Factory-Made Wrought Belled End Pipe Fittings for Socket-Welding

Standard Practice
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This MSS Standard Practice was developed under the consensus of the MSS Technical Committee 113 and the MSS Coordinating Committee. The content of this Standard Practice is the result of the efforts of competent and concerned volunteers to provide an effective, clear, and non-exclusive specification that will benefit the industry as a whole. This MSS Standard Practice is intended as a basis for common practice by the manufacturer, the user, and the general public. The existence of an MSS Standard Practice does not in itself preclude the manufacture, sale, or use of products not conforming to the Standard Practice. Mandatory conformance is established only by reference in a code, specification, sales contract, or public law, as applicable.

"Unless otherwise specifically noted in this MSS Standard Practice, other standards referred to herein are identified by the date of issue that was applicable to this Standard Practice at the date of issue of this Standard Practice. See Annex A. This Standard Practice shall remain silent on the applicability of those other standards of prior or subsequent dates of issue even though applicable provisions may not have changed. References contained herein which are bibliographic in nature are noted as 'supplemental' in the text."

In this Standard Practice all notes, annexes, tables, and figures are construed to be essential to the understanding of the message of the Standard Practice, and are considered part of the text unless noted as "supplemental". All appendices, if included, that appear in this document are construed as "supplemental". Supplemental information does not include mandatory requirements for this Standard Practice.

U.S. customary units in this Standard Practice are the standard; (SI) metric units are for reference only.

This document has been substantially revised from the previous 1996 and 2003 editions. It is suggested that if the user is interested in knowing what changes have been made, that direct page by page comparison should be made of this document.

Originally Approved: November 1996
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Current Edition Published: September 2010

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 standard (Schedule 40) wall and heavier as it was developed for carbon steel and those grades of alloy steel piping that are selected for pressure and temperature considerations. In 1949 ASME approved standard B36.19 for Stainless Steel Pipe in which Schedule 10S was established. Schedule 5S pipe was recognized in the 1952 publication of B36.19. The companion fittings for Schedule 10S pipe used B16.9 shapes and proportions and were standardized by MSS SP-43, which was first published in 1950. In anticipation, the original 1950 edition of MSS SP-43 also standardized Schedule 5S fittings.

Since 1950 the use of lighter than standard wall stainless steel piping in new construction has become predominant. The reasons for this evolution include the rapid expansion of the process industries in the fields of chemicals, plastics, textiles, paper, etc.

Coincident with the greater utilization of light wall pipe and of more capable metal forming machinery, the need to reduce pipe assembly fabrication times brought about by world market competition led to the development of belled end socket welding fittings. As with the development of MSS SP-43, the shapes and proportions for B16.9 were reused for the belled end fitting bodies to the maximum extent possible.

In 1992 first work on belled end fittings for this Standard Practice included defining socket proportions, socket to fitting body transition geometry, fitting thickness, and determining the ability of U.S. industry to support manufacturing. Some of this work only standardized service proven relationships used in belled end fittings made for the pulp and paper industry without standards for over 20 years. In 1994 the U.S. Navy funded burst and fatigue testing prototype fittings in the first of a two-phase program. The second phase was for an increased thickness fitting and was never done. In 1995 mid-way through testing, the Navy directed that these belled end fittings be used on ship systems in new construction followed shortly thereafter by direction to use them on the repair of ship systems. The quality and configuration control of these fittings was done by an interim document, the requirements of which, with some improvements, are contained herein.

In keeping with trends wherein military procurement activities have been using more commercial material standards and because of recognized fabrication economies related to the use of these fittings, the U.S. Navy sponsored the writing of the 1996 edition of this Standard Practice in cooperation with fitting manufacturers.

This Standard Practice established dimensional uniformity for light wall belled end socket welding fitting designs qualified by burst and fatigue testing for Military Service and qualified by burst testing for Commercial Code Practice.

The most significant changes in the 2003 revision included the following: 1) A new definition for allowable pressure ratings for MP fittings (Section 6), which adopts the B16.9 format rating the fitting the same as the connecting pipe of the same schedule; 2) The addition of titanium and aluminum fitting materials; and 3) The addition of the Supplementary Requirements (Section 18, now 17), which supports Navy special requirements.

The most significant changes in this 2010 revision include the following: 1) The extension of the SCOPE to include heavier wall fittings; 2) The relocation of the CR fitting requirements from the body of the Standard Practice to that of a Supplementary Requirement; 3) The addition of all the combinations of reducing fittings included in B16.9; and, 4) The addition of a reference line on the socket end to enable inspectors to measure the installation weld length – as a Supplementary Requirement. The title of this 2010 revised Standard Practice has also been amended.

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"The Technical Voice of the Industry for Over 94 Years"

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November 21, 2018

ERRATA SHEET FOR MSS SP-119
(Factory-Made Wrought Belled End Pipe Fittings for Socket-Welding)
(Errata Sheet 1 for 2003 and Errata Sheet 2 for 2010 Edition)

These "normative" errata corrections and clarifications apply to **MSS SP-119-2010, *Factory-Made Wrought Belled End Pipe Fittings for Socket-Welding*** as Errata Sheet 2 and **MSS SP-119-2003, *Factory-Made Wrought Belled End Socket-Welding Fittings*** as Errata Sheet 1.

NOTE THE FOLLOWING CORRECTIONS AND/OR CLARIFICATIONS:

Current 2010 Edition (Errata Sheet 2)

General Clarification. The tolerance dimensions that are stated in MSS SP-119-2010 are the limit dimensions for manufactures and there is no rounding applied. The accuracy level of the dimensions and tolerances for the manufacturing of product, as stated, are to be the same degree of accuracy for measurements.

For inspection (acceptance/rejection) purposes only, an inspector should match the accuracy level of the equipment used and/or measurement taken with the specification and/or tolerance that is indicated within SP-119-2010; thus, standard or common rounding (half up) should be utilized if necessary to achieve a measurement reading with the same degree of accuracy as the standard and then decide based on that final value. In addition, for inspection (acceptance/rejection) purposes, no trailing zeros shall be assumed as that affects the standardized and implied degree of accuracy to be imposed by the inspector and the measuring device used.

Previous 2003 Edition (Errata Sheet 1)

Page 12, Table 3 (*Socket Dimensions*), Column C (CuNi Class 200) and Column C (All Other Materials). In both "C" Columns, delete all the existing zeros located as the third digit to the right of the decimal. For example, correct the current text "0.570" to "0.57".

General Clarification. The tolerance dimensions that are stated in MSS SP-119-2003 are the limit dimensions for manufactures and there is no rounding applied. The accuracy level of the dimensions and tolerances for the manufacturing of product, as stated, are to be the same degree of accuracy for measurements.

For inspection (acceptance/rejection) purposes ONLY, an inspector should match the accuracy level of the equipment used and/or measurement taken with the specification and/or tolerance that is indicated within SP-119-2003; thus, standard or common rounding (half up) should be utilized if necessary to achieve a measurement reading with the same degree of accuracy as the standard and then decide based on that final value. In addition, for inspection (acceptance/rejection) purposes, no trailing zeros shall be assumed as that affects the standardized and implied degree of accuracy to be imposed by the inspector and the measuring device used.

This Errata Sheet has been inserted into the 2003 and 2010 editions of the Standard Practice. For those who obtained the Standard Practice before the November 21, 2018 errata publication date indicated above or otherwise do not already have this information, please include this Errata Sheet within your existing 2010 and/or previous 2003 edition(s) of the Standard Practice. Future editions of this Standard Practice will include this corrected information.

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ERRATA SHEET FOR MSS SP-119-2010

(*Factory-Made Wrought Belted End Pipe Fittings for Socket-Welding)*

June 4, 2014

These "normative" errata corrections applies only to MSS SP-119-2010 edition (current).

NOTE THE FOLLOWING CORRECTIONS:

1. **Page 19, Table 9** (*Reducing Branch Tee Dimensions*). Correct "P" dimensions as follows:
   a. Size $2^1/_2$ x $2^1/_2$ x $1^1/_4$: Change to correctly read as "2.06". This is consistent with previous versions.
   b. Size $2^1/_2$ x $2^1/_2$ x $1^1/_2$: Change to correctly read as "2.07".
2. **Page 25, Table 15.** Change title of table to correctly read as "Cap Dimensions".
   Note that Table of Contents (page iii) is listed correctly.

This Errata Sheet has been inserted into the Standard Practice. For those who obtained the Standard Practice before the June 4, 2014 errata publication date indicated above or otherwise do not already have this information, please include this Errata Sheet within your existing 2010 edition of the Standard Practice.

Future editions of this Standard Practice will include this corrected information.

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FACTORY-MADE WROUGHT BELLED END PIPE FITTINGS FOR SOCKET-WELDING

1. SCOPE

1.1 ***General*** This Standard Practice covers the design and manufacturing requirements for factory-made wrought belled end pipe fittings for socket-welding formed from either tubular sections or flat material. Included are the overall dimensions, tolerances, materials, socket end details, heat treatment, marking and other requirements for belled end fittings in sizes NPS $^{1}/_{2}$ through 12. The requirements for these belled end fittings are stipulated into each of two pressure service classes:

1.1.1 Class MP for stainless steel fittings for use with ASTM A312 pipe; for titanium fittings for use with ASTM B861 or B862 pipe; and aluminum fittings for use with ASTM B241 pipe.

1.1.2 Class MARINE for copper nickel fittings for use with Military Specification MIL-T-16240 pipe or ASTM B466 or B467 pipe.

1.2 ***Partial Compliance Fittings*** This Standard Practice may be used to specify Partial Compliance (PC) fittings by agreement between the manufacturer and purchaser. Special considerations include, but are not limited to: dimensions; such as unlisted reducing tee outlet size combinations, or end shapes; such as a street end tee, or custom tolerances. When such fittings meet all other stipulations of this Standard Practice, they shall be considered as being in Partial Compliance herewith, provided they are appropriately marked (see Section 16).

1.3 ***Fitting Shapes and Types Not Covered*** This Standard Practice does not cover the design or construction of laterals, wyes, mitered elbows, tees of notch and point or saddle weld types, sweep elbows, sweep tees or any other fitting not described herein by sketch and table.

1.4 ***Service Conditions*** This Standard Practice does not cover the criteria for selection of fitting type or fitting materials suitable for a particular fluid type or service.

1.5 ***Installation Welding*** This Standard Practice does not cover installation-welding requirements. Installation welding shall be done in accordance with the applicable piping system into which the fittings are installed. Pipe joint weld geometry suggestions contained in Section 13 reflect the proportions used in the fatigue tests conducted on pipe pieces used to qualify these fittings for Navy service.

2. REFERENCES

2.1 ***General*** Standards and specifications adopted by reference in this Standard Practice are shown in Annex A, for the convenience of identifying edition number, date and source of supply.

3. DEFINITIONS

3.1 ***General*** Wrought Belled End Fittings for Socket Welding add the advantages of socket welding joints to ASME B16.9 shape butt-welding fittings. In this Standard Practice, "wrought" is used to denote fittings formed from tubular or flat starting materials as opposed to those, which are either forged or cast to their final shape or machined from forgings or castings.

3.2 ***CuNi*** CuNi is a notation representing copper-nickel alloy. The two most common alloys are 90/10 and 70/30. The most commonly used pipe specification is MIL-T-16420.

3.3 ***Electro-etching*** Electro-etching is an electro-chemical marking process, which consists of an electrical power unit that delivers current to a marking head. The marking head is covered with a pad that has