

MSS SP-43-2013

**Wrought and Fabricated
Butt-Welding Fittings
for Low Pressure,
Corrosion Resistant
Applications**

Standard Practice
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Substantive changes in this 2013 edition are "flagged" by parallel bars as shown on the margins of this paragraph. The specific detail of the change may be determined by comparing the material flagged with that in the previous edition.

Non-toleranced dimensions in this Standard Practice are nominal unless otherwise specified.

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| FOREWORD |

ASME B16.9 is the American Standard for steel butt-welding fittings and although not so stated, it is implied that its scope deals primarily with the schedules of wall thicknesses which are common to carbon steel and the grades of alloy steel piping that are selected for pressure and temperature considerations.

The rapid expansion of the process industries in the field of chemicals, plastics, textiles, etc., has created a demand for a class of pipe referred to as stainless piping, using this word in its generic sense. This field employs the use of the austenitic stainless steels and also nickel and its related alloys. This stainless piping is used with resistance to corrosion, elimination of product contamination, or combination of the two as the principle reason for material selection. Pressure is seldom, if ever, a critical consideration.

When pressure is a consideration, reference is made to ASME B16.9.

Mechanical strength, resistance to vacuum, and economy, are the most usual criteria in the selection of pipe thickness in this field, and for this reason the wall thicknesses employed in the field of corrosion resistant pipe are lighter than those in common usage with carbon steel piping.

In 1949, the American Standards Association, now known as the American National Standards Institute or ANSI, approved B36.19, Stainless Steel Pipe, as an American Standard. The B36.19 standard was developed by the B36 Standards Committee, which included MSS as a participant. In this American Standard, a schedule of wall thickness was established and designated as Schedule 10S. Numerous companies were also using a wall thickness lighter than Schedule 10S for services where contamination rather than corrosion was the prime consideration. These lighter wall thicknesses were designated Schedule 5S and the original 1950 edition of MSS SP-43 established a series of Schedule 5S fittings. The 5S thicknesses were published in SP-43 and were developed in cooperation with representatives of the various principal chemical companies and processing industries. In 1952, the B36.19 Stainless Steel Pipe Standard was revised to recognize the Schedule 5S wall thickness pipe as an American Standard. MSS and the ASA endorsed this inclusion.

The purpose of this Standard Practice is to provide industry with a set of dimensional standards for butt-welding fittings that can be used with these light wall pipes of corrosion resisting materials. The center-to-end dimensions of all fittings are identical with those in ASME B16.9, which give to industry the advantage of uniform design room practice and a maximum utilization of existing die equipment. The only departure from this is in the lap-joint stub end, where for purposes of economy, the face-to-end of the product has been reduced for use with thin wall piping.

The advantage of longer center-to-end dimensions of size 3/4 elbows resulted in a change to the tables that would permit a gradual changeover; thus providing manufacturers ample time to deplete existing stock, re-tool, and replenish their stock.

The 1991 revision of SP-43 involved the deletion of metric equivalents.

The 2001 Reaffirmation had no technical changes. There were minor editorial changes. The precedence of the longer dimensions for 3/4 elbows was made in accordance with ASME B16.9. Referenced standards were brought up to date. The title of 180 degree returns was clarified.

In the 2008 edition, a minimal pressure rating was established to correspond with the ASTM CR designation.

The 2013 edition was revised to include a new section on welding, a revision of Table 1 to include angularity tolerances, a revision of Section 6.1 to update AISI/SAE fitting grade types, data corrections were made to Tables 4, 5, and 6, referenced standards in Annex A were updated, and numerous formatting and editorial corrections were made. In addition, the drawings for Section 10 and 11, and Tables 2, 3, and 5 have been redone in this current revision although not "flagged" given there were no substantive changes. Note that various Table corrections contained within an Errata Sheet issued in 2010 were also incorporated.

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**WROUGHT AND FABRICATED BUTT-WELDING FITTINGS
FOR LOW PRESSURE, CORROSION RESISTANT APPLICATIONS**

1. **SCOPE**

1.1 This Standard Practice provides dimensions, tolerances, and markings for butt-welding fittings for low pressure, corrosion resistant applications.

1.2 This Standard Practice covers only fittings made for use with Schedule 5S or 10S pipe, for all Nominal Pipe Sizes (NPS) listed in ASME B36.19M, except that short pattern stub ends suitable for use with Schedule 40S are also shown.

2. **REFERENCES**

2.1 External standards incorporated by reference in this Standard Practice are shown in Annex A for convenience of identifying edition number, date, and source of supply.

3. **PRESSURE RATINGS**

3.1 Fittings covered by this Standard Practice are not pressure rated; however, they must be capable of withstanding 30% of the allowable pressure rating of the pipe with which they are marked.

3.2 For fittings that are of the same pressure rating as the matching pipe, refer to ASME B16.9.

4. **SIZE**

4.1 The size of the fittings in Tables 1 through 6 are identified by the corresponding NPS.

5. **MARKING**

5.1 Each fitting shall be marked as per SP-25 to show the following:

- a) Manufacturer's name or trademark
- b) "CR" followed by the material identification symbol established for the respective grade in the appropriate ASTM specifications or AISI/SAE designations

- c) Manufacturer's heat identification number
- d) Schedule number or nominal wall thickness designation
- e) Size

5.2 Where the size of the fittings does not permit complete marking, Sections 5.1 (a) and (c) are mandatory. The other marking and identification marks may be omitted in the sequence, as specified in MSS SP-25.

5.3 The required markings shall be made by any suitable method that is not injurious to the fitting.

6. **MATERIALS**

6.1 Fittings made from AISI/SAE Grade Types 304, 304L, 310, 316, 316L, 317, 317L, 321, and 347 are considered standard designations under this Standard Practice. Fittings made from other corrosion resistant material, including nonferrous materials, are acceptable by agreement between the purchaser and the manufacturer provided they meet the requirements of a recognized and applicable AISI/SAE grade designation or ASTM specification.

7. **METAL THICKNESS**

7.1 As these fittings are to match pipe, the dimensions of the welding ends must conform to established pipe standards, with regard to outside diameters and tolerances. The nominal wall thickness of the fittings shall be the same as the pipe to which it is welded; except that fittings with heavier walls may be butt-welded to lighter wall pipe, provided the heavier wall is tapered on the inside or outside to match the dimensions of the lighter pipe.