



Standard Specification for Tool Steels Alloy¹

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

1. Scope

1.1 This specification covers the chemical, mechanical, and physical requirements for available wrought alloy tool steel products.

1.2 These products, which include hot or cold finished bar, plate, sheet, strip, rod, wire, or forgings, are normally fabricated into tools, dies, or fixtures. The selection of a material for a particular application will depend upon design, service conditions, and desired properties.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

2. Referenced Documents

2.1 ASTM Standards:²

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A561 Practice for Macroetch Testing of Tool Steel Bars

A600 Specification for Tool Steel High Speed

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

E3 Guide for Preparation of Metallographic Specimens

E30 Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron (Withdrawn 1995)³

E45 Test Methods for Determining the Inclusion Content of Steel

E59 Practice for Sampling Steel and Iron for Determination of Chemical Composition (Withdrawn 1996)³

E527 Practice for Numbering Metals and Alloys in the

Unified Numbering System (UNS)

2.2 Military Standard:⁴

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage

2.3 Federal Standards:⁴

Fed. Std. No. 123 Marking and Shipment (Civil Agencies)

Fed. Std. No. 183 Continuous Identification Marking of Iron and Steel Products

2.4 Other Standards:⁵

SAE J1086 Recommended Practice for Numbering Metals and Alloys (UNS)

3. Classification

3.1 Material in accordance with this specification is classified by chemical composition. Types correspond to respective AISI designations.

3.1.1 Hot Work Tool Steels, Identification H:

3.1.1.1 Types H10 to H19 are characterized by a controlled chromium content along with other alloying elements. The first four, containing molybdenum, offer excellent toughness and high hardenability and are frequently used in cold work applications requiring toughness at relatively high hardness levels.

3.1.1.2 Types H21 to H26 are characterized by a controlled tungsten content along with other alloying elements. These steels offer greater resistance to the softening effect of elevated service temperatures but exhibit a lower degree of toughness.

3.1.1.3 Types H41 to H43 are low-carbon modifications of molybdenum high speed tool steels (Note 1) and have characteristics similar to the tungsten types.

NOTE 1—High-speed tool steels are covered in Specification A600.

3.1.2 Cold Work Tool Steels, Identification A—Types A2 to A10 cover a wide range of carbon and alloy contents but all have high hardenability and may be hardened in air. The low carbon Types A8 and A9 have less wear resistance but offer greater toughness than others in this group. Type A7, with high

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 A01.29 on Tool Steels.

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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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, <http://quicksearch.dla.mil>.

⁵ Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096, <http://www.sae.org>.