**

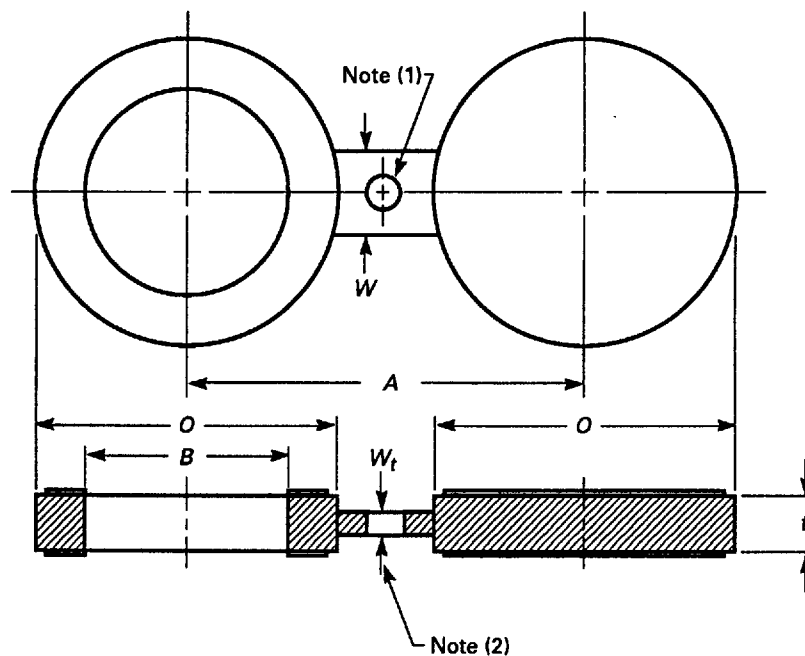
| NPS | Inside Diameter <i>B</i> , in. | Outside Diameter <i>O</i> , in. | Centerline Dimension <i>A</i> , in. | Thickness <i>t</i> , in. | Web Width <i>W</i> , in. |
|-------|--------------------------------------|---------------------------------------|---|-----------------------------|-----------------------------|
| 1/2 | 0.62 | 2.00 | 2.62 | 0.25 | 1.50 |
| 3/4 | 0.82 | 2.50 | 3.25 | 0.25 | 1.50 |
| 1 | 1.05 | 2.75 | 3.50 | 0.25 | 1.50 |
| 1 1/4 | 1.66 | 3.12 | 3.88 | 0.25 | 1.50 |
| 1 1/2 | 1.90 | 3.62 | 4.50 | 0.25 | 2.00 |
| 2 | 2.38 | 4.25 | 5.00 | 0.38 | 2.00 |
| 2 1/2 | 2.88 | 5.00 | 5.88 | 0.38 | 2.50 |
| 3 | 3.50 | 5.75 | 6.62 | 0.38 | 2.50 |
| 3 1/2 | 4.00 | 6.38 | 7.25 | 0.50 | 2.50 |
| 4 | 4.50 | 7.00 | 7.88 | 0.50 | 2.50 |
| 5 | 5.56 | 8.38 | 9.25 | 0.62 | 3.00 |
| 6 | 6.62 | 9.75 | 10.62 | 0.62 | 3.00 |
| 8 | 8.62 | 12.00 | 13.00 | 0.88 | 3.50 |
| 10 | 10.75 | 14.12 | 15.25 | 1.00 | 4.00 |
| 12 | 12.75 | 16.50 | 17.75 | 1.12 | 4.00 |
| 14 | 14.00 | 19.00 | 20.25 | 1.25 | 4.75 |
| 16 | 16.00 | 21.12 | 22.50 | 1.50 | 4.88 |
| 18 | 18.00 | 23.38 | 24.75 | 1.62 | 4.50 |
| 20 | 20.00 | 25.62 | 27.00 | 1.75 | 4.75 |
| 24 | 24.00 | 30.38 | 32.00 | 2.00 | 5.50 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

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**TABLE 4 DIMENSIONS OF CLASS 600 RAISED FACE FIGURE 8 BLANKS**

| NPS | Inside Diameter B, in. | Outside Diameter O, in. | Centerline Dimension A, in. | Thickness t, in. | Web Width W, in. |
|----------------|------------------------|-------------------------|-----------------------------|------------------|------------------|
| $\frac{1}{2}$ | 0.62 | 2.00 | 2.62 | 0.25 | 1.50 |
| $\frac{3}{4}$ | 0.82 | 2.50 | 3.25 | 0.25 | 1.50 |
| 1 | 1.05 | 2.75 | 3.50 | 0.25 | 2.25 |
| $1\frac{1}{4}$ | 1.44 | 3.12 | 3.88 | 0.38 | 2.25 |
| $1\frac{1}{2}$ | 1.68 | 3.62 | 4.50 | 0.38 | 2.62 |
| 2 | 2.16 | 4.25 | 5.00 | 0.38 | 2.25 |
| $2\frac{1}{2}$ | 2.64 | 5.00 | 5.88 | 0.50 | 2.62 |
| 3 | 3.26 | 5.75 | 6.62 | 0.50 | 2.62 |
| $3\frac{1}{2}$ | 3.76 | 6.25 | 7.25 | 0.62 | 3.00 |
| 4 | 4.26 | 7.50 | 8.50 | 0.62 | 3.00 |
| 5 | 5.30 | 9.38 | 10.50 | 0.75 | 3.38 |
| 6 | 6.36 | 10.38 | 11.50 | 0.88 | 3.38 |
| 8 | 8.33 | 12.50 | 13.75 | 1.12 | 3.75 |
| 10 | 10.42 | 15.62 | 17.00 | 1.38 | 4.12 |
| 12 | 12.39 | 17.88 | 19.25 | 1.62 | 4.12 |
| 14 | 13.62 | 19.25 | 20.75 | 1.75 | 4.50 |
| 16 | 15.62 | 22.12 | 23.75 | 2.00 | 4.88 |
| 18 | 17.62 | 24.00 | 25.75 | 2.12 | 5.25 |
| 20 | 19.56 | 26.75 | 28.50 | 2.50 | 5.25 |
| 24 | 23.50 | 31.00 | 33.00 | 2.88 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

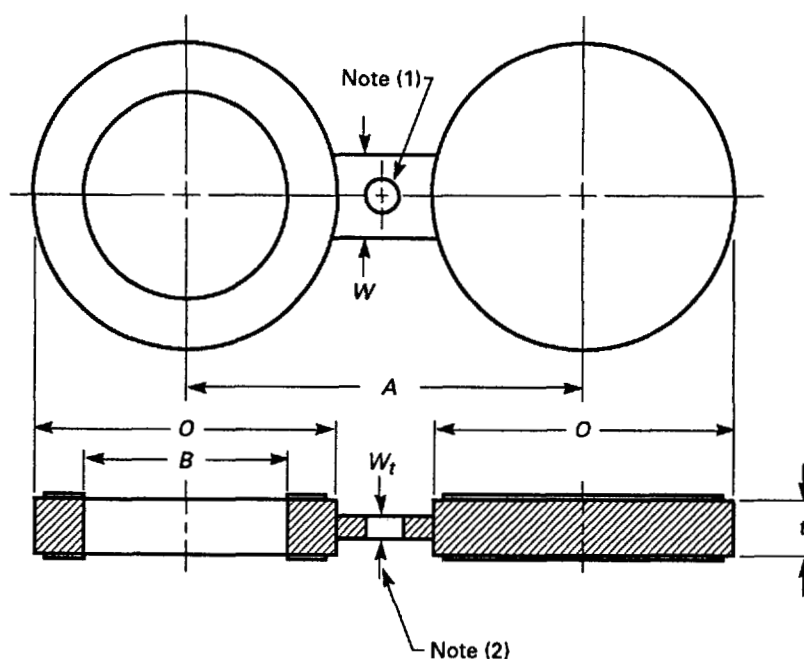
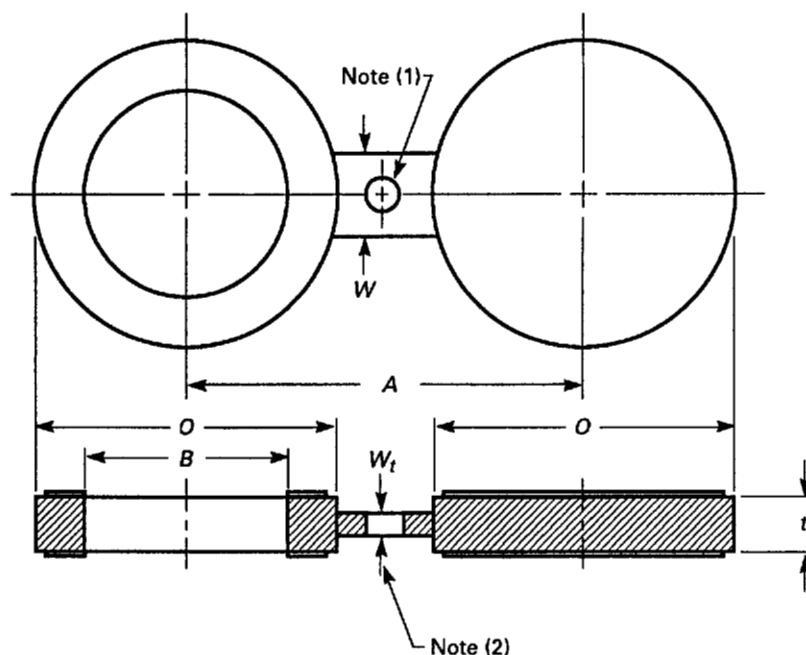


TABLE 5 DIMENSIONS OF CLASS 900 RAISED FACE FIGURE 8 BLANKS

| NPS | Inside Diameter B , in. | Outside Diameter O , in. | Centerline Dimension A , in. | Thickness t , in. | Web Width W , in. |
|----------------|------------------------------|-------------------------------|-----------------------------------|------------------------|------------------------|
| $\frac{1}{2}$ | 0.62 | 2.38 | 3.25 | 0.25 | 1.50 |
| $\frac{3}{4}$ | 0.82 | 2.62 | 3.50 | 0.25 | 1.62 |
| 1 | 1.05 | 3.00 | 4.00 | 0.25 | 2.25 |
| $1\frac{1}{4}$ | 1.44 | 3.38 | 4.38 | 0.38 | 2.25 |
| $1\frac{1}{2}$ | 1.68 | 3.75 | 4.88 | 0.38 | 2.62 |
| 2 | 2.16 | 5.50 | 6.50 | 0.50 | 2.25 |
| $2\frac{1}{2}$ | 2.64 | 6.38 | 7.50 | 0.50 | 2.62 |
| 3 | 3.26 | 6.50 | 7.50 | 0.62 | 2.62 |
| 4 | 4.26 | 8.00 | 9.25 | 0.75 | 3.00 |
| 5 | 5.30 | 9.62 | 11.00 | 0.88 | 3.38 |
| 6 | 6.36 | 11.25 | 12.50 | 1.00 | 3.38 |
| 8 | 8.33 | 14.00 | 15.50 | 1.38 | 3.75 |
| 10 | 10.42 | 17.00 | 18.50 | 1.62 | 4.12 |
| 12 | 12.39 | 19.50 | 21.00 | 1.88 | 4.12 |
| 14 | 13.62 | 20.38 | 22.00 | 2.12 | 4.50 |
| 16 | 15.62 | 22.50 | 24.25 | 2.38 | 4.88 |
| 18 | 17.62 | 25.00 | 27.00 | 2.62 | 5.25 |
| 20 | 19.56 | 27.38 | 29.50 | 2.88 | 5.25 |
| 24 | 23.50 | 32.88 | 35.50 | 3.50 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

**TABLE 6 DIMENSIONS OF CLASS 1500 RAISED FACE FIGURE 8 BLANKS**

| NPS | Inside Diameter B , in. | Outside Diameter O , in. | Centerline Dimension A , in. | Thickness t , in. | Web Width W , in. |
|----------------|------------------------------|-------------------------------|-----------------------------------|------------------------|------------------------|
| $\frac{1}{2}$ | 0.62 | 2.38 | 3.25 | 0.25 | 1.50 |
| $\frac{3}{4}$ | 0.82 | 2.62 | 3.50 | 0.38 | 1.62 |
| 1 | 1.05 | 3.00 | 4.00 | 0.38 | 2.50 |
| $1\frac{1}{4}$ | 1.38 | 3.38 | 4.38 | 0.38 | 2.50 |
| $1\frac{1}{2}$ | 1.61 | 3.75 | 4.88 | 0.50 | 2.75 |
| 2 | 2.07 | 5.50 | 6.50 | 0.50 | 2.75 |
| $2\frac{1}{2}$ | 2.47 | 6.38 | 7.50 | 0.62 | 3.00 |
| 3 | 3.07 | 6.75 | 8.00 | 0.75 | 3.00 |
| 4 | 4.03 | 8.12 | 9.50 | 0.88 | 3.50 |
| 5 | 5.05 | 9.88 | 11.50 | 1.12 | 3.50 |
| 6 | 6.06 | 11.00 | 12.50 | 1.38 | 3.50 |
| 8 | 7.98 | 13.75 | 15.50 | 1.62 | 4.00 |
| 10 | 10.02 | 17.00 | 19.00 | 2.00 | 4.50 |
| 12 | 11.94 | 20.38 | 22.50 | 2.38 | 4.50 |
| 14 | 13.12 | 22.62 | 25.00 | 2.62 | 5.00 |
| 16 | 15.00 | 25.12 | 27.75 | 3.00 | 5.25 |
| 18 | 16.88 | 27.62 | 30.50 | 3.38 | 5.75 |
| 20 | 18.81 | 29.62 | 32.75 | 3.75 | 6.00 |
| 24 | 22.62 | 35.38 | 39.00 | 4.38 | 7.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

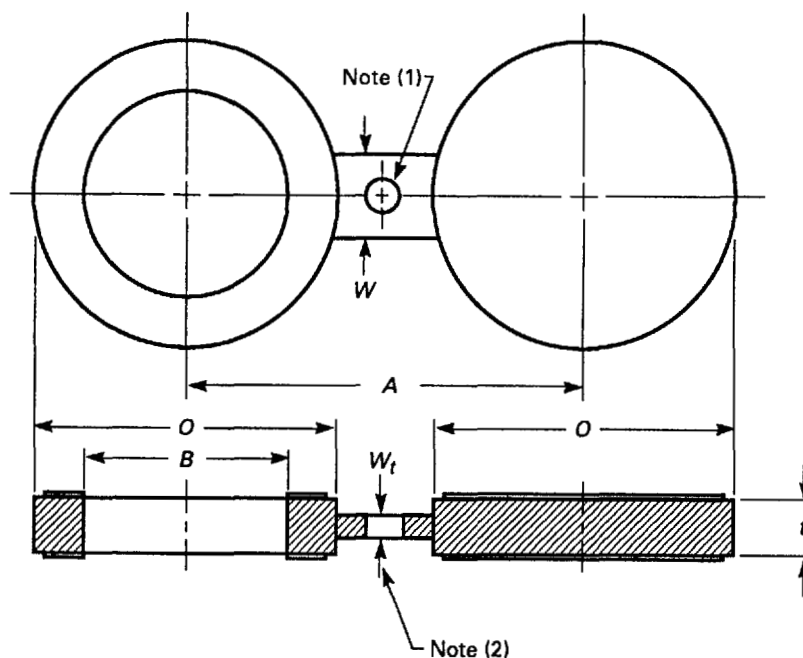
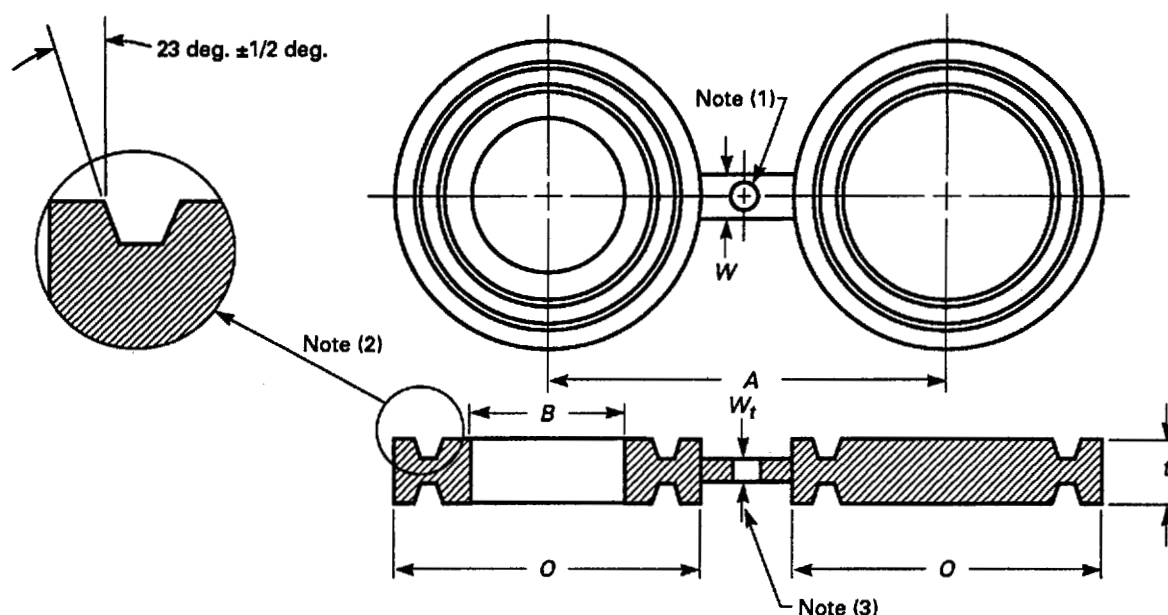


TABLE 7 DIMENSIONS OF CLASS 2500 RAISED FACE FIGURE 8 BLANKS

| NPS | Inside Diameter B, in. | Outside Diameter O, in. | Centerline Dimension A, in. | Thickness t, in. | Web Width W, in. |
|-------|------------------------------|-------------------------------|-----------------------------------|---------------------|---------------------|
| 1/2 | 0.62 | 2.62 | 3.50 | 0.38 | 1.50 |
| 3/4 | 0.82 | 2.88 | 3.75 | 0.38 | 1.62 |
| 1 | 1.05 | 3.25 | 4.25 | 0.38 | 2.50 |
| 1 1/4 | 1.38 | 4.00 | 5.12 | 0.50 | 2.50 |
| 1 1/2 | 1.61 | 4.50 | 5.75 | 0.62 | 2.75 |
| 2 | 2.07 | 5.62 | 6.75 | 0.62 | 2.75 |
| 2 1/2 | 2.47 | 6.50 | 7.75 | 0.75 | 3.00 |
| 3 | 3.07 | 7.62 | 9.00 | 0.88 | 3.00 |
| 4 | 4.03 | 9.12 | 10.75 | 1.12 | 3.50 |
| 5 | 5.05 | 10.88 | 12.75 | 1.38 | 3.50 |
| 6 | 6.06 | 12.38 | 14.50 | 1.62 | 3.50 |
| 8 | 7.81 | 15.12 | 17.25 | 2.12 | 4.00 |
| 10 | 9.75 | 18.62 | 21.25 | 2.62 | 4.50 |
| 12 | 11.37 | 21.50 | 24.38 | 3.12 | 4.50 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

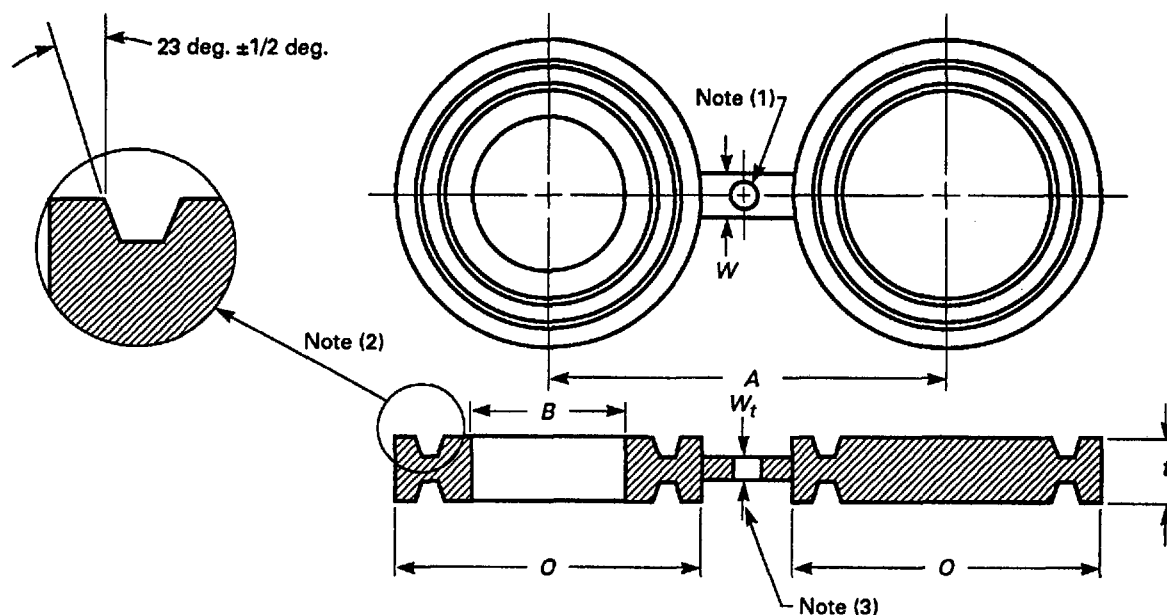


**TABLE 8 DIMENSIONS OF CLASS 150 FEMALE RING-JOINT FACING
FIGURE 8 BLANKS**

| NPS | Inside Diameter B, in. | Outside Diameter O, in. | Centerline Dimension A, in. | Thickness t, in. | Web Width W, in. |
|-----------------|------------------------------|-------------------------------|-----------------------------------|---------------------|---------------------|
| 1 | 1.32 | 2.50 | 3.12 | 0.75 | 2.00 |
| 1 $\frac{1}{4}$ | 1.66 | 2.88 | 3.50 | 0.75 | 2.00 |
| 1 $\frac{1}{2}$ | 1.90 | 3.25 | 3.88 | 0.75 | 2.25 |
| 2 | 2.38 | 4.00 | 4.75 | 0.75 | 2.25 |
| 2 $\frac{1}{2}$ | 2.88 | 4.75 | 5.50 | 0.88 | 2.25 |
| 3 | 3.50 | 5.25 | 6.00 | 0.88 | 2.25 |
| 3 $\frac{1}{2}$ | 4.00 | 6.06 | 7.00 | 0.88 | 2.50 |
| 4 | 4.50 | 6.75 | 7.50 | 0.88 | 2.50 |
| 5 | 5.56 | 7.62 | 8.50 | 1.00 | 2.75 |
| 6 | 6.62 | 8.62 | 9.50 | 1.00 | 3.25 |
| 8 | 8.62 | 10.75 | 11.75 | 1.12 | 3.75 |
| 10 | 10.75 | 13.00 | 14.25 | 1.25 | 4.00 |
| 12 | 12.75 | 16.00 | 17.00 | 1.38 | 4.75 |
| 14 | 14.00 | 16.75 | 18.75 | 1.38 | 5.00 |
| 16 | 16.00 | 19.00 | 21.25 | 1.50 | 5.00 |
| 18 | 18.00 | 21.50 | 22.75 | 1.62 | 5.00 |
| 20 | 20.00 | 23.50 | 25.00 | 1.62 | 5.00 |
| 24 | 24.00 | 28.00 | 29.50 | 1.88 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Female ring-joint groove dimensions shall be in accordance with ASME B16.5.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).



**TABLE 9 DIMENSIONS OF CLASS 300 FEMALE RING-JOINT FACING
FIGURE 8 BLANKS**

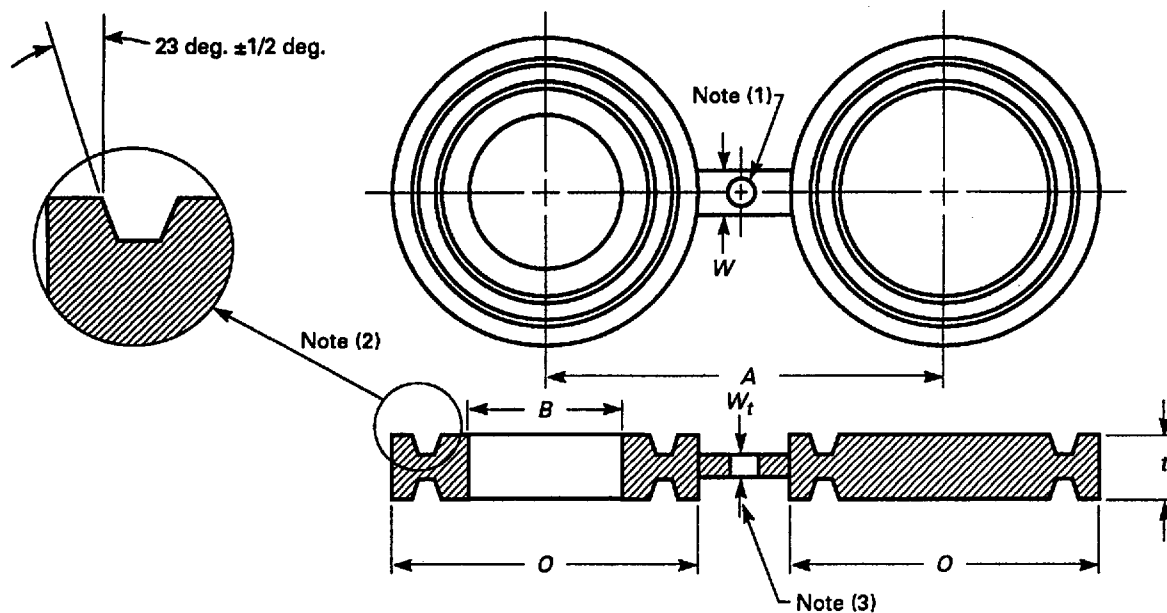
| NPS | Inside Diameter B , in. | Outside Diameter O , in. | Centerline Dimension A , in. | Thickness t , in. | Web Width W , in. |
|---------|---------------------------------|----------------------------------|--------------------------------------|------------------------|------------------------|
| $1/2$ | 0.84 | 2.00 | 2.62 | 0.62 | 1.50 |
| $3/4$ | 1.05 | 2.50 | 3.25 | 0.75 | 1.75 |
| 1 | 1.32 | 2.75 | 3.50 | 0.75 | 2.00 |
| $1 1/4$ | 1.66 | 3.12 | 3.88 | 0.88 | 2.00 |
| $1 1/2$ | 1.90 | 3.56 | 4.50 | 0.88 | 2.25 |
| 2 | 2.38 | 4.25 | 5.00 | 1.00 | 2.25 |
| $2 1/2$ | 2.88 | 5.00 | 5.88 | 1.12 | 2.25 |
| 3 | 3.50 | 5.75 | 6.62 | 1.12 | 2.25 |
| $3 1/2$ | 4.00 | 6.25 | 7.25 | 1.12 | 2.50 |
| 4 | 4.50 | 6.88 | 7.88 | 1.25 | 2.50 |
| 5 | 5.56 | 8.25 | 9.25 | 1.38 | 2.75 |
| 6 | 6.62 | 9.50 | 10.62 | 1.38 | 3.25 |
| 8 | 8.62 | 11.88 | 13.00 | 1.62 | 3.75 |
| 10 | 10.75 | 14.00 | 15.25 | 1.75 | 4.00 |
| 12 | 12.75 | 16.25 | 17.75 | 2.00 | 4.75 |
| 14 | 14.00 | 18.00 | 20.25 | 2.12 | 5.00 |
| 16 | 16.00 | 20.00 | 22.50 | 2.25 | 5.00 |
| 18 | 18.00 | 22.62 | 24.75 | 2.38 | 5.00 |
| 20 | 20.00 | 25.00 | 27.00 | 2.75 | 5.00 |
| 24 | 24.00 | 29.50 | 32.00 | 3.12 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Female ring-joint groove dimensions shall be in accordance with ASME B16.5.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

STEEL LINE BLANKS

ASME B16.48-1997

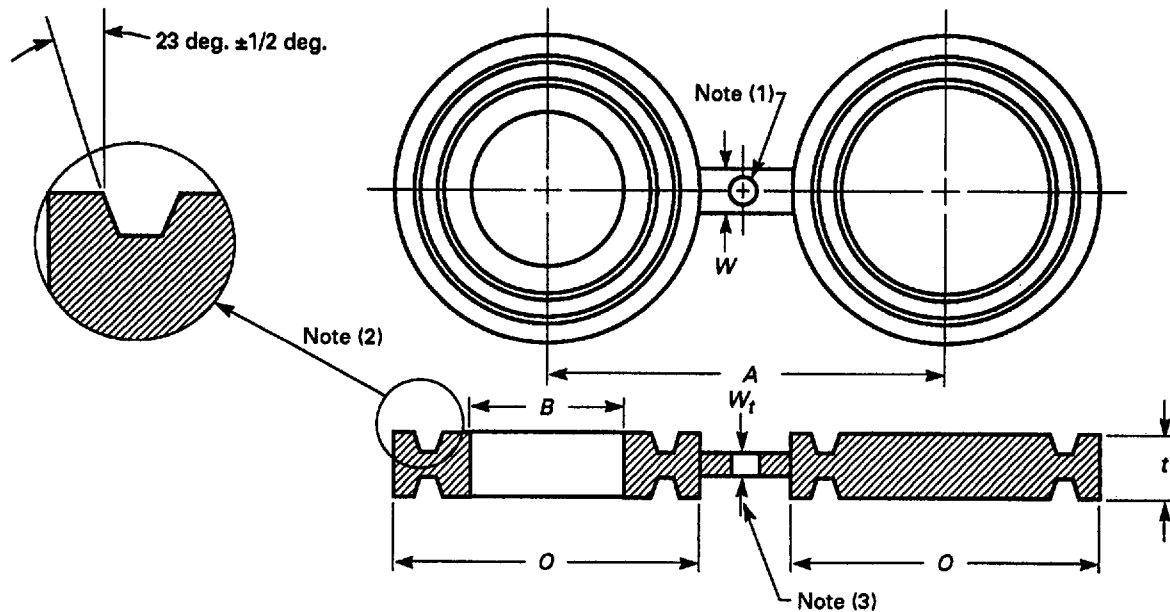


**TABLE 10 DIMENSIONS OF CLASS 600 FEMALE RING-JOINT FACING
FIGURE 8 BLANKS**

| NPS | Inside Diameter B, in. | Outside Diameter O, in. | Centerline Dimension A, in. | Thickness t, in. | Web Width W, in. |
|----------------|------------------------------|-------------------------------|-----------------------------------|---------------------|---------------------|
| $\frac{1}{2}$ | 0.84 | 2.00 | 2.62 | 0.75 | 1.50 |
| $\frac{3}{4}$ | 1.05 | 2.50 | 3.25 | 0.88 | 1.75 |
| 1 | 1.32 | 2.75 | 3.50 | 0.88 | 2.00 |
| $1\frac{1}{4}$ | 1.66 | 3.12 | 3.88 | 0.88 | 2.00 |
| $1\frac{1}{2}$ | 1.90 | 3.56 | 4.50 | 0.88 | 2.25 |
| 2 | 2.38 | 4.25 | 5.00 | 1.12 | 2.25 |
| $2\frac{1}{2}$ | 2.88 | 5.00 | 5.88 | 1.25 | 2.25 |
| 3 | 3.50 | 5.75 | 6.62 | 1.25 | 2.25 |
| $3\frac{1}{2}$ | 4.00 | 6.25 | 7.25 | 1.38 | 2.50 |
| 4 | 4.50 | 6.88 | 8.50 | 1.38 | 2.50 |
| 5 | 5.56 | 8.25 | 10.50 | 1.50 | 2.75 |
| 6 | 6.62 | 9.50 | 11.50 | 1.75 | 3.25 |
| 8 | 8.62 | 11.88 | 13.75 | 2.00 | 3.75 |
| 10 | 10.75 | 14.00 | 17.00 | 2.25 | 4.00 |
| 12 | 12.75 | 16.25 | 19.25 | 2.50 | 4.75 |
| 14 | 14.00 | 18.00 | 20.75 | 2.62 | 5.00 |
| 16 | 16.00 | 20.00 | 23.75 | 2.88 | 5.00 |
| 18 | 18.00 | 22.62 | 25.75 | 3.12 | 5.00 |
| 20 | 20.00 | 25.00 | 28.50 | 3.50 | 5.00 |
| 24 | 24.00 | 29.50 | 33.00 | 4.12 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Female ring-joint groove dimensions shall be in accordance with ASME B16.5.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

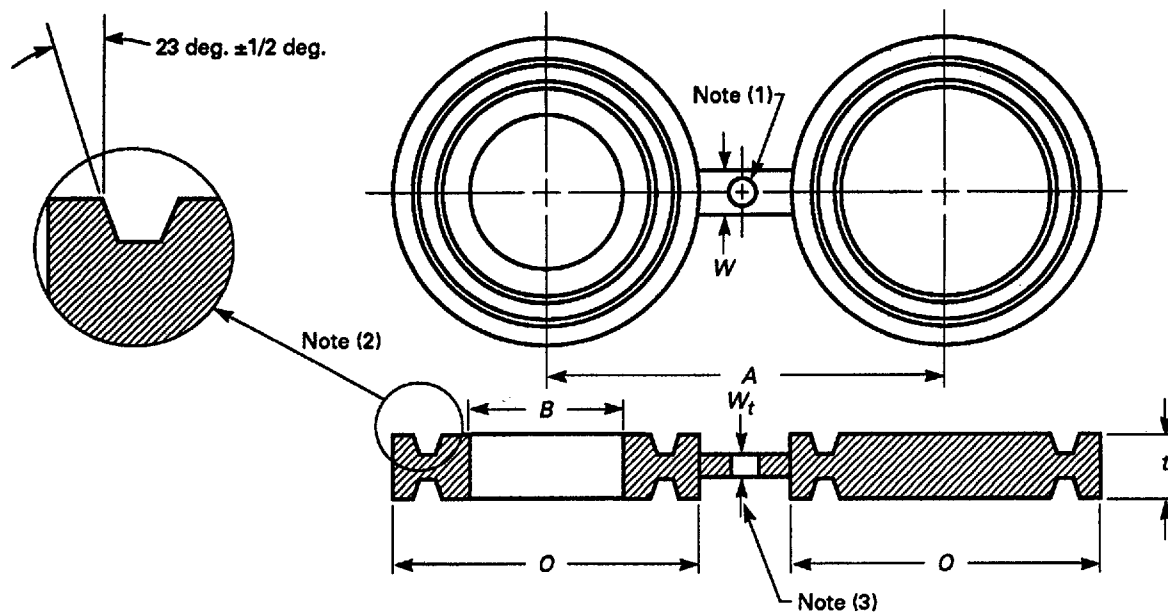


**TABLE 11 DIMENSIONS OF CLASS 900 FEMALE RING-JOINT FACING
FIGURE 8 BLANKS**

| NPS | Inside Diameter B , in. | Outside Diameter O , in. | Centerline Dimension A , in. | Thickness t , in. | Web Width W , in. |
|---------|---------------------------------|----------------------------------|--------------------------------------|------------------------|------------------------|
| $1/2$ | 0.84 | 2.38 | 3.25 | 0.88 | 1.50 |
| $3/4$ | 1.05 | 2.62 | 3.50 | 0.88 | 1.75 |
| 1 | 1.32 | 2.81 | 4.00 | 0.88 | 2.00 |
| $1 1/4$ | 1.66 | 3.19 | 4.38 | 1.00 | 2.00 |
| $1 1/2$ | 1.90 | 3.62 | 4.88 | 1.00 | 2.50 |
| 2 | 2.38 | 4.88 | 6.50 | 1.25 | 2.00 |
| $2 1/2$ | 2.88 | 5.38 | 7.50 | 1.38 | 2.62 |
| 3 | 3.50 | 6.12 | 7.50 | 1.38 | 2.62 |
| 4 | 4.50 | 7.12 | 9.25 | 1.62 | 2.88 |
| 5 | 5.56 | 8.50 | 11.00 | 1.75 | 2.88 |
| 6 | 6.62 | 9.50 | 12.50 | 1.88 | 2.88 |
| 8 | 8.62 | 12.12 | 15.50 | 2.25 | 3.12 |
| 10 | 10.75 | 14.25 | 18.50 | 2.50 | 4.75 |
| 12 | 12.75 | 16.50 | 21.00 | 2.88 | 4.75 |
| 14 | 14.00 | 18.38 | 22.00 | 3.25 | 4.75 |
| 16 | 16.00 | 20.62 | 24.25 | 3.62 | 5.00 |
| 18 | 18.00 | 23.38 | 27.00 | 4.00 | 5.25 |
| 20 | 20.00 | 25.50 | 29.50 | 4.38 | 5.00 |
| 24 | 24.00 | 30.38 | 35.50 | 5.25 | 5.50 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Female ring-joint groove dimensions shall be in accordance with ASME B16.5.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

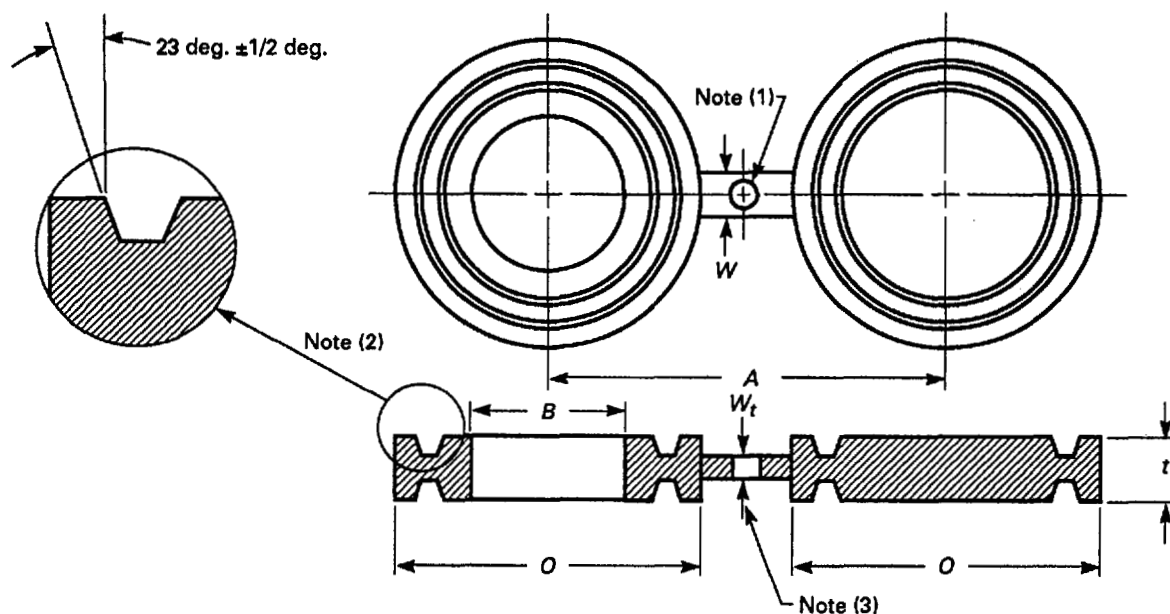


**TABLE 12 DIMENSIONS OF CLASS 1500 FEMALE RING-JOINT FACING
FIGURE 8 BLANKS**

| NPS | Inside Diameter B, in. | Outside Diameter O, in. | Centerline Dimension A, in. | Thickness t, in. | Web Width W, in. |
|-------|------------------------------|-------------------------------|-----------------------------------|---------------------|---------------------|
| 1/2 | 0.84 | 2.38 | 3.25 | 0.88 | 1.50 |
| 3/4 | 1.05 | 2.62 | 3.50 | 1.00 | 1.75 |
| 1 | 1.32 | 2.81 | 4.00 | 1.00 | 2.12 |
| 1 1/4 | 1.66 | 3.19 | 4.38 | 1.00 | 2.12 |
| 1 1/2 | 1.90 | 3.62 | 4.88 | 1.12 | 2.25 |
| 2 | 2.38 | 4.88 | 6.50 | 1.38 | 2.12 |
| 2 1/2 | 2.88 | 5.38 | 7.50 | 1.50 | 2.25 |
| 3 | 3.50 | 6.62 | 8.00 | 1.75 | 2.88 |
| 4 | 4.50 | 7.62 | 9.50 | 1.88 | 3.00 |
| 5 | 5.56 | 9.00 | 11.50 | 2.12 | 3.00 |
| 6 | 6.62 | 9.75 | 12.50 | 2.38 | 3.12 |
| 8 | 8.62 | 12.50 | 15.50 | 2.88 | 3.38 |
| 10 | 10.75 | 14.62 | 19.00 | 3.25 | 5.25 |
| 12 | 12.75 | 17.25 | 22.50 | 4.00 | 5.25 |
| 14 | 14.00 | 19.25 | 25.00 | 4.38 | 5.50 |
| 16 | 16.00 | 21.50 | 27.75 | 4.88 | 5.75 |
| 18 | 18.00 | 24.12 | 30.50 | 5.25 | 6.00 |
| 20 | 20.00 | 26.50 | 32.75 | 5.62 | 6.50 |
| 24 | 24.00 | 31.25 | 39.00 | 6.62 | 7.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Female ring-joint groove dimensions shall be in accordance with ASME B16.5.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

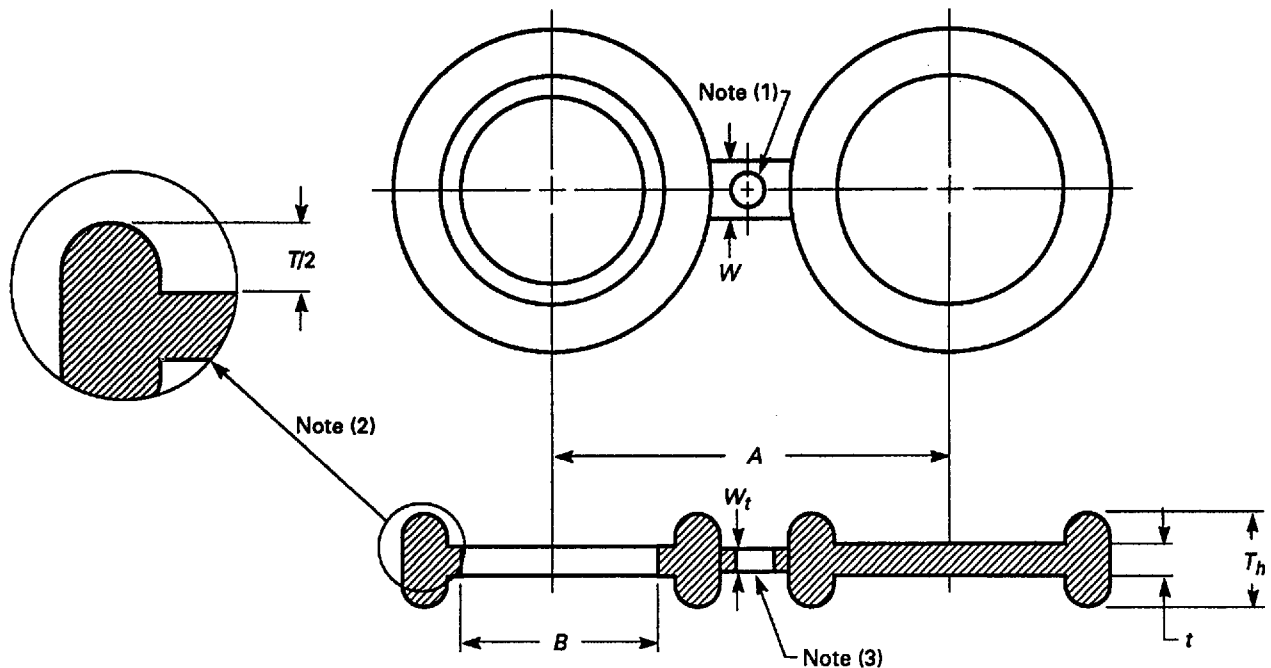


**TABLE 13 DIMENSIONS OF CLASS 2500 FEMALE RING-JOINT FACING
FIGURE 8 BLANKS**

| NPS | Inside Diameter B , in. | Outside Diameter O , in. | Centerline Dimension A , in. | Thickness t , in. | Web Width W , in. |
|---------|---------------------------------|----------------------------------|--------------------------------------|------------------------|------------------------|
| $1/2$ | 0.84 | 2.56 | 3.50 | 1.00 | 1.50 |
| $3/4$ | 1.05 | 2.88 | 3.75 | 1.12 | 1.75 |
| 1 | 1.32 | 3.25 | 4.25 | 1.12 | 2.12 |
| $1 1/4$ | 1.66 | 4.00 | 5.12 | 1.38 | 2.12 |
| $1 1/2$ | 1.90 | 4.50 | 5.75 | 1.50 | 2.38 |
| 2 | 2.38 | 5.25 | 6.75 | 1.62 | 2.25 |
| $2 1/2$ | 2.88 | 5.88 | 7.75 | 1.88 | 2.38 |
| 3 | 3.50 | 6.62 | 9.00 | 2.00 | 3.00 |
| 4 | 4.50 | 8.00 | 10.75 | 2.50 | 3.25 |
| 5 | 5.56 | 9.50 | 12.75 | 2.88 | 3.50 |
| 6 | 6.62 | 11.00 | 14.50 | 3.25 | 3.75 |
| 8 | 8.62 | 13.38 | 17.25 | 3.88 | 3.75 |
| 10 | 10.75 | 16.75 | 21.25 | 4.62 | 3.58 |
| 12 | 12.75 | 19.50 | 24.38 | 5.25 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Female ring-joint groove dimensions shall be in accordance with ASME B16.5.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

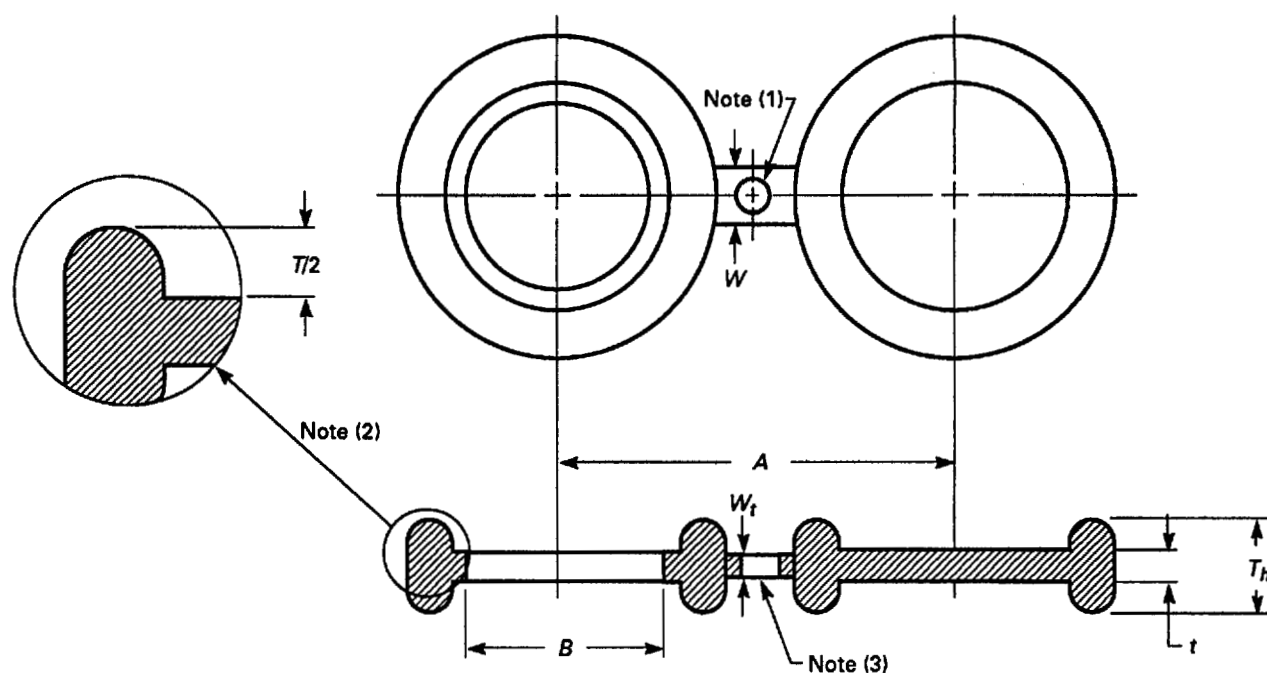


**TABLE 14 DIMENSIONS OF CLASS 150 MALE OVAL RING-JOINT FACING
FIGURE 8 BLANKS**

| NPS | Inside Diameter B , in. | Centerline Dimension A , in. | Thickness t , in. | Web Width W , in. |
|-----------------|---------------------------------|--------------------------------------|------------------------|------------------------|
| 1 | 1.32 | 3.12 | 0.25 | 2.00 |
| 1 $\frac{1}{4}$ | 1.66 | 3.50 | 0.25 | 2.00 |
| 1 $\frac{1}{2}$ | 1.90 | 3.88 | 0.25 | 2.25 |
| 2 | 2.38 | 4.75 | 0.25 | 2.25 |
| 2 $\frac{1}{2}$ | 2.88 | 5.50 | 0.38 | 2.25 |
| 3 | 3.50 | 6.00 | 0.38 | 2.25 |
| 3 $\frac{1}{2}$ | 4.00 | 7.00 | 0.38 | 2.50 |
| 4 | 4.50 | 7.50 | 0.38 | 2.50 |
| 5 | 5.56 | 8.50 | 0.50 | 3.00 |
| 6 | 6.62 | 9.50 | 0.50 | 3.25 |
| 8 | 8.62 | 11.75 | 0.62 | 3.75 |
| 10 | 10.75 | 14.25 | 0.75 | 4.00 |
| 12 | 12.75 | 17.00 | 0.88 | 4.75 |
| 14 | 14.00 | 18.75 | 0.88 | 5.00 |
| 16 | 16.00 | 21.25 | 1.00 | 5.00 |
| 18 | 18.00 | 22.75 | 1.12 | 5.00 |
| 20 | 20.00 | 25.00 | 1.12 | 5.00 |
| 24 | 24.00 | 29.50 | 1.38 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Oval ring-joint dimensions shall be in accordance with ASME B16.20, except $T_h = T + t$ where T is the ring height specified in ASME B16.20.
- (3) The thickness of the web (or tie bar) dimension W shall be 0.25 in. minimum (see para. 3.1).

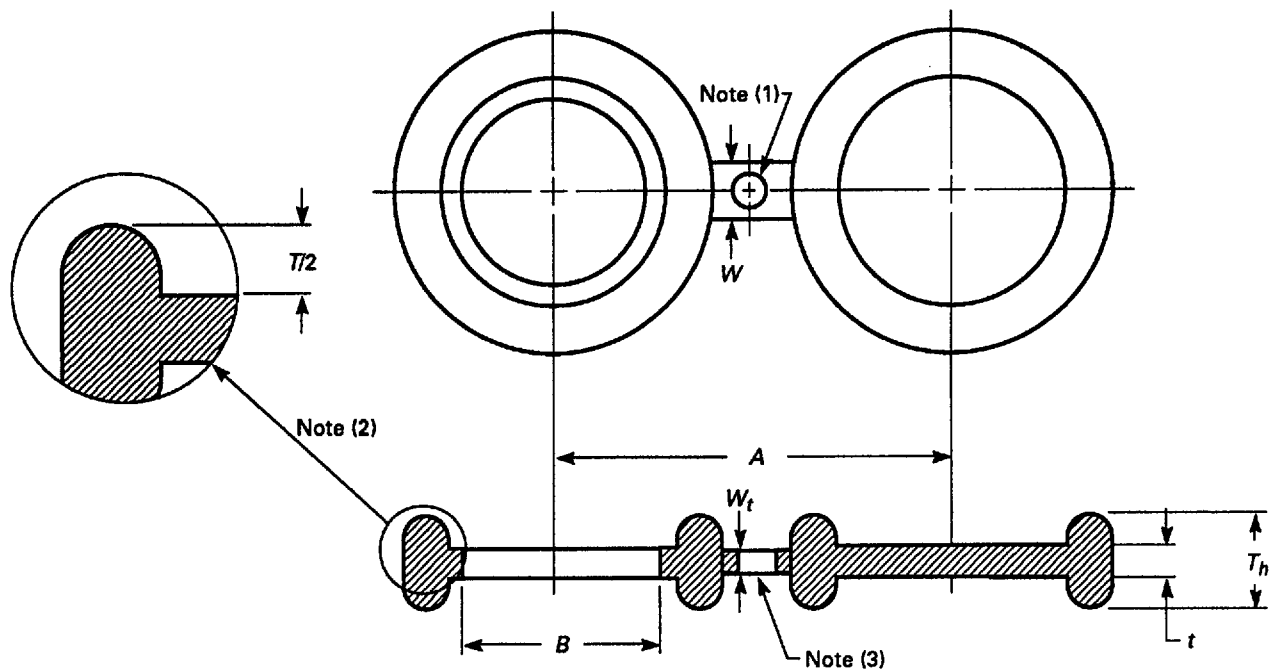


**TABLE 15 DIMENSIONS OF CLASS 300 MALE OVAL RING-JOINT FACING
FIGURE 8 BLANKS**

| NPS | Inside Diameter B , in. | Centerline Dimension A , in. | Thickness t , in. | Web Width W , in. |
|----------------|---------------------------------|--------------------------------------|------------------------|------------------------|
| $\frac{1}{2}$ | 0.84 | 2.62 | 0.25 | 1.50 |
| $\frac{3}{4}$ | 1.05 | 3.25 | 0.38 | 1.75 |
| 1 | 1.32 | 3.50 | 0.38 | 2.00 |
| $1\frac{1}{4}$ | 1.66 | 3.88 | 0.38 | 2.00 |
| $1\frac{1}{2}$ | 1.90 | 4.50 | 0.38 | 2.25 |
| 2 | 2.38 | 5.00 | 0.50 | 2.25 |
| $2\frac{1}{2}$ | 2.88 | 5.88 | 0.62 | 2.25 |
| 3 | 3.50 | 6.62 | 0.62 | 2.25 |
| $3\frac{1}{2}$ | 4.00 | 7.25 | 0.75 | 2.50 |
| 4 | 4.50 | 7.88 | 0.62 | 2.50 |
| 5 | 5.56 | 9.25 | 0.75 | 3.00 |
| 6 | 6.62 | 10.62 | 0.88 | 3.25 |
| 8 | 8.62 | 13.00 | 1.00 | 3.75 |
| 10 | 10.75 | 15.25 | 1.12 | 4.00 |
| 12 | 12.75 | 17.75 | 1.38 | 4.75 |
| 14 | 14.00 | 20.25 | 1.50 | 5.00 |
| 16 | 16.00 | 22.50 | 1.62 | 5.00 |
| 18 | 18.00 | 24.75 | 1.75 | 5.00 |
| 20 | 20.00 | 27.00 | 2.00 | 5.00 |
| 24 | 24.00 | 32.00 | 2.25 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Oval ring-joint dimensions shall be in accordance with ASME B16.20, except $T_h = T + t$ where T is the ring height specified in ASME B16.20.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

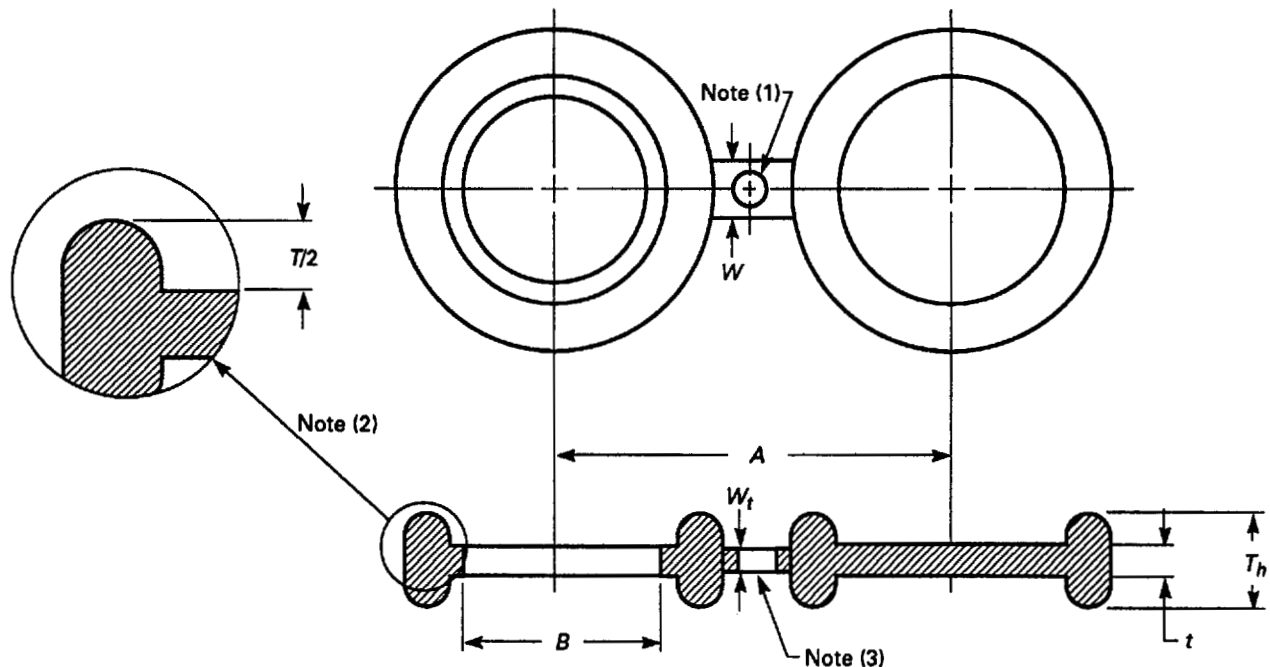


**TABLE 16 DIMENSIONS OF CLASS 600 MALE OVAL RING-JOINT FACING
FIGURE 8 BLANKS**

| NPS | Inside Diameter B , in. | Centerline Dimension A , in. | Thickness t , in. | Web Width W , in. |
|----------------|---------------------------------|--------------------------------------|------------------------|------------------------|
| $\frac{1}{2}$ | 0.84 | 2.62 | 0.25 | 1.50 |
| $\frac{3}{4}$ | 1.05 | 3.25 | 0.38 | 1.75 |
| 1 | 1.32 | 3.50 | 0.38 | 2.00 |
| $1\frac{1}{4}$ | 1.66 | 3.88 | 0.38 | 2.25 |
| $1\frac{1}{2}$ | 1.90 | 4.50 | 0.38 | 2.25 |
| 2 | 2.38 | 5.00 | 0.50 | 2.00 |
| $2\frac{1}{2}$ | 2.88 | 5.88 | 0.62 | 2.25 |
| 3 | 3.50 | 6.62 | 0.62 | 2.62 |
| $3\frac{1}{2}$ | 4.00 | 7.25 | 0.75 | 2.62 |
| 4 | 4.50 | 8.50 | 0.75 | 2.88 |
| 5 | 5.56 | 10.50 | 0.88 | 2.88 |
| 6 | 6.62 | 11.50 | 1.12 | 2.88 |
| 8 | 8.62 | 13.75 | 1.38 | 3.25 |
| 10 | 10.75 | 17.00 | 1.62 | 4.75 |
| 12 | 12.75 | 19.25 | 1.88 | 4.75 |
| 14 | 14.00 | 20.75 | 2.00 | 4.75 |
| 16 | 16.00 | 23.75 | 2.25 | 5.00 |
| 18 | 18.00 | 25.75 | 2.50 | 5.25 |
| 20 | 20.00 | 28.50 | 2.75 | 5.00 |
| 24 | 24.00 | 33.00 | 3.25 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Oval ring-joint dimensions shall be in accordance with ASME B16.20, except $T_h = T + t$ where T is the ring height specified in ASME B16.20.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

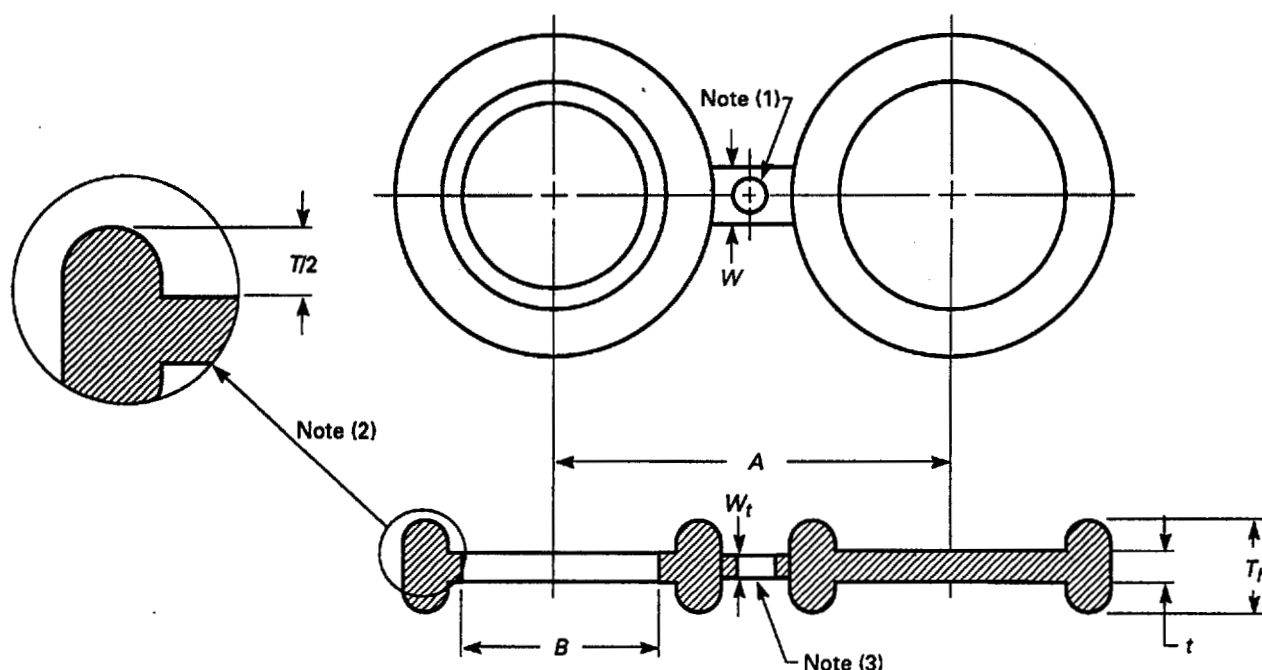


**TABLE 17 DIMENSIONS OF CLASS 900 MALE OVAL RING-JOINT FACING
FIGURE 8 BLANKS**

| NPS | Inside Diameter B, in. | Centerline Dimension A, in. | Thickness t, in. | Web Width W, in. |
|-------|------------------------------|-----------------------------------|---------------------|---------------------|
| 1/2 | 0.84 | 3.25 | 0.38 | 1.50 |
| 3/4 | 1.05 | 3.50 | 0.38 | 1.75 |
| 1 | 1.32 | 4.00 | 0.38 | 2.00 |
| 1 1/4 | 1.66 | 4.38 | 0.50 | 2.12 |
| 1 1/2 | 1.90 | 4.88 | 0.50 | 2.12 |
| 2 | 2.38 | 6.50 | 0.62 | 2.00 |
| 2 1/2 | 2.88 | 7.50 | 0.75 | 2.12 |
| 3 | 3.50 | 7.50 | 0.75 | 2.62 |
| 4 | 4.50 | 9.25 | 1.00 | 2.88 |
| 5 | 5.56 | 11.00 | 1.12 | 2.88 |
| 6 | 6.62 | 12.50 | 1.25 | 2.88 |
| 8 | 8.62 | 15.50 | 1.62 | 3.12 |
| 10 | 10.75 | 18.50 | 1.88 | 4.75 |
| 12 | 12.75 | 21.00 | 2.25 | 4.75 |
| 14 | 14.00 | 22.00 | 2.38 | 4.75 |
| 16 | 16.00 | 24.25 | 2.75 | 5.00 |
| 18 | 18.00 | 27.00 | 3.00 | 5.25 |
| 20 | 20.00 | 29.50 | 3.38 | 5.00 |
| 24 | 24.00 | 35.50 | 3.88 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Oval ring-joint dimensions shall be in accordance with ASME B16.20, except $T_h = T + t$ where T is the ring height specified in ASME B16.20.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

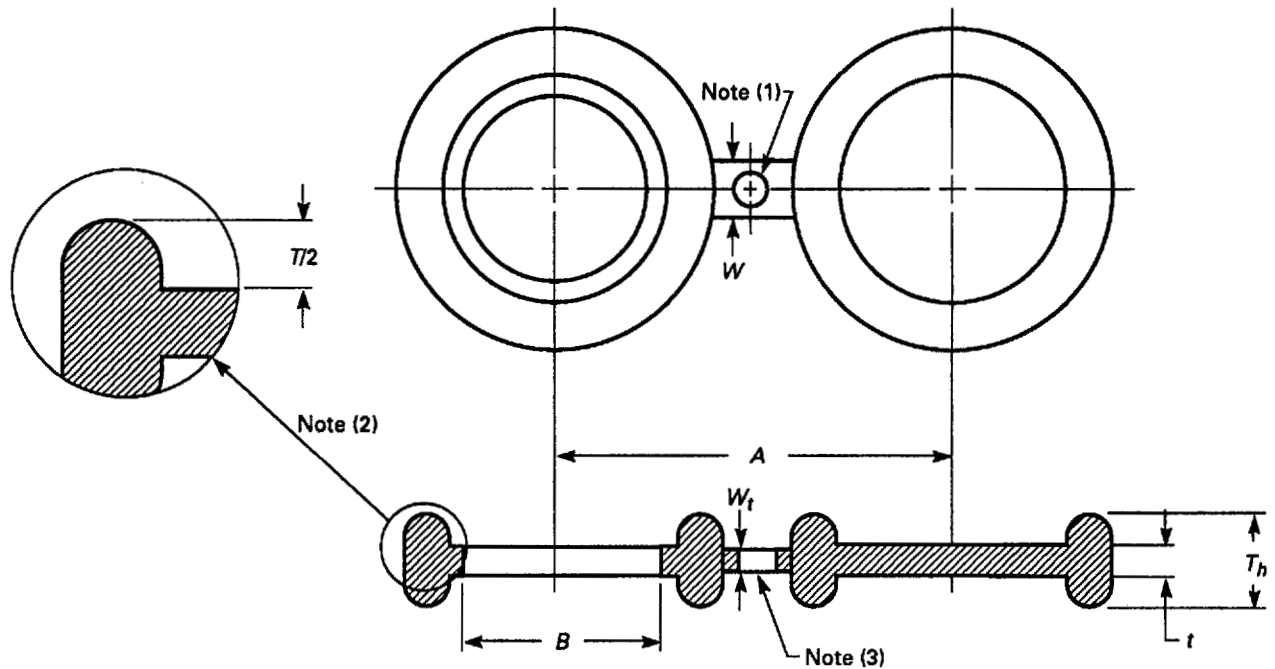


**TABLE 18 DIMENSIONS OF CLASS 1500 MALE OVAL RING-JOINT
FACING FIGURE 8 BLANKS**

| NPS | Inside Diameter B, in. | Centerline Dimension A, in. | Thickness t, in. | Web Width W, in. |
|-------|------------------------------|-----------------------------------|---------------------|---------------------|
| 1/2 | 0.84 | 3.25 | 0.38 | 1.50 |
| 3/4 | 1.05 | 3.50 | 0.38 | 1.75 |
| 1 | 1.32 | 4.00 | 0.50 | 2.12 |
| 1 1/4 | 1.66 | 4.38 | 0.50 | 2.12 |
| 1 1/2 | 1.90 | 4.88 | 0.62 | 2.25 |
| 2 | 2.38 | 6.50 | 0.75 | 2.12 |
| 2 1/2 | 2.88 | 7.50 | 0.88 | 2.25 |
| 3 | 3.50 | 8.00 | 1.12 | 2.88 |
| 4 | 4.50 | 9.50 | 1.25 | 3.00 |
| 5 | 5.56 | 11.50 | 1.50 | 3.00 |
| 6 | 6.62 | 12.50 | 1.62 | 3.12 |
| 8 | 8.62 | 15.50 | 2.00 | 3.38 |
| 10 | 10.75 | 19.00 | 2.50 | 5.25 |
| 12 | 12.75 | 22.50 | 2.88 | 5.25 |
| 14 | 14.00 | 25.00 | 3.12 | 5.50 |
| 16 | 16.00 | 27.75 | 3.50 | 5.75 |
| 18 | 18.00 | 30.50 | 3.88 | 6.00 |
| 20 | 20.00 | 32.75 | 4.25 | 6.50 |
| 24 | 24.00 | 39.00 | 5.00 | 7.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Oval ring-joint dimensions shall be in accordance with ASME B16.20, except $T_h = T + t$ where T is the ring height specified in ASME B16.20.
- (3) The thickness of the web (or tie bar) dimension W , shall be 0.25 in. minimum (see para. 3.1).



**TABLE 19 DIMENSIONS OF CLASS 2500 MALE OVAL RING-JOINT
FACING FIGURE 8 BLANKS**

| NPS | Inside Diameter B , in. | Centerline Dimension A , in. | Thickness t , in. | Web Width W , in. |
|----------------|---------------------------------|--------------------------------------|------------------------|------------------------|
| $\frac{1}{2}$ | 0.84 | 3.50 | 0.50 | 1.62 |
| $\frac{3}{4}$ | 1.05 | 3.75 | 0.62 | 1.88 |
| 1 | 1.32 | 4.25 | 0.62 | 2.12 |
| $1\frac{1}{4}$ | 1.66 | 5.12 | 0.75 | 2.12 |
| $1\frac{1}{2}$ | 1.90 | 5.75 | 0.88 | 2.38 |
| 2 | 2.38 | 6.75 | 1.00 | 2.25 |
| $2\frac{1}{2}$ | 2.88 | 7.75 | 1.12 | 2.38 |
| 3 | 3.50 | 9.00 | 1.25 | 3.00 |
| 4 | 4.50 | 10.75 | 1.50 | 3.25 |
| 5 | 5.56 | 12.75 | 1.88 | 3.50 |
| 6 | 6.62 | 14.50 | 2.25 | 3.75 |
| 8 | 8.62 | 17.25 | 2.75 | 3.75 |
| 10 | 10.75 | 21.25 | 3.25 | 3.75 |
| 12 | 12.75 | 24.38 | 3.88 | 6.00 |

NOTES:

- (1) Hole size (where required due to bolt spacing) shall be the same as the flange bolt hole, and located such that it will not interfere with bolting between two flanges.
- (2) Oval ring-joint dimensions shall be in accordance with ASME B16.20, except $T_h = T + t$ where T is the ring height specified in ASME B16.20.
- (3) The thickness of the web (or tie bar) dimension W_t shall be 0.25 in. minimum (see para. 3.1).

ANNEX A

REFERENCES

(This Annex is an integral part of ASME B16.48-1997 and is placed after the main text for convenience.)

The following is a list of standards and specifications referenced in this Standard showing the year of approval. Products covered by each ASTM specification are listed for convenience. (See specifications for exact titles and detailed contents.)

ASME Publications (Approved as American National Standards)

| | |
|----------------------|--|
| ANSI/ASME B46.1-1985 | Surface Texture (Surface Roughness, Waviness, and Lay) |
| ASME B16.5-1996 | Pipe Flanges and Flanged Fittings |
| ASME B16.20-1993 | Metallic Gaskets for Pipe Flanges — Ring-Joint, Spiral-Wound, and Jacketed |

ASTM Publications

| | |
|----------------|--|
| ASTM A 105-95b | Forgings, Carbon Steel, for Piping Components |
| ASTM A 182-95c | Forged or Rolled Alloy Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High Temperature Service |
| ASTM A 204-93 | Pressure Vessel Plates, Alloy Steel, Molybdenum |
| ASTM A 216-93 | Steel Castings, Carbon Suitable for Fusion Welding for High Temperature Service |
| ASTM A 217-93 | Steel Castings, Martensitic Stainless and Alloy, for Pressure Containing Parts, Suitable for High Pressure Service |
| ASTM A 240-95b | Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels |
| ASTM A 351-94a | Steel Castings, Austenitic, Austenitic-Ferritic (Duplex) for High Temperature Service |
| ASTM A 387-92 | Pressure Vessel Plates, Alloy Steel, Chromium-Molybdenum |
| ASTM A 515-94 | Pressure Vessel Plates, Carbon Steel, for Intermediate and Higher Temperature Service |
| ASTM A 516-90 | Pressure Vessel Plates, Carbon Steel, for Moderate and Lower Temperature Service |
| ASTM A 537-93 | Pressure Vessel Plates, Heat Treated, Carbon-Manganese-Silicon Steel |

International Organization for Standardization (ISO)

| | |
|------------------|--|
| ISO 9000-1: 1994 | Quality Management and Quality Assurance Standards — Part 1: Guidelines for Selection and Use |
| ISO 9000-2: 1993 | Quality Management and Quality Assurance Standards — Part 2: Generic Guidelines for the Application of ISO 9001, ISO 9002, and ISO 9003 |
| ISO 9000-3: 1991 | Quality Management and Quality Assurance Standards — Part 3: Guidelines for the Application of ISO 9001 to the Development, Supply and Maintenance of Software |
| ISO 9001: 1994 | Quality Systems — Model for Quality Assurance in Design, Development, Production, Installation, and Servicing |
| ISO 9002: 1994 | Quality Systems — Model for Quality Assurance in Production and Servicing |
| ISO 9003: 1994 | Quality Systems — Model for Quality Assurance in Final Inspection and Test |

Publications of the following organizations appear in the above list:

| | |
|------|---|
| ASQC | American Society for Quality Control P.O. Box 3005 Milwaukee, WI 53201 (see Annex B, footnote 1). |
| ASME | The American Society of Mechanical Engineers 345 East 47th Street, New York, New York 10017 ASME Order Department 22 Law Drive, Box 2300, Fairfield, New Jersey 07007 |
| ASTM | American Society for Testing and Materials 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428 |

ISO documents are available from ANSI. Publications appearing above which have been approved as American National Standards may also be obtained from ANSI.

| | |
|------|--|
| ANSI | American National Standards Institute 11 West 42nd Street, New York, New York 10036 |
|------|--|

ANNEX B

QUALITY SYSTEM PROGRAM

(This nonmandatory Annex is a part of ASME B16.48-1997 and is placed after the main text for convenience.)

The products manufactured in accordance with this Standard shall be produced under a quality system program following the principles of an appropriate standard from the ISO 9000 series.¹ A determination of the need for registration and/or certification of the product manufacturer's quality system program by an independent organization shall be the responsibility of the manufacturer. The detailed documentation demonstrating program compliance shall be available to the purchaser at the manufacturer's facility. A written summary description of the program utilized by the product manufacturer shall be available to the purchaser upon request. The product manufacturer is defined as the entity whose name or trademark appears on the product in accordance with the marking or identification requirements of this Standard.

¹ The series is also available from the American National Standards Institute (ANSI) and the American Society for Quality Control (ASQC) as American National Standards that are identified by a prefix "Q" replacing the prefix "ISO". Each standard of the series is listed under Annex A.

AMERICAN NATIONAL STANDARDS FOR PIPING, PIPE FLANGES, FITTINGS, AND VALVES

| | |
|--|---------------------|
| Scheme for the Identification of Piping Systems | A13.1-1996 |
| Pipe Threads, General Purpose (Inch) | B1.20.1-1983(R1992) |
| Dryseal Pipe Threads (Inch) | B1.20.3-1976(R1991) |
| Cast Iron Pipe Flanges and Flanged Fittings | B16.1-1989 |
| Malleable Iron Threaded Fittings | B16.3-1992 |
| Gray Iron Threaded Fittings | B16.4-1992 |
| Pipe Flanges and Flanged Fittings (NPS ½ Through NPS 24) | B16.5-1996 |
| Factory-Made Wrought Steel Buttwelding Fittings | B16.9-1993 |
| Face-to-Face and End-to-End Dimensions of Valves | B16.10-1992 |
| Forged Fittings, Socket-Welding and Threaded | B16.11-1996 |
| Cast Iron Threaded Drainage Fittings | B16.12-1991 |
| Ferrous Pipe Plugs, Bushings, and Locknuts with Pipe Threads | B16.14-1991 |
| Cast Bronze Threaded Fittings, Classes 125 and 250 | B16.15-1985(R1994) |
| Cast Copper Alloy Solder Joint Pressure Fittings | B16.18-1984(R1994) |
| Metallic Gaskets for Pipe Flanges — Ring-Joint, Spiral-Wound, and Jacketed | B16.20-1993 |
| Nonmetallic Flat Gaskets for Pipe Flanges | B16.21-1992 |
| Wrought Copper and Copper Alloy Solder Joint Pressure Fittings | B16.22-1995 |
| Cast Copper Alloy Solder Joint Drainage Fittings — DWV | B16.23-1992 |
| Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500, and 2500 | B16.24-1991 |
| Buttwelding Ends | B16.25-1992 |
| Cast Copper Alloy Fittings for Flared Copper Tubes | B16.26-1988 |
| Wrought Steel Buttwelding Short Radius Elbows and Returns | B16.28-1994 |
| Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings — DWV | B16.29-1994 |
| Cast Copper Alloy Solder Joint Fittings for Solvent Drainage Systems | B16.32-1992 |
| Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 psig (Sizes ½ Through 2) | B16.33-1990 |
| Valves — Flanged, Threaded, and Welding End | B16.34-1996 |
| Orifice Flanges | B16.36-1996 |
| Large Metallic Valves for Gas Distribution (Manually Operated, NPS 2½ to 12, 125 psig Maximum) | B16.38-1985(R1994) |
| Malleable Iron Threaded Pipe Unions | B16.39-1986(R1994) |
| Manually Operated Thermoplastic Gas Shutoffs and Valves in Gas Distribution Systems | B16.40-1985(R1994) |
| Functional Qualification Requirements for Power Operated Active Valve Assemblies for Nuclear Power Plants | B16.41-1983(R1989) |
| Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300 | B16.42-1987 |
| Manually Operated Metallic Gas Valves for Use in House Piping Systems | B16.44-1995 |
| Cast Iron Fittings for Solvent® Drainage Systems | B16.45-1987 |
| Large Diameter Steel Flanges (NPS 26 Through NPS 60) | B16.47-1996 |
| Steel Line Blanks | B16.48-1997 |
| Power Piping | B31.1-1995 |
| Fuel Gas Piping (not an ANSI standard) | B31.2-1968 |
| Process Piping | B31.3-1996 |
| Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids | B31.4-1992 |
| Refrigeration Piping | B31.5-1992 |
| Gas Transmission and Distribution Piping Systems | B31.8-1995 |
| Building Services Piping | B31.9-1988 |
| Slurry Transportation Piping Systems | B31.11-1989 |
| Manual for Determining the Remaining Strength of Corroded Pipelines | B31G-1991 |
| Welded and Seamless Wrought Steel Pipe | B36.10M-1995 |
| Stainless Steel Pipe | B36.19M-1985(R1994) |
| Self-Operated and Power-Operated Safety-Related Valves Functional Specification Standard | N278.1-1975(R1992) |

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