Designation: A1069/A1069M – 11

StandardSpecification for Laser-Fused Stainless Steel Bars, Plates, and Shapes[1]

This standard is issued under the fixed designation A1069/A1069M; 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 laser-fused stainless steel bars, plates, and shapes of structural quality for use in bolted or welded structural applications.

1.2 Shapes covered in this specification include those classified in Article 3.1.2 of Specification A6/A6M and those that are made from two or more shapes or plates.

1.3 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.

1.4 *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]

A6/A6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

A240/A240M Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

A262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels

A276 Specification for Stainless Steel Bars and Shapes

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A479/A479M Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels

A484/A484M Specification for General Requirements for Stainless Steel Bars, Billets, and Forgings

A673/A673M Specification for Sampling Procedure for Impact Testing of Structural Steel

A700 Guide for Packaging, Marking, and Loading Methods for Steel Products for Shipment

A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

A923 Test Methods for Detecting Detrimental Intermetallic Phase in Duplex Austenitic/Ferritic Stainless Steels

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

E190 Test Method for Guided Bend Test for Ductility of Welds

E208 Test Method for Conducting Drop-Weight Test to Determine Nil-Ductility Transition Temperature of Ferritic Steels

E290 Test Methods for Bend Testing of Material for Ductility

2.2 *ISO Standards:*

ISO 13919-1 Welding and laser-beam welded joints-Guidance on quality levels for imperfections- Part 1: Steel.

ISO 15609-4 Specification and qualification of welding procedures for metallic materials. Welding procedure specification.

ISO 15614-11 Specification and qualification of welding procedures for metallic materials- Welding procedure test-Part 11: Electron and laser beam welding.

2.3 *U.S. Military Standards:*

MIL-STD-129 Marking for shipment and storage.

2.4 *Federal Standards:*

Federal Standard No. 123 Marking for Shipment (Civil Agencies).

3. Terminology

3.1 *Definitions:*

3.1.1 Definitions of terms pertaining to this specification shall be those of Terminology A941, "Standard Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys."

3.2 *Definitions of Terms Specific to This Standard:*

[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 A01.17 on Flat-Rolled and Wrought Stainless Steel.

Current edition approved Jan. 15, 2011. Published January 2011. DOI: 10.1520/A1069_A1069M–11.

[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.

3.2.1 *laser fusion, n*—a joining process that produces coalescence of material with the heat obtained from the application of a concentrated coherent light beam impinging on the surface of a weld joint.

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 Name of structural product (plate, shape, bar, or sheet piling).

4.1.2 Shape designation and applicable dimensions including size, thickness, width, diameter, and length.

4.1.3 Type or UNS designation as specified in Table 1 of Specification A240/A240M.

4.1.4 Quantity (weight or number of pieces).

4.1.5 Special packaging, marking, and loading for shipment requirements, if any.

4.1.6 ASTM specification designation and edition year if other than the latest edition.

4.1.7 Condition, whether stress-relieved, heat treated, or as welded.

4.1.8 Finish.

4.1.9 Supplementary Requirements, when invoked.

4.1.10 Preparation for delivery.

4.1.11 Marking requirements.

4.1.12 Special requirements.

NOTE 1—A typical ordering description is as follows: 5000 lb (2300 kg), Angle, L4 × 4 × ½ in. (L100 × 100 × 13mm), laser fused, 20 ft (6 m) in length, Type 304L, ASTM Specification AXXXX dated ____.

5. Materials and Manufacture

5.1 *Condition:*

5.1.1 Parent materials shall be in accordance to the requirements of Specifications A240/A240M.

5.1.2 Laser-fused section materials shall conform to the requirements of Specifications A276 or A479/A479M.

5.1.3 Bars and shapes shall be in the as-fused condition.

5.1.4 Fusion weld process shall comply with ISO 15614-11 and ISO 15609-4 standards.

5.1.5 The quality levels of welded joints shall be in accordance with ISO 13919-1 standard. If not otherwise specified, quality level B of ISO 13919-1 standard shall be met.

5.1.6 The tensile strength of the fusion weldment conducted on coupons excised from the laser fused stainless steel plates, as shown in Fig. 1, shall meet or exceed those specified in Specifications A240/A240M, A276, or A479/A479M when any of those materials are specified in the purchase order. Tensile testing and specimen dimensions shall be in accordance with Test Methods A370.

5.1.7 Bend tests in accordance with Article 14 of Test Methods A370 shall be conducted for evaluating the ductility of the fusion weldment. Test coupons shall be excised from the laser fused stainless steel plates in accordance with Fig. 1. The inside diameter for root bend test specimens shall meet the value(s) stipulated in the application specification, or the specific requirements of the purchase order. Root bend tests shall be conducted, removing any flash or melt-through at the roots of the weld, and shall be in accordance with either Test Methods E190 or E290, depending on the thickness of the material and the purchaser's application. Lack of penetration or

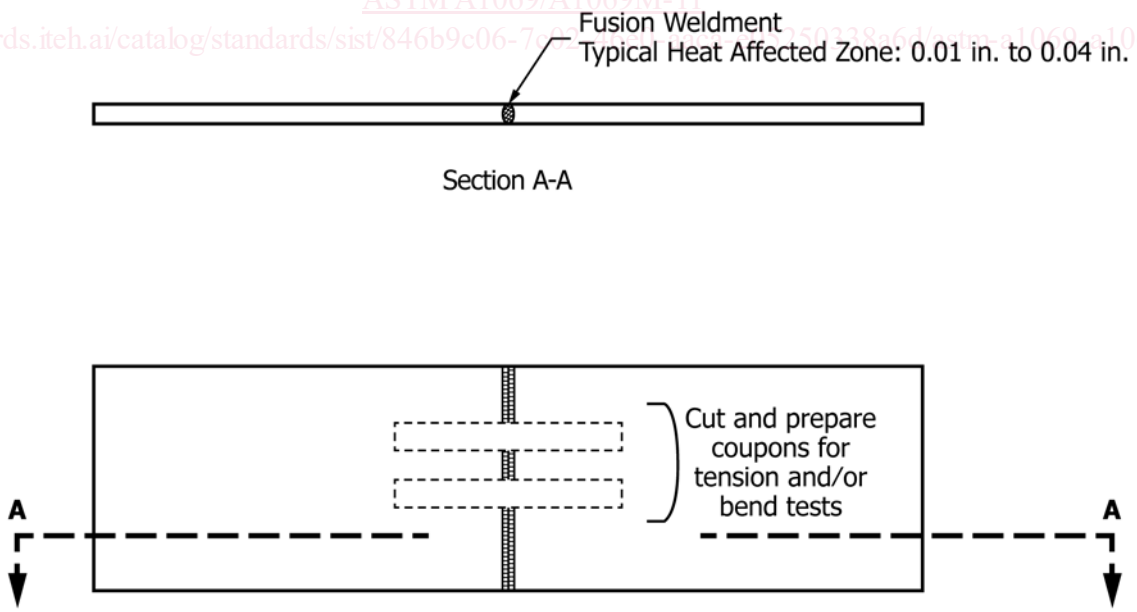

FIG. 1 Butt-Welded Test Pieces Are Laser-Fusion Welded and Then Subsequently Machined Into Tensile Test Bars and Root-Bend Test Specimens (Not to Scale)