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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 consolidation of metal powder mixtures of which the composition is mainly tungsten. This material specification may be used for bare parts or be used 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 characteristics are defined as material having a maximum magnetic permeability of 1.05 (see Test Method B 193). 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 the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards:*

A 600 Specification for Tool Steel Highspeed[2]

B 193 Test Method for Resistivity of Electrical Conductor Materials[3]

B 311 Test Method for Density Determination for Powder Metallurgy (P/M) Materials Containing Less than Two Percent Porosity[4]

D 3951 Practice for Commercial Packaging[5]

E 3 Test Methods for Preparation of Metallographic Specimens[6]

E 8 Test Methods for Tension Testing of Metallic Materials[6]

E 18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials[6]

E 407 Practice for Microetching Metals and Alloys[6]

2.2 *Federal Standard:*

Fed. Std. No. 151 Metals, Test Methods[7]

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 %
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 section7.3),

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 B-10 on Reactive and Refractory Metals and Alloysand is the direct responsibility of Subcommittee B10.04on Molybdenum and Tungsten.

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[2] *Annual Book of ASTM Standards*, Vol 01.05.

[3] *Annual Book of ASTM Standards*, Vol 02.03.

[4] *Annual Book of ASTM Standards*, Vol 02.05.

[5] *Annual Book of ASTM Standards*, Vol 15.09.

[6] *Annual Book of ASTM Standards*, Vol 03.01.

[7] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.