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Standard Specification for Tungsten Base, High-Density Metal[1]

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1. Scope

1.1 This specification covers the requirements for four classes of machinable, high-density tungsten base metal produced by consolidating metal powder mixtures, the composition of which is mainly tungsten. This material specification may be used for bare parts or for parts that may be coated with other materials for protection against corrosion and abrasion.

1.2 *Intended Use*—Parts made from this material are intended for uses such as weights or counter-balances in static or dynamic balancing, high-speed rotating inertia members, radiation shielding, hypervelocity impact, and vibration-damping applications.

1.3 *Special Applications*—For particular applications, properties or requirements other than those specified in Sections 5, 6, and 7 of this specification may be important. These alloys may contain elements which make them magnetic. Where freedom from magnetic response is required, this should be specified in the purchase order. Class 4 is not available in a non-magnetic grade. For purposes of this specification, non-magnetic material is defined as material having a maximum magnetic permeability of 1.05 (see Test Method B193). Also for special applications involving large sections, methods for determining internal quality, such as mechanical tests on specimens from these larger sections or suitable nondestructive tests may be applied. If required, these additional tests shall be specified in the purchase order.

1.4 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]

A600 Specification for Tool Steel High Speed

B193 Test Method for Resistivity of Electrical Conductor Materials

B311 Test Method for Density of Powder Metallurgy (PM) Materials Containing Less Than Two Percent Porosity

D3951 Practice for Commercial Packaging

E3 Guide for Preparation of Metallographic Specimens

E8 Test Methods for Tension Testing of Metallic Materials

E18 Test Methods for Rockwell Hardness of Metallic Materials

E407 Practice for Microetching Metals and Alloys

2.2 *Federal Standard:*

Fed. Std. No. 151 Metals, Test Methods[3]

3. Classification

3.1 The tungsten base metal shall be of the following classes (see Table 1 and Table 2), as specified (see 4.1):

Class	Tungsten, Nominal Wt. %
1	90
2	92.5
3	95
4	97

4. Ordering Information

4.1 Orders for tungsten base, high-density metal should specify the following:

4.1.1 Title, designation, and year of issue of this specification,

4.1.2 Class, (see 3.1),

4.1.3 Machinability requirements, if any (see 7.3),

4.1.4 Quantity,

4.1.5 Levels of preservation and packing (see 9.1),

4.1.6 Special markings, if required (see 9.2),

4.1.7 Method of hardness testing, if different from Rockwell "C" (see Table 1),

4.1.8 Freedom of parts from magnetic response, if required (see 1.3), and

4.1.9 Dimensions and tolerances.

[1] This specification is under the jurisdiction of ASTM Committee B10 on Reactive and Refractory Metals and Alloys and is the direct responsibility of Subcommittee B10.04 on Molybdenum and Tungsten.

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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] Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://www.dodssp.daps.mil.