Class 3000 and 6000 Pipe Unions, Socket Welding and Threaded (Carbon Steel, Alloy Steel, Stainless Steels, and Nickel Alloys)

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

Since MSS 1924 ®

www.mss-hq.org

This MSS Standard Practice was developed under the consensus of the MSS Technical Committee 105 and the MSS Coordinating Committee. 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 referred 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 claims(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 2006 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.

Originally Approved/Published: September 1976
Current Edition Approved October 2014
Current Edition Published December 2014

FOREWORD

This Standard Practice was originally approved in 1976; providing coverage for Class 3000 Carbon Steel Unions primarily for use in high-pressure industrial, oil-field, and petrochemical industries. In 1987, austenitic stainless steel grades 304/304L and 316/316L were added for use in process chemical, pharmaceutical, power generation, and other industries where corrosion resistance was a major concern.

In 1995, socket-welding union dimensions for socket diameters, socket wall thicknesses, and union "water-way" bores were aligned to correspond with dimensions of the ASME B16.11 Class 3000 fittings specification. In the 2001 edition, the waterways of threaded unions were adapted to allow the use of the larger diameters of the drills used for NPT threading, which is in line with practices for threaded fittings use within the same piping systems. In 2006, the Standard Practice was essentially reaffirmed with minor editorial changes.

The 2014 revision represents a substantive revision for SP-83. The committee reviewed and confirmed the basis for the original pressure-temperature ratings contained in the Standard Practice and pressure-temperature tables were updated as a result. Based on formula, test, and field experience, coverage for numerous alloy steel, stainless steel and nickel alloy grades were added to the Standard Practice. In addition, on the same basis, dimensions, materials, and pressure-temperature ratings were added for the new inclusion of Class 6000 socket-welding and threaded unions. The revisions contained in this edition provide for a more robust and comprehensive standard for pipe unions, intended for commercial and industrial applications of a wide variety.

CAUTIONARY NOTES REGARDING INSTALLATION OF PIPE UNIONS

a) Leakage from a union can result when joining pipe ends which are poorly aligned.

b) Care should be taken to avoid placing unions in lines subject to live loads and bending loads, which may cause leakage.

c) Care should be taken to prevent damage to the seating surfaces.

d) Due consideration should be given to the possibility of shock pressure in the system.

e) Installation techniques or instructions are outside the scope of this Standard Practice.

NOTE: Union parts from different manufacturers are not functionally interchangeable and combining parts from different manufacturers is not recommended.

TABLE OF CONTENTS

CLASS 3000 AND 6000 PIPE UNIONS, SOCKET WELDING AND THREADED (CARBON STEEL, ALLOY STEEL, STAINLESS STEELS, AND NICKEL ALLOYS)

1. SCOPE

1.1 This Standard Practice establishes envelope and other essential dimensions, finish, tolerances, testing, marking, material, and minimum performance requirements for forged carbon steel, alloy steel, stainless steel, and nickel alloy pipe unions, socket welding and threaded ends.

2. PRESSURE RATINGS

2.1 These unions shall be designated as Class 3000 or Class 6000, socket welding or threaded and shall carry ratings shown in Table 4 for Class 3000 or Table 5 for Class 6000.

2.2 Class designations of these unions are correlated with ASME B36.10 Pipe Schedule Thicknesses as shown in Table 1.

TABLE 1
Correlation of Class Designation with Pipe Schedule

Class Designation of Union	Pipe Used in Wall Thickness Calculations [a]
3000	Schedule 80
6000	Schedule 160

NOTE: (a) This table is not intended to restrict the use of pipe of thinner or thicker wall with unions. The pipe actually used may be thinner or thicker in nominal wall than that shown in this table. The rating of the pipe, or the rating of the union as shown in Tables 4 or 5, whichever is less, may govern the rating of the system.

2.3 Since ASME B36.10 does not include Schedule 160 thickness for NPS 1/8, 1/4 and 3/8, the values in Table 2 shall be used as the nominal wall thicknesses of the pipe.

TABLE 2
Nominal Wall Thickness of Schedule 160 Pipe

NPS of Union	Schedule 160 Nominal Wall
1/8	0.124
1/4	0.145
3/8	0.158

3. SIZE

3.1 The size of the union is identified by the nominal pipe size (NPS).

4. DESCRIPTION

4.1 The complete union shall consist of three parts: male end, female end, and, nut. Equivalent terms are tabulated in Table 3.

TABLE 3
Terminology of Parts

Preferred Term	Equivalent Terms
Male	Male seat-end Tail Piece – Nut Piece – Coupling – Ball End
Female	Female seat-end Thread Piece – Body – Head – Cone End
Nut	Union Coupling Nut – Swivel – Ring

4.2 The seating surfaces of the joint shall be integral metal-to-metal, ball-to-cone design. Male and Female ends shall be machined with sockets for socket welding or threaded with internal NPT pipe threads. Male and Female ends and Nuts may be round, polygon, or modified polygon with rounded corners, at the option of the manufacturer. The length of the union ends shall be sufficient to provide a suitable wrenching surface.

5. MARKING

5.1 Each union part shall be permanently marked in accordance with MSS SP-25. The marking shall include (but is not limited to) the following:

a) Manufacturer's name or trademark.

b) Material grade identification - in accordance with the requirements of the applicable ASTM specifications listed in Tables 4 or 5.

Note: Multiple material markings shall be allowed as covered in ASTM material specifications listed in Tables 4 or 5.

c) Material lot or heat number for traceability.

d) Service designation: 3000 or 3M or 6000 or 6M (M to designate units of 1000).

e) The nominal pipe size.