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Standard Specification for Refined Ruthenium¹

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1. Scope

1.1 This specification covers refined ruthenium as sponge and powder in one grade as follows:

1.1.1 *Grade 99.80*—Ruthenium having a purity of 99.80 %.

1.1.2 *Grade 99.90*—Ruthenium having a purity of 99.90 %.

NOTE 1—For the purposes of determining conformance with this specification, an observed value obtained from analysis shall be rounded to the nearest unit in the last right-hand place of figures used in expressing the limiting value in accordance with the rounding method of Practice E29.

1.2 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.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to become familiar with all hazards including those identified in the appropriate Safety Data Sheet (SDS) for this product/material as provided by the manufacturer, to establish appropriate safety, health, and environmental practices, and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)

[B542 Terminology Relating to Electrical Contacts and Their Use](#)

[B899 Terminology Relating to Non-ferrous Metals and Alloys](#)

3. Terminology

3.1 For definitions of the terms pertaining to this standard, reference shall be made to Terminology B542 and B899.

¹ This specification is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.05 on Precious Metals and Electrical Contact Materials and Test Methods.

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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.

4. Manufacture

4.1 The material may be produced by any refining process that yields a product capable of meeting the chemical requirements of this specification. The purchaser, upon request, shall be informed of the refining process used.

5. Chemical Composition

5.1 The material should conform to the requirements for chemical composition as prescribed in [Table 1](#).

5.2 Analysis shall be made using the manufacturer's standard methods. In the event of disagreement as to the chemical composition of the metal, methods of chemical analysis for reference purposes shall be determined by a mutually acceptable laboratory.

6. Sampling

6.1 The value of this material is such that special attention must be paid to the sampling procedures. The purchaser and manufacturer shall agree upon the sampling procedures used.

6.2 *Lot Size*—Sampling lots shall consist of the following:

6.2.1 *Sponge*—A single refining lot.

6.2.2 *Powder*—A single refining lot.

7. Rejection and Rehearing

7.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the manufacturer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for rehearing.

7.2 *Investigation of Claims*—In a question of chemical composition, a new sample shall be drawn by representatives of both parties in accordance with [Section 56](#). The properly mixed and quartered sample shall be divided into three parts, each of which shall be placed in a sealed package, one for the manufacturer, one for the purchaser, and one for an umpire, if necessary.

7.3 In the event of disagreement between the manufacturer and the purchaser on the conformance of the metal to the requirements of this specification by the purchaser, the umpire sample is to be submitted to a mutually acceptable laboratory for analysis. The results of the referee's analysis shall be used in determining conformance of the metal to this specification.

TABLE 1 Chemical Requirements

Element ^A	Composition, %	
	Grade 99.80	Grade 99.90
Ruthenium, min (by difference)	99.80	99.90
Platinum, max	0.02	0.01
Palladium, max	0.05	0.005
Iridium, max	0.05	0.005
Rhodium, max	0.05	0.01
Osmium, max	0.06	0.005
Iron, max	0.05	0.02
Silicon, max	0.02	0.005
Copper, max	0.01	0.005
Calcium, max	0.01	0.005
Tin, max	0.01	0.005
Silver, max	0.01	0.005
Sodium, max	0.01	0.005
Gold, max	0.005	0.005

^A Upon agreement between manufacturer and purchaser, analyses may be required and limits established for elements or compounds not specified in this table.