

MSS SP-75-2014

High-Strength, Wrought, Butt-Welding Fittings

Standard Practice
Developed and Approved by the
Manufacturers Standardization Society of the
Valve and Fittings Industry, Inc.
127 Park Street, NE
Vienna, Virginia 22180-4602
Phone: (703) 281-6613
Fax: (703) 281-6671
E-mail: standards@mss-hq.org



www.mss-hq.org

This MSS Standard Practice was developed under the consensus of the MSS Technical Committee 113 and the MSS Coordinating Committee. Input from the user community and the Regulatory body responsible for pipeline safety compliance was requested and the task group assigned to revising this Standard Practice had very important input from these groups in preparing this edition of SP-75. The content of this Standard Practice is the resulting efforts of competent and experienced volunteers to provide an effective, clear, and non-exclusive standard that will benefit the industry as a whole. This MSS Standard Practice describes minimal requirements and 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 to this Standard Practice is established only by reference in other documents such as a code, specification, sales contract, or public law, as applicable. MSS has no power, nor does it undertake, to enforce or certify compliance with this document. Any certification or other statement of compliance with the requirements of this Standard Practice shall not be attributable to MSS and is solely the responsibility of the certifier or maker of the statement.

“Unless indicated otherwise within this MSS Standard Practice, other standards documents referenced to herein are identified by the date of issue that was applicable to this Standard Practice at the date of approval of this MSS Standard Practice (see Annex A). This Standard Practice shall remain silent on the validity of those other standards of prior or subsequent dates of issue even though applicable provisions may not have changed.”

By publication of this Standard Practice, no position is taken with respect to the validity of any potential claim(s) or of any patent rights in connection therewith. MSS shall not be held responsible for identifying any patent rights. Users are expressly advised that determination of patent rights and the risk of infringement of such rights are entirely their responsibility.

In this Standard Practice, all text, notes, annexes, tables, figures, and references are construed to be essential to the understanding of the message of the standard, and are considered normative unless indicated as “supplemental”. All appendices, if included, that appear in this document are construed as “supplemental”. Note that supplemental information does not include mandatory requirements.

This Standard Practice has been substantially revised from the previous 2008 edition. 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 and that of the previous edition.

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

Excerpts of this Standard Practice may be quoted with permission. Credit lines should read ‘Extracted from MSS SP-75-2014 with permission of the publisher, Manufacturers Standardization Society of the Valve and Fittings Industry’. Reproduction and/or electronic transmission or dissemination is prohibited under copyright convention unless written permission is granted by the Manufacturers Standardization Society of the Valve and Fittings Industry Inc. All rights reserved.

Originally Approved: September 1970
Originally Published: November 1970
Current Edition Approved: April 2014
Current Edition Published: September 2014

MSS is a registered trademark of Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.

Copyright ©, 2014 by
Manufacturers Standardization Society
of the
Valve and Fittings Industry, Inc.
Printed in U.S.A.

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1 SCOPE	1
2 PRESSURE RATINGS	1
3 SIZE	2
4 DESIGN PROOF-TEST	2
5 HYDROSTATIC TESTING	3
6 MATERIALS	3
7 CHEMICAL COMPOSITION	3
8 TENSILE PROPERTIES	4
9 HEAT TREATMENT	5
10 TRANSVERSE GUIDED-WELD BEND-TESTS	5
11 NOTCH-TOUGHNESS PROPERTIES	6
12 FITTING DIMENSIONS	6
13 TOLERANCES FOR WELDING FITTINGS	6
14 MANUFACTURE	7
15 NONDESTRUCTIVE EXAMINATION (NDE)	8
16 INSPECTION	8
17 MARKING	9

TABLE

1 Maximum Limit of Chemical Elements	14
2 Tensile Requirements	14
3 Tolerances	15
4 Dimensions of Long-Radius Elbows	16
5 Dimensions of 3R Elbows	17
6 Dimensions of Straight Tees	18
7 Dimensions of Reducing Outlet Tees	19
8 Dimensions of Caps	22
9 Dimensions of Reducers	23

FIGURE

1 Recommended Bevel for Wall Thicknesses (T) at End of Fitting, 0.75 in. or Less	11
2 Recommended Bevel for Wall Thicknesses (T) at End of Fitting, Greater than 0.75 in.	11
3 Acceptable Design for Unequal Wall Thickness	12
4 Traverse Face and Root-Bend Test Specimens	12
5 Guided-Bend Test Jig	13
X2-1 Longitudinal-Bead Underbead Cracking Test Specimen	28

ANNEX

A Referenced Standards and Applicable Dates	25
---	----

APPENDIX

X1 Supplementary Requirements	26
X2 Longitudinal-Bead Underbead Cracking Test.....	28
X3 Recommendations for Segmenting	29

HIGH-STRENGTH, WROUGHT, BUTT-WELDING FITTINGS

1. SCOPE

1.1 This Standard Practice covers factory-made, seamless and electric welded carbon and low-alloy steel, butt-welding fittings for use in high pressure gas and oil transmission and distribution systems; including pipelines, compressor stations, metering and regulating stations, and mains.

1.2 This Standard Practice governs dimensions, tolerances, ratings, testing, materials, chemical and tensile properties, heat treatment, notch toughness properties, manufacture, inspection and marking for high-strength, butt-welding fittings NPS 60 and smaller. Dimensional requirements for NPS 14 and smaller are provided by reference to ASME B16.9.

1.3 The term “welding fittings” applies to butt-welding fittings such as elbows, segments of elbows, return bends, caps, tees, single or multiple-outlet extruded headers, reducers, and extensions and transition sections⁽¹⁾. Girth weld requirements are outside the scope of this Standard Practice and are covered by the applicable ASME B31 Code for Pressure Piping and/or customer specifications.

1.4 Fittings may be made to special dimensions, sizes, shapes, and tolerances, or of wrought materials other than those covered by this Standard Practice by agreement between the manufacturer and the purchaser. When such fittings meet all other stipulations of this Standard Practice they shall be considered as being in partial compliance therewith, providing they are appropriately marked.

1.4.1 Fittings manufactured in partial compliance, as provided in Section 1.4, shall be identified with “Part” following the respective grade designation.

NOTE: (1) Lengths of extensions and transitions as agreed upon by purchaser and manufacturer.

2. PRESSURE RATINGS

2.1 The allowable internal-pressure ratings for pipe fittings designed in accordance with this Standard Practice shall be calculated as for straight seamless pipe (or welded pipe with a joint efficiency factor of 1.0) of equivalent grade, diameter and wall thickness in accordance with the rules established in the applicable sections of ASME B31 Codes.

2.2 All fittings produced in accordance with this Standard Practice shall be designed to withstand a field hydrostatic test pressure, after installation, at a pressure level equivalent to that required to develop a hoop stress equal to the specified minimum yield strength for pipe of equivalent grade and wall thickness based on Barlow’s Formula, without failure, leakage, or impairment of serviceability. Barlow’s formula is defined as:

$$P = \frac{2St}{D}$$

Where:

P = internal design pressure, psig;

S = specified minimum yield strength of the pipe, psi;

t = nominal wall thickness of the pipe, inches;

D = outside diameter of the pipe, inches.

2.3 By agreement between the manufacturer and the purchaser, fittings may be tested at a higher pressure providing the manufacturer is notified of the test pressure to be used.

2.4 The design shall take into consideration performance requirements prescribed above as well as additional factors dictated by the shape of the part.

2.5 The design of fittings may be established by mathematical analyses contained in nationally recognized pressure vessel or piping codes or, at the manufacturer’s option, by proof testing in accordance with Section 4.