



Standard Specification for Carbon Steel Forgings, for General-Purpose Piping¹

This standard is issued under the fixed designation A 181/A 181M; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification² covers nonstandard as-forged fittings, valve components, and parts for general service. Forgings made to this specification are limited to a maximum weight of 10 000 lb [4540 kg]. Larger forgings may be ordered to Specification A 266/A 266M.

1.2 Two grades of material are covered, designated as Classes 60 and 70, respectively, and are classified in accordance with their chemical composition and mechanical properties as specified in 5.1 and 6.1.

1.3 Class 60 was formerly designated Grade I and Class 70 was formerly designated Grade II.

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

1.5 The values stated in either inch-pound units or SI units are to be regarded 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.

2. Referenced Documents

2.1 ASTM Standards:

A 266/A 266M Specification for Carbon Steel Forgings for Pressure Vessel Components³

A 788 Specification for Steel Forgings, General Requirements³

A 961 Specification for Common Requirements for Steel Flanges, Forged Fittings Valves, and Parts for Piping Applications⁴

2.2 AIAG Standard:

AIAG B-5 02.00 Primary Metals Identification Tag Application Standard⁵

3. General Requirements and Ordering Information

3.1 Product furnished to this specification shall conform to the requirements of Specification A 961, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the requirements of Specification A 961 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 A 961 and the following:

3.2.1 Supplementary requirements, and

3.2.2 Additional requirements (See 4.3, 9.1, 10.2, 12.1, and 12.2).

3.3 If the requirements of this specification are in conflict with the requirements of Specification A 961, the requirements of this specification shall prevail.

4. Materials and Manufacture

4.1 Except for flanges of all types, hollow, cylindrically shaped parts may be machined from hot-rolled or forged bar, provided that the axial length of the part is approximately parallel to the metal flow lines of the stock. Other parts, excluding flanges of all types, up to and including NPS 4 may be machined from hot-rolled or forged bar. Elbows, return bends, tees, and header tees shall not be machined directly from bar stock.

4.2 Except as permitted in 4.1, the finished product shall be a forging as defined in the Terminology section (exclusively) of Specification A 788.

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

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

4.5 Heat treatment is neither required nor prohibited, but when applied, heat treatment shall consist of tempering,

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 A01.22 on Valves, Fittings, Bolting, and Flanges for High and Subatmospheric Temperatures.

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² For ASME Boiler and Pressure Vessel Code applications see related Specification SA-181 in Section II of that Code.

³ *Annual Book of ASTM Standards*, Vol 01.05.

⁴ *Annual Book of ASTM Standards*, Vol 01.01.

⁵ Available from Automotive Industry Action Group, 26200 Lahser, Suite 200, Southfield, MI 48034.