



Standard Specification for Lap Joint Flange Pipe End Applications¹

This standard is issued under the fixed designation F2015; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the pipe material and wall thickness applicable to lap joint flange pipe ends, manufactured by a mechanical forming process.

1.2 The lap joint flange connection has been widely used for low-pressure systems in the marine, process piping, and similar industries.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

A53/A53M Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

A106/A106M Specification for Seamless Carbon Steel Pipe for High-Temperature Service

A135 Specification for Electric-Resistance-Welded Steel Pipe

A139/A139M Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over)

A161 Specification for Seamless Low-Carbon and Carbon-Molybdenum Steel Still Tubes for Refinery (Withdrawn 1999)³

A178/A178M Specification for Electric-Resistance-Welded Carbon Steel and Carbon-Manganese Steel Boiler and Superheater Tubes

A199/A199M Specification for Seamless Cold-Drawn Intermediate Alloy-Steel Heat-Exchanger and Condenser Tubes (Withdrawn 1995)³

A200 Specification for Seamless Intermediate Alloy-Steel Still Tubes for Refinery Service (Withdrawn 1999)³

A209/A209M Specification for Seamless Carbon-Molybdenum Alloy-Steel Boiler and Superheater Tubes

A210/A210M Specification for Seamless Medium-Carbon Steel Boiler and Superheater Tubes

A250/A250M Specification for Electric-Resistance-Welded Ferritic Alloy-Steel Boiler and Superheater Tubes (Withdrawn 2017)³

A252 Specification for Welded and Seamless Steel Pipe Piles

A312/A312M Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes

A333/A333M Specification for Seamless and Welded Steel Pipe for Low-Temperature Service and Other Applications with Required Notch Toughness

A334/A334M Specification for Seamless and Welded Carbon and Alloy-Steel Tubes for Low-Temperature Service

A500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

A512 Specification for Cold-Drawn Buttweld Carbon Steel Mechanical Tubing

A519 Specification for Seamless Carbon and Alloy Steel Mechanical Tubing

A587 Specification for Electric-Resistance-Welded Low-Carbon Steel Pipe for the Chemical Industry

A589 Specification for Seamless and Welded Carbon Steel Water-Well Pipe

A672 Specification for Electric-Fusion-Welded Steel Pipe for High-Pressure Service at Moderate Temperatures

B42 Specification for Seamless Copper Pipe, Standard Sizes

B88 Specification for Seamless Copper Water Tube

B88M Specification for Seamless Copper Water Tube (Metric)

B280 Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service

B337 Specification for Seamless and Welded Titanium and Titanium Alloy Pipe (Withdrawn 1997)³

¹ This specification is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.11 on Machinery and Piping Systems.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

B338 Specification for Seamless and Welded Titanium and Titanium Alloy Tubes for Condensers and Heat Exchangers

B466/B466M Specification for Seamless Copper-Nickel Pipe and Tube

B467 Specification for Welded Copper-Nickel Pipe

2.2 *ANSI Standards*:⁴

B31.1 Power Piping

B31.3 Process Piping

B16.5 Pipe Flanges and Flanged Fittings

B16.9 Factory-Made Wrought Butt-Welding Fittings

B16.24 Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves: Classes 150, 300, 600, 900, 1500, and 2500

B16.42 Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300

2.3 *ISO Standards*:⁵

ISO-7005-1 Metallic Flanges Part 1: Steel Flanges

ISO-7005-2 Metallic Flanges Part 2: Cast Iron Flanges

ISO-7005-3 Metallic Flanges Part 3: Copper Alloy and Composite Flanges

4.2 The back-up flange dimensions are covered under ASME Standards B16.5, B16.24, and B16.42, and ISO Standards 7005-1, 7005-2, and 7005-3.

5. Fabrication

5.1 The formed lap joint end may have a smooth or serrated face.

5.2 The back-up flange may be a different material from the lap joint end pipe as long as it conforms to the applicable piping system codes or standards.

5.3 Convolved back-up flanges may be used if they comply with the applicable piping system codes or standards.

6. Pipe Materials and Limitations

6.1 **Table 1** contains a list of materials that have been found to have acceptable forming qualities to produce a lap joint end.

7. Finish, Appearance and Repairs

7.1 The lap joint flange pipe connection shall be produced in accordance with accepted shop practices and shall be free from burrs and cracks, which would affect the suitability for the intended service.

7.2 Pipe/tube repairs are permitted in accordance with the applicable ASTM specification.

8. Dimensional Limitations (see Tables 2-4)

8.1 Interpolation is allowable for sizes not covered.

8.2 The limitations are based on current technology subject to amendment to equipment or process developments, or both.

9. Allowable Pressure and Temperature

9.1 The allowable pressures and temperatures shall be in accordance with ASME B31.1 and B31.3, and the individual limitations imposed by the back-up flange, gasket, pipe, and fasteners in accordance with ASME B16.5.

10. Keywords

10.1 lap joint flange; loose flange joint; slip flange joint; spin flange joint; Van Stone flange

3. Terminology

3.1 *Definitions*:

3.1.1 *back-up flange, n*—the flange used to back up the lap joint to facilitate the pipe connection, also known in industry as loose, slip, plate, or spin flange.

3.1.2 *convoluted flange, n*—a back-up flange designed with a variable cross section to provide the material in the stress-related zones.

3.1.3 *lap joint end, n*—the formed pipe end to accommodate the back-up flange, commonly referred to as a Van Stone flange (see **Fig. 1**).

4. Dimensions and Tolerances

4.1 The lap joint end outside diameter shall be formed to the raised face flange diameter as covered under ISO Standard 7005-1, 7005-2, 7005-3, and ASME B16.9 Table 7, Dim. G.

⁴ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, <http://www.asme.org>.

⁵ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

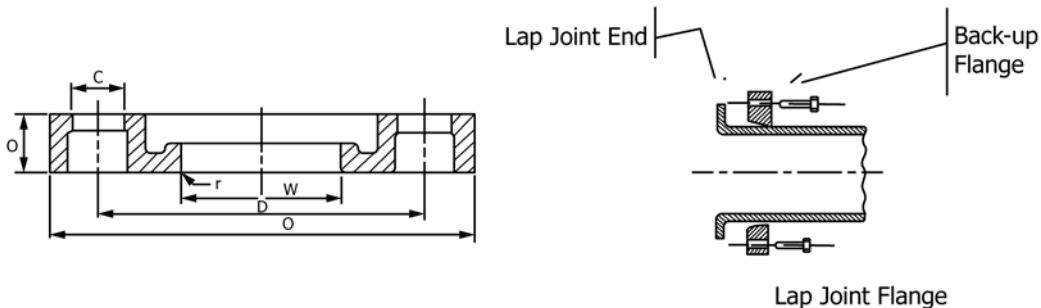


FIG. 1 Lap Joint End