



Designation: A1119/A1119M – 23a

Standard Specification for Welded Partially Corrugated Stainless Steel Tube for Potable Water and General Service¹

This standard is issued under the fixed designation A1119/A1119M; 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 describes welded austenitic, ferritic, and duplex stainless steel tube on which the external and internal surface has been modified by a cold forming process to produce an intermittent corrugation for improved formability and resistance to seismic and other environmental distortions. The tubes are used for potable water service lines and other liquid delivery systems in nominal diameters from ½ to 2 in. [13 to 50 mm].

1.2 The tube sizes and thicknesses usually furnished to this specification are 0.625 to 2.125 in. [15.88 to 48.60 mm], outside diameter and 0.028 to 0.049 in. [0.8 to 1.2 mm], inclusive, in wall thickness.

1.3 The grades of austenitic, ferritic, and duplex stainless steels included in this specification shall conform to materials listed in the governing straight tube Specifications **A268/A268M**, **A269/A269M**, or **A789/A789M**. Selection will depend upon design and service requirements.

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.5 This specification is expressed in both inch-pound and SI units. However, unless the order specifies the applicable “M” specification designation (SI units), the material shall be furnished in inch-pound units.

1.6 The following safety hazards statement pertains only to the test methods of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

¹ This specification is under the jurisdiction of ASTM Committee **A01** on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee **A01.10** on Stainless and Alloy Steel Tubular Products.

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1.7 *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

A268/A268M Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service

A269/A269M Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

A789/A789M Specification for Seamless and Welded Ferritic/Austenitic Stainless Steel Tubing for General Service

A1016/A1016M Specification for General Requirements for Ferritic Alloy Steel, Austenitic Alloy Steel, and Stainless Steel Tubes

A1047/A1047M Test Method for Pneumatic Leak Testing of Tubing

E384 Test Method for Microindentation Hardness of Materials

2.2 Other Standard:

JWWA G 119 Corrugated Stainless Steel Tubes for Water Supply

3. Terminology and Symbols

3.1 **Definitions**—For definition of general terms used in this specification, refer to Specification **A1016/A1016M**.

3.2 Symbols (Corrugation Nomenclature):

d_1 = outside diameter of straight section

d_2 = outside diameter of corrugated section

L = total tube length

l_0 = end to first corrugation

l_1 = end to center of first corrugation

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.

*A Summary of Changes section appears at the end of this standard

l_2 = corrugation centerline to corrugation centerline
 l_3 = last corrugation centerline to tube end
 l_4 = length of corrugation
 t_1 = wall thickness of straight section
 N = number of corrugations in a corrugated section

4. Ordering Information

4.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Such requirements may include, but are not limited to, the following:

- 4.1.1 ASTM designation and year of issue (this specification);
- 4.1.2 ASTM designation and year of issue (straight tube specification);
- 4.1.3 Alloy grade and UNS designation;
- 4.1.4 Dimensions; straight tube outside diameter, tube wall thickness (average or minimum specified) and the total tube length. Configuration of corrugated surfaces shall be according to Figs. 1 and 2, and Tables 1-3;
- 4.1.5 Quantity;
- 4.1.6 Packaging;
- 4.1.7 Nondestructive tests;
- 4.1.8 Corrugated tube performance tests;
- 4.1.9 Customer inspection;
- 4.1.10 Certified test reports.

5. General Requirements

5.1 Material furnished under this specification shall conform to the applicable requirements of Specification A1016/A1016M unless otherwise provided herein.

5.2 Corrugated sections of the tube shall be produced by cold forming (hydraulic bulge forming) the tube in such a manner that corrugations are homogeneous.

5.3 Tubes described by this specification shall be furnished with straight (plain) ends.

5.4 Lengths of the partially corrugated tube shall be supplied in the solution annealed condition in accordance with Section 7.

6. Materials and Manufacture

6.1 The corrugated tubes shall be manufactured from welded and solution annealed straight tubes that conform to one of the following Specifications: A268/A268M, A269/A269M, or A789/A789M. The corrugations are formed using the hydraulic bulge forming method.

7. Heat Treatment

7.1 Heat treatment of the partially corrugated tube shall be in accordance with the governing straight tube specification.

8. Chemical Composition

8.1 The tubing specified shall conform to the chemical requirements prescribed in the governing straight tube specification.

9. Mechanical Properties

9.1 The straight tube prior to the corrugation, shall conform to the requirements for tensile properties prescribed in the governing straight tube specification.

10. Permissible Variations in Dimensions

10.1 *Diameter*—The outside diameter d_1 of the straight sections shall not exceed the diameter tolerances shown in Table 2. The corrugation diameter d_2 to be determined by manufacturer.

10.2 *Wall Thickness*—The wall thickness of straight and corrugated sections t_1 shall not exceed the thickness tolerances shown Table 2. The straight sections shall not be less than the minimum thickness specified. The corrugated sections shall not be less than the maximum 20 % reduction as measured per 13.1.7.

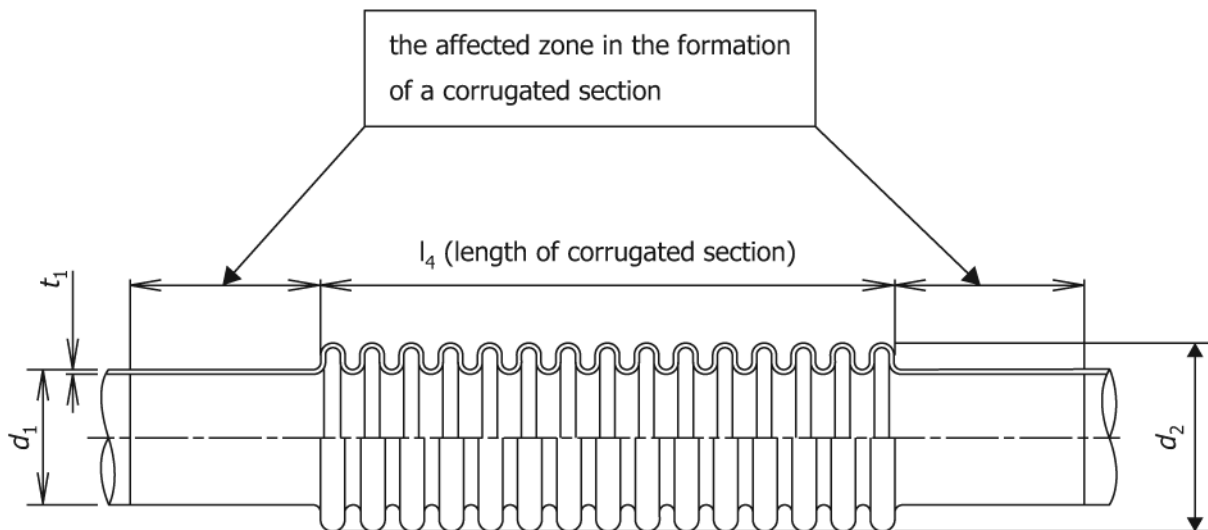


FIG. 1 Dimensions of Corrugated Segment (upper portion is a sectional view)