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Standard Specification for Titanium Sponge¹

This standard is issued under the fixed designation B299/B299M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the purchase of virgin titanium sponge metal. This virgin metal is commonly designated as titanium sponge because it is most commonly porous and sponge-like in texture, although metal produced electrolytically is granular and is essentially nonporous.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 *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

[E10 Test Method for Brinell Hardness of Metallic Materials](#)

[E1409 Test Method for Determination of Oxygen and Nitrogen in Titanium and Titanium Alloys by Inert Gas Fusion](#)

[E1447 Test Method for Determination of Hydrogen in Titanium and Titanium Alloys by Inert Gas Fusion Thermal Conductivity/Infrared Detection Method](#)

[E1941 Test Method for Determination of Carbon in Refractory and Reactive Metals and Their Alloys by Combustion Analysis](#)

[E2371 Test Method for Analysis of Titanium and Titanium Alloys by Direct Current Plasma and Inductively Coupled Plasma Atomic Emission Spectrometry \(Performance-](#)

[Based Test Methodology\)](#)

[E2626 Guide for Spectrometric Analysis of Reactive and Refractory Metals \(Withdrawn 2017\)](#)³

3. Terminology

3.1 *Lot Definitions:*

3.1.1 *sponge, n*—a lot shall consist of a single blend produced at one time.

4. Materials and Manufacture

4.1 Titanium sponge is usually prepared by reduction of titanium tetrachloride and gets its sponge-like character from the processes involved in production. This spongy characteristic, however, is not considered essential and may be expected to vary greatly with manufacturing methods. For example, virgin titanium produced electrolytically is crystalline or granular in character and is essentially nonporous. The metal is usually supplied in lump or granular form.

4.2 This specification is not limited to metal prepared by reduction of the tetrachloride.

4.3 Particle size requirements shall be a matter of agreement between the manufacturer and the purchaser.

5. Chemical Composition

5.1 The titanium sponge metal purchased to this specification shall conform to the chemical composition requirements prescribed in [Table 1](#).

6. Hardness

6.1 Brinell hardness testing is optional unless requested by the purchaser. The Brinell Hardness of a lot shall be the average of the hardness determinations on each button prepared as described in [7.1.2](#). The average hardness of each button for the lot shall not exceed the values specified in [Table 1](#). Measurement shall be in accordance with Test Method [E10](#), using a 0.394 in. [10-mm] ball, 3307-lbf [1500-kgf] load, and 30-s dwell.

7. Sampling

7.1 The sampling method detailed in this section shall be considered the industry standard, but alternate methods are

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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.