Steel Pipeline Flanges
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This Standard Practice has been substantially revised from the previous 2010 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.

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FOREWORD

The Manufacturers Standardization Society originally developed this Standard Practice in response to the continued requests for steel pipe flanges for pipeline use, particularly in sizes larger than those covered by ANSI Standard B16.5 on Steel Pipe Flanges and Flanged Fittings. The line pipe is uniquely characterized by high-strength, cold worked, thin-wall of the carbon steel grade, which necessitates special considerations for the welding end of the flanges.

The size and pressure class range was originally NPS 26 through NPS 36 in pressure classes customarily designated in ANSI Standard B16.5 as 300, 400, 600, and 900 lb. The 1970 edition deleted the slip-on flanges for lack of demand, and added a 150 lb. Class and coverage for NPS 12 through NPS 24. Additional coverage was also necessitated by the advent of line pipe of grades having minimum specified yield strength higher than the 52,000 psi maximum contemplated at the time of initial development, and therefore still thinner walls.

In some instances, this advent widened the differential between the tensile properties of the flange steel versus that of the mating pipe steel. This, in turn necessitated greater flexibility in the selection of hub dimensions, so that various combinations of material-strength and flange-dimensions could be utilized to supply the flanges. Section 5 on Flange Design was introduced at this point, and is one of the key features of this Standard Practice. The 1972 edition included the coverage of blind flanges in all pressure classes and clarification of text requirements for better understanding and usage under the more diverse conditions.

The 1975 edition expanded the size range above NPS 36. The drilling templates for the Class 150 flanges of the NPS 38 and larger sizes continued the previous philosophy of adopting the drilling template of the Class 125 of ANSI/ASME Standard B16.1. However, the drilling templates of the Class 300 flanges of the NPS 38 and larger sizes did not continue the adoption of the Class 250 of ANSI/ASME Standard B16.1 drilling templates, nor did the NPS 38 and larger sizes of Classes 400, 600, and 900 continue the extrapolation of ANSI/ASME B16.5 drilling templates; instead, these drilling templates were necessarily designed more compactly because of the increased loads. While these flanges are designated by the customary ANSI Standard Class 150, 300, 400, 600, and 900, their use is almost entirely confined to cross country transmission pipelines at atmospheric temperatures. The flanges have been designed primarily for use at their cold ratings which conform to the ANSI/ASME Standard B16.5 ratings of 100 °F, and are intended primarily for attachment to relatively thin-wall, high-strength cold worked pipe, and high-strength butt-welding fittings in pipeline service at temperatures of 450 °F and lower. However, flanges forged of other materials are capable of pressure temperature ratings as specified in Section 2.1.

The 1981 edition brought the document into closer editorial alignment with ANSI/ASME B16.5. However, out of recognition of the successful experience of the pipeline industry, room temperature ratings were extended to 250 °F. Users are cautioned that when these flanges are bolted to valves and used at temperatures between 100 °F and 450 °F, the rating of the valve may not be as high as the flange.

The 1990 revision of this SP was required to update the referenced standards list and delete the SI (metric) equivalents.

The 1991 revision of this SP was required to add blind flange machining guidance, flat face requirements and precautionary notes as well as updating of the referenced standards.

The 1996 revision adds a table with permissible imperfections in flange facing finish and clarifies Annex A design criteria. There were several errata, or corrections made to references to other standards. Dimensional tolerances have been changed where necessary to conform to ASME B16.5 and B16.47.

The 2006 revision was required to add SI (metric) equivalent units, notch toughness requirement, new bolting materials and update of reference standards list.

The 2010 revision recognized the existence of ASME B16.47 Series A flanges, which adopted MSS SP-44 dimensions but does not cover the SP-44 high strength materials used in the pipeline industry to match API line pipe of equivalent grades.

In 2014, this Standard Practice (2010 Edition) was ANSI-approved as an American National Standard. This process involved an ANSI/MSS Consensus Committee that was composed of a diverse volunteer group of industry stakeholders with a material interest in the topic of this Standard Practice. This American National Standard edition, ANSI-approved and published in 2015, is substantively consistent with the 2010 MSS-only edition and will utilize this 2010 year in its nomenclature.

In 2016, this Standard Practice was substantially revised and reformatted to include: Defined chemistry limits (added a Table 1 and also removed external references), clarified the “lot” definition, made impact testing at 50 °F mandatory for grades over F42, added requirement for hardness testing, clarified allowable heat treatment methods, changed marking requirements, added tolerances for raised face height and bolt hole diameter, added requirements for Manufacturing Procedure Specification and Inspection and Test Plans, added Figure 4 to illustrate test locations and orientation, removed ring gasket dimensions and referenced ASME B16.20, added Supplementary Requirements SR1 through SR16, updated and renumbered the reference annex, among other substantive and editorial revisions. Moreover, the 2016 edition was ANSI-approved as a Revised American National Standard. Note that the original 2016 edition was replaced by the 2017 Reissue of the 2016 Edition to correct publication processing related errata.
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MSS Standard Practices (SPs) related to or referenced in this publication:

- MSS SP-9  Spot Facing for Bronze, Iron, and Steel Flanges
- ANSI/MSS SP-25  Standard Marking System for Valves, Fittings, Flanges, and Unions
- ANSI/MSS SP-96  Terminology for Valves, Fittings, and Their Related Components

American National Standards Published by MSS, an ANSI-accredited Standards Developer:

- ANSI/MSS SP-25  Standard Marking System for Valves, Fittings, Flanges, and Unions
- ANSI/MSS SP-44  Steel Pipeline Flanges
- ANSI/MSS SP-58  Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation
- ANSI/MSS SP-96  Terminology for Valves, Fittings, and Their Related Components
- ANSI/MSS SP-114  Corrosion Resistant Pipe Fittings Threaded and Socket Welding Class 150 and 1000
- ANSI/MSS SP-134  Valves for Cryogenic Service, including Requirements for Body/Bonnet Extensions
- ANSI/MSS SP-135  High Pressure Knife Gate Valves
- ANSI/MSS SP-138  Quality Standard Practice for Oxygen Cleaning of Valves and Fittings
- ANSI/MSS SP-144  Pressure Seal Bonnet Valves

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The Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry is a non-profit technical association organized for development and improvement of industry, national and international codes and standards for Valves, Valve Actuators, Valve Modifications, Pipe Fittings, Flanges, Pipe Hangers and Supports, and Associated Seals. Since its establishment in 1924, MSS has been dedicated to developing standards for national and global applications, in cooperation with other standardizing bodies and regulatory authorities.

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