



## Standard Specification for Lap Joint Flange Pipe End Applications<sup>1</sup>

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### 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 the standard. The values given in parentheses are for information only.

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

[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[A161](#) Specification for Seamless Low-Carbon and Carbon-Molybdenum Steel Still Tubes for Refinery (Withdrawn 1999)<sup>3</sup>

[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[A199/A199M](#) Specification for Seamless Cold-Drawn Intermediate Alloy-Steel Heat-Exchanger and Condenser Tubes (Withdrawn 1995)<sup>3</sup>

[A200](#) Specification for Seamless Intermediate Alloy-Steel Still Tubes for Refinery Service (Withdrawn 1999)<sup>3</sup>

[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

[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

[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)<sup>3</sup>

[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

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

2.2 ANSI Standards:

- B31.1 Power Piping<sup>4</sup>
- B31.3 Chemical Plant and Petroleum Refining Piping<sup>4</sup>
- B16.5 Pipe Flanges and Flanged Fittings<sup>4</sup>
- B16.9 Factory-Made Wrought Steel Butt-Welding Fittings<sup>4</sup>
- B16.24 Cast Copper Alloy Pipe Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500<sup>4</sup>
- B16.42 Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300<sup>4</sup>

2.3 ISO Standard:

- ISO-7005-1 Metallic Flanges Part 1: Steel Flanges<sup>4</sup>
- ISO-7005-2 Metallic Flanges Part 2: Cast Iron Flanges<sup>4</sup>
- ISO-7005-3 Metallic Flanges Part 3: Copper Alloy and Composite Flanges<sup>4</sup>

3. Terminology

3.1 *back-up flange*—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.

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

3.3 *lap joint end*—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 ANSI B16.9 Table 7, Dim. G.

4.2 The back-up flange dimensions are covered under ANSI 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 Convoluted 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 ANSI B31.1 and B31.3, and the individual limitations imposed by the back-up flange, gasket, pipe, and fasteners in accordance with ANSI B16.5.

10. Keywords

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

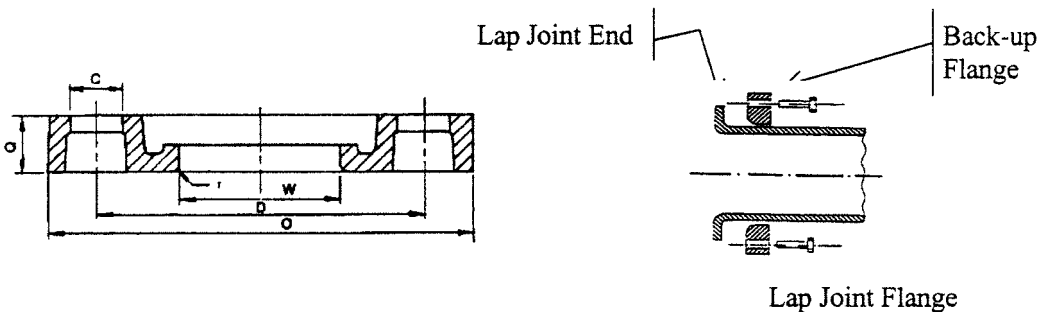


FIG. 1 Lap Joint End

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