

Steel Line Blanks

API STANDARD 590
FIRST EDITION, MARCH 1985
REAFFIRMED, MAY 1995

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005



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Refining Department

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FOREWORD

This standard is a purchase specification for steel line blanks intended for installation between flanges conforming to ANSI B16.5 dimensions.

Suggested revisions are invited and should be submitted to the director of the Refining Department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

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NOTES TO PURCHASER

1. If the purchaser needs a steel line blank that deviates from this standard, the deviating requirements shall be stated in the purchase order.
2. If no exceptions are to be taken to this standard, the purchase order need only make reference to API Standard 590 and specify the items marked with an asterisk (*) in the following list. Other items listed are options that may also be specified if required.
 - *a. Size (see 1.1).
 - *b. Class (see 2.2).
 - *c. Facing (see 3.3).
 - *d. Style (see 1.2).
 - *e. Plate material (see Section 5).
 - f. Inside diameter (see 4.2).
 - g. Lifting or handling device (see 3.1.2).

Steel Line Blanks

SECTION 1—GENERAL

1.1 Scope

This standard provides dimensions for operating line blanks (or "blinds") in sizes NPS ½ through NPS 24 for installation between ANSI B16.5 flanges in the 150, 300, 600, 900, 1500, and 2500 pound pressure classes. The dimensions are suitable for blanks made of ten different steel plate materials. Line blanks used only for pressure testing are not part of this standard.

1.2 Definitions

1.2.1 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 Figure 1).

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

1.2.3 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 Figure 1).

1.3 Referenced Publications

The latest edition or revision of the following standards or specifications shall, to the extent specified in this standard, form a part of this standard.

ANSI¹/ASME²

- B16.5 *Pipe Flanges and Flanged Fittings*
- B16.20 *Ring-Joint Gaskets and Grooves for Steel Pipe Flanges*
- B16.34 *Valves, Flanged and Butt welding End*
- B31.3 *Chemical Plant and Petroleum Refinery Piping*

ANSI

- B46.1 *Surface Texture*

ASTM³

- A 204 *Pressure Vessel Plates, Alloy Steel, Molybdenum*

- A 240 *Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels*
- A 387 *Pressure Vessel Plates, Alloy Steel, Chromium-Molybdenum*
- A 515 *Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service*
- A 516 *Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service*

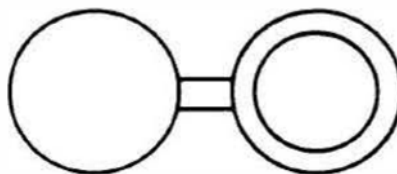
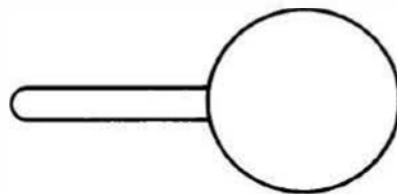
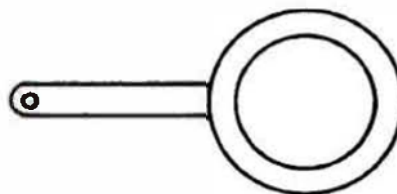


FIGURE 8 BLANK



PADDLE BLANK



PADDLE SPACER

Figure 1—Steel Line Blanks



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SECTION 2—RATINGS

2.1 Pressure-Temperature Ratings

Pressure-temperature ratings are those listed in ANSI B16.5 and B16.34 standard class for the material group corresponding to the plate materials.

2.2 ANSI Class

Line blanks covered by this standard are for the following ANSI classes: 150, 300, 600, 900, 1500, and 2500.

SECTION 3—DESIGN

3.1 Handle

3.1.1 The handle or web (tie-bar) may be integral or attached to the line blank or spacer by welding. Any weld shall be capable of supporting the weight of the blank or spacer in all orientations and shall meet the visual inspection requirements of ANSI/ASME B31.3.

3.1.2 When a lifting or handling device is deemed necessary by the purchaser, the purchaser shall provide the necessary details to the supplier.

3.2 Edge Preparation

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

3.3 Facing

3.3.1 RAISED FACE JOINT BLANKS

A raised face may be specified at the option of the purchaser.

The gasket seating surface finish and dimensions for raised face line blanks shall be in accordance with ANSI B16.5. The height of the raised faces shall be in addition to the thicknesses listed in Tables 2 through 19.

3.3.2 FEMALE RING-JOINT BLANKS

Female ring-joint grooves shall be shaped for octagonal rings with the groove side wall surface finish not rougher than 63 microinches AARH. Roughness shall be determined in accordance with ANSI B46.1.

3.3.3 MALE RING-JOINT BLANKS

The gasket shape (ring) for male ring-joint blanks shall be oval unless an octagonal ring is specified in the purchase order. Surface finish on the sealing surface shall not be rougher than 63 microinches AARH. Roughness shall be determined in accordance with ANSI B46.1.

SECTION 4—DIMENSIONS

4.1 General

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

4.1.2 Dimensional tolerances shall be established by the manufacturer but shall not exceed ANSI B16.5 tolerances for similar aspects.

4.1.3 Line blank thickness is designed in accordance with ANSI/ASME B31.3.

4.2 Openings

4.2.1 For NPS $\frac{1}{2}$, $\frac{3}{4}$, and 1 in all raised face classes, the

inside diameter is equal to standard weight weld neck flange bore.

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

4.2.3 For NPS $1\frac{1}{4}$ and larger in Class 600 and 900 raised face, the inside diameter is equal to Schedule 10S weld neck flange bore.

4.2.4 For Class 1500 raised face, the inside diameter is equal to Schedule 40 weld neck flange bore.

4.2.5 For Class 2500 raised face, the inside diameter is