



Standard Specification for Steel Forgings, Microalloy, for General Industrial Use¹

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1. Scope*

1.1 This specification covers wrought, microalloyed carbon steel forgings for industrial use. Microalloyed steels develop their properties by the addition of small amounts of microalloying elements such as vanadium, columbium, titanium, or molybdenum. The properties may be influenced also by control of the hot working process and temperature and by control of the subsequent cooling rate.

1.2 The forgings shall be furnished to chemical composition and mechanical property requirements as specified herein. Chemical composition is based on standard carbon steel grades modified to include microalloying elements. Strength level is specified based on desired mechanical properties in the forgings. Depending on the forging process, different strength classes may be attainable from a single chemical composition. Conversely, mechanical properties of a given strength class may be achieved using different chemical compositions. The manufacturer should be consulted if development of chemical composition is necessary.

1.3 For the purpose of this specification, forgings with maximum section thickness of 4 in. (102 mm) are to be considered.

1.4 Supplementary Requirements S1 to S8 are provided for use when additional controls or requirements are desired. These shall apply only when specified on the purchase order.

1.5 The values stated in either inch-pound units or SI (metric) units are to be regarded separately as standard. Within the text and tables, 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 this specification.

1.6 Unless the order specifies the applicable “M” specification designation, the material shall be furnished to the inch-pound units.

2. Referenced Documents

2.1 ASTM Standards:²

- A 29/A 29M Specification for Steel Bars, Carbon and Alloy, Hot-Wrought and Cold-Finished, General Requirements for
- A 275/A 275M Test Method for Magnetic Particle Examination of Steel Forgings
- A 370 Test Methods and Definitions for Mechanical Testing of Steel Products
- A 576 Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality
- A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products
- A 788 Specification for Steel Forgings, General Requirements
- A 921 Specification for Steel Bars, Microalloy, Hot-Wrought, Special Quality, for Subsequent Hot Forging
- E 10 Test Method for Brinell Hardness of Metallic Materials
- E 18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
- E 45 Test Methods for Determining the Inclusion Content of Steel

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *microalloy forgings*—forgings from microalloyed steels produced by effectively controlling the thermomechanical components of the forging process to achieve required mechanical properties with no post-forging heat treatment.

3.1.2 *microalloy forging procedure*—the written thermomechanical processing parameters to be followed during the production of a microalloy forging. It would include, but is not limited to: starting stock size; chemical composition, including

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 A01.06 on Steel Forgings and Billets.

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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.