Designation: A1053/A1053M – 12

StandardSpecification for Welded Ferritic-Martensitic Stainless Steel Pipe[1]

This standard is issued under the fixed designation A1053/A1053M; 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 seam welded ferritic-martensitic (dual phase) stainless steel pipe intended for abrasive and general corrosion service, manufactured with or without the addition of filler metal. Nominal sizes are NPS 2 to NPS 36 inclusive, with nominal (average) wall thickness up to 0.75-in. (19 mm).

1.2 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. 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. The inch-pound units shall apply unless the "M" designation is specified in the order.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys

A999/A999M Specification for General Requirements for Alloy and Stainless Steel Pipe

A1010/A1010M Specification for Higher-Strength Martensitic Stainless Steel Plate, Sheet, and Strip

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

E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

2.2 *ANSI/ASME Standards:*[3]

B1.20.1 Pipe Threads, General Purpose

B36.10 Welded and Seamless Wrought Steel Pipe

B36.19 Stainless Steel Pipe

ASME Boiler and Pressure Vessel Code, Section IX [4]

2.3 *Other Standard:*

SAE J1086 Practice for Numbering Metals and Alloys (UNS)[5]

3. Terminology

3.1 *Definitions:*

3.1.1 The definitions in Specification A999/A999M and Terminology A941 are applicable to this specification.

4. Ordering Information

4.1 Orders for material to this specification shall conform to the requirements of the current edition of Specification A999/A999M.

5. General Requirements

5.1 Material furnished under this specification shall conform to the applicable requirements of the current edition of Specification A999/A999M unless otherwise provided herein.

6. Materials and Manufacture

6.1 *Material:*

6.1.1 The material for this pipe shall conform to Specification A1010/A1010M Grade 50 dual phase stainless steel.

6.2 *Manufacture:*

6.2.1 The pipe shall be made using the following welding methods: Electric Resistance Welding (ERW) without the addition of filler metal, submerged arc welding (SAW), or an automatic fusion welding process with or without the addition of filler metal during the welding process.

[1] This test method 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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[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] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

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

[5] Available from Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, http://www.sae.org.

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

6.2.2 The welded joints made with the addition of filler metal shall be made with procedures and by welders or welding operators that are qualified in accordance with the ASME Boiler and Pressure Vessel Code, Section IX.

6.2.3 Welded pipe of NPS 14 and smaller shall have a single longitudinal weld. Welded pipe of a size larger than NPS 14 shall have a single longitudinal weld or shall be produced by forming and welding two longitudinal sections of flat stock when approved by the purchaser. All weld tests, examinations, inspections or treatments shall be performed on each weld seam.

6.2.4 The pipe shall be free of scale and contaminating surface iron particles. Pickling, blasting or surface finishing is not mandatory. The purchaser is permitted to require that a passivating treatment be applied to the finished pipe.

6.3 *Heat Treatment*—All pipe shall be made from heat-treated strip or plate, cold formed and welded. The weld may be induction strip tempered, at the discretion of the buyer, at a minimum temperature of 1300 °F [700 °C], but not exceeding 1400 °F [760 °C].

7. Chemical Composition

7.1 The steel shall conform to the requirements as to chemical composition as prescribed in Table 1.

8. Product Analysis

8.1 At the request of the purchaser, an analysis of one length of flat rolled stock from each heat, or two pipes from each *lot*, shall be made by the manufacturer. A *lot* of pipe shall consist of the following number of lengths of the same size and wall thickness from any one heat of steel:

NPS Designator	Lengths of Pipe in *Lot*
Under 2	400 or fraction thereof
2 to 5	200 or fraction thereof
6 and over	100 or fraction thereof

8.2 The results of these analyses shall be reported to the purchaser or the purchaser's representative, and shall conform to the requirements of Section 7.

8.3 If the analysis of one of the tests specified in 8.1 does not conform to the requirements specified in Section 7, an analysis of each pipe from the same heat or *lot* may be made, and all pipes conforming to the requirements shall be accepted.

9. 9. Permitted Variations in Wall Thickness and Diameter

9.1 The wall thickness of the pipe shall be within the tolerances specified in Table 2, except that the weld area shall not be limited by the "Over" tolerance.

9.2 The outside diameter to be used for inspection for compliance with this requirement when ordered by NPS and schedule number is shown in Table 3. Other diameters and wall thicknesses may be used when specified in the purchase order. Standard sizes of NPS pipe are listed in Table 4.

10. Tensile Requirements

10.1 The tensile properties of the pipe shall conform to the requirements prescribed in Table 5.

11. Mechanical Tests Required

11.1 *Mechanical Testing Lot Definition*—The term *lot* for mechanical tests shall be as follows:

11.1.1 The *lot* size shall be that defined in 8.1.

11.1.2 The minimum number of tests shall be one (1) test per *lot*.

11.2 *Transverse or Longitudinal Tension Test*—One tension test shall be made on a specimen for *lots* of not more than 100 pipes. Tension tests shall be made on specimens from two tubes for *lots* of more than 100 pipes.

11.3 *Flattening Test*—Flattening tests shall be made on a sufficient number of pipes to constitute 1 % of the *lot*, but at least one length of pipe. Flattening tests shall be made on specimens from two tubes for *lots* of more than 100 pipes.

11.4 A transverse guided face bend test may be conducted instead of a flattening test in accordance with the method outlined in the steel tubular product supplement of Test Methods and Definitions A370. The ductility of the weld shall be considered acceptable when there is no evidence of cracks in the weld or between the weld and the base metal after bending. Test specimens from 1 % of the *lot* shall be taken from the pipe or test plates of the same material as the pipe, the test plates being attached to the end of the cylinder and welded as a prolongation of the pipe longitudinal seam.

12. Hydrostatic or Nondestructive Electric Test

12.1 Each pipe shall be subjected to a nondestructive electric test or hydrostatic test. The type of test to be used shall be at the option of the manufacturer, unless otherwise specified in the purchase order.

12.2 The hydrostatic test shall be in accordance with Specification A999/A999M, unless specifically exempted under the provisions of 12.3.

12.3 For pipe whose dimensions equal or exceed NPS 10, the purchaser, with the agreement of the manufacturer, is permitted to waive the hydrostatic test requirement when in lieu of such test the purchaser performs a system test. Each length of pipe furnished without the completed manufacturer's hydrostatic test shall include with the mandatory marking the letters "NH."

12.4 The nondestructive electric test shall be in accordance with Specification A999/A999M.

13. Lengths

13.1 Pipe lengths shall be in accordance with the following practice:

13.1.1 The standard length, unless otherwise agreed upon, shall be 20 ft [6 m] with the permitted range of 17 to 24 ft [5.2 to 7.3 m]. Shorter and longer lengths are acceptable, the number of joints and the minimum length shall be agreed upon between the manufacturer and the purchaser.

13.1.2 If definite cut lengths are desired, the lengths required shall be specified in the order. No pipe shall be under the specified length and no pipe shall be more than ¼ in. [6 mm] over the specified length.