Standard Specification for
Titanium-Stabilized Carbon Steel Forgings for Glass-Lined Piping and Pressure Vessel Service

This standard is issued under the fixed designation A836/A836M; 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 nonstandard as-forged fittings, valve components, and parts for glass-lined piping and pressure vessel service. Mechanical properties are certified on the basis of test material subjected to heat treatments to simulate glass-coating operations.

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 are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification. The inch-pound units shall apply unless the “M” designation of this specification is specified in the order.

2. Referenced Documents

2.1 ASTM Standards:
A788/A788M Specification for Steel Forgings, General Requirements
A961/A961M Specification for Common Requirements for Steel Flanges, Forged Fittings, Valves, and Parts for Piping Applications

3. Ordering Information

3.1 Product furnished to this specification shall conform to the requirements of Specification A961/A961M, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the requirements of Specification A961/A961M constitutes non-conformance with this specification.

3.2 It is the purchaser’s responsibility to specify in the purchase order all ordering information necessary to purchase the needed material. Examples of such information include but are not limited to the ordering information in Specification A961/A961M and the following:

3.2.1 Supplementary requirements, and
3.2.2 Additional requirements (see 10.1, 12.1, 12.2, and 12.3).

3.3 If the requirements of this specification are in conflict with the requirements of Specification A961/A961M, the requirements of this specification shall prevail.

4. Materials and Manufacture

4.1 The material shall be forged by hammering, pressing, rolling, extruding, or upsetting, such that the finished product will be a forging as defined in the Terminology Section of Specification A788/A788M.

4.2 When specified in the order, the manufacturer shall submit for approval by the purchaser a sketch showing the shape of the rough forging before machining.

4.3 Forgings shall be protected against sudden or too rapid cooling from the rolling or forging while passing through the critical range.

4.4 Heat treatment of forgings is neither required nor prohibited. However, the test material for qualifying the forging or the welding procedure shall be heat treated to simulate glass-coating operations.

5. Chemical Composition

5.1 An analysis of each heat shall be made by the manufacturer to determine the percentages of the elements specified in Table 1. The chemical composition thus determined shall conform to the requirements in Table 1.

6. Mechanical Properties

6.1 The test material shall conform to the requirements as to tensile properties prescribed in Table 2.

7. Number of Tests and Retests

7.1 One tension test shall be made from each heat.

7.2 If any test specimen is defectively machined, it may be discarded and another specimen substituted.
10. Repair by Welding

10.1 Approval by the purchaser shall be required prior to weld repair.

10.2 The welded test plate used to qualify the procedure shall be normalized three times at 1550 °F [845 °C] prior to testing to simulate glass-coating operations.

10.3 The composition of the weld deposits shall be similar to the base metal and in accordance with the procedure qualification for the applicable material. Welding shall be accomplished with a weld procedure designed to produce low hydrogen in the weldment. Short-circuit gas metal arc welding is permissible only with the approval of the purchaser.

11. Rejection and Rehearing

11.1 Samples representing material rejected by the purchaser shall be preserved until disposition of the claim has been agreed upon by the manufacturer and the purchaser.

12. Certification

12.1 When specified in the purchase order or contract, a producer’s or supplier’s certification shall be furnished to the purchaser that the material was manufactured, sampled, tested, and inspected in accordance with this specification and has been found to meet the requirements. The specification designation included on test reports shall include year of issue and revision letter, if any.

12.2 When specified in the purchase order or contract, a report of the test results shall be furnished.

12.3 Upon request of the purchaser in the contract or order, a report of the test results and chemical analyses shall be furnished.

13. Marking of Forgings

13.1 Identification marks consisting of the manufacturer’s symbol or name (Note), designation of service rating, this specification number, class, and size shall be legibly forged or stamped on each forging, and in such a position as not to injure the usefulness of the forgings.

13.2 Bar Coding—In addition to the requirements in 13.1, bar coding is acceptable as a supplemental identification method. The purchaser may specify in the order a specific bar coding system to be used. The bar coding system, if applied at the discretion of the supplier, should be consistent with one of the published industry standards for bar coding. If used on small parts, the bar code may be applied to the box or a substantially applied tag.

14. Keywords

carbon; pipe fittings; piping applications; pressure containing parts; pressure vessel service; steel; steel flanges; steel forgings; steel valves