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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Determination of Nitrogen in Titanium and Titanium Alloys by the Inert Gas Fusion Technique[1]

This standard is issued under the fixed designation E 1937; 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 test method provides a procedure for the determination of nitrogen in titanium and titanium alloys in concentrations from 0.007 to 0.11 %.

1.2 *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 establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific hazards statements are given in 7.8 and Section 8.

2. Referenced Documents

2.1 *ASTM Standards:*

E 50 Practices for Apparatus, Reagents, and Safety Precautions for Chemical Analysis of Metals[2]

E 173 Practice For Conducting Interlaboratory Studies of Methods For Chemical Analysis of Metals[2]

3. Summary of Test Method

3.1 This test method is intended for use with automated, commercially available inert gas fusion analyzers.

3.2 The test sample, plus flux, is fused in a graphite crucible in a flowing helium gas stream at a temperature sufficient to release nitrogen. The nitrogen is swept by the helium gas stream into a thermal conductivity detector. The detector response is compared to that of calibration standards and the result is displayed as percent nitrogen.

3.3 In a typical instrument (Fig. 1) the sample gases are swept with helium through heated rare earth/copper oxide which converts CO to CO_2 and H_2 to H_2O. The CO_2 is absorbed on sodium hydroxide impregnated on clay, and the H_2O is removed with magnesium perchlorate. The nitrogen, as N_2, enters the measuring cell and the thermistor bridge output is integrated and processed to display percent nitrogen.

4. Significance and Use

4.1 This test method is primarily intended as a referee method for compliance with compositional specifications. It is assumed that all who use this test method will be trained analysts capable of performing common laboratory procedures skillfully and safely. It is expected that the work will be performed in a properly equipped laboratory.

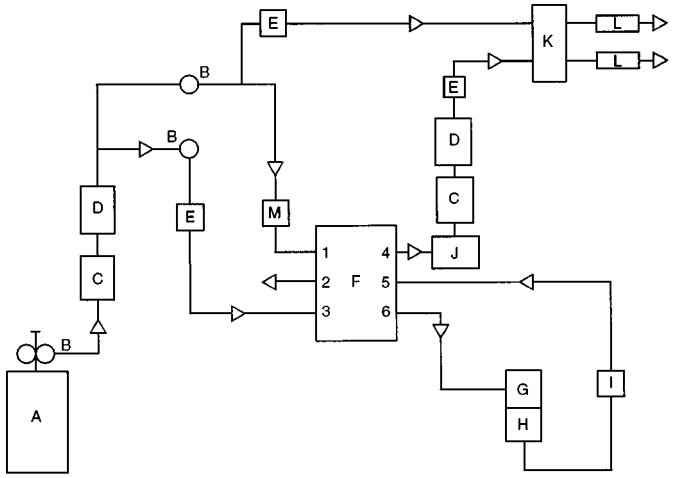

FIG. 1 Apparatus for Determination of Nitrogen by the Inert Gas Fusion-Thermal Conductivity Method

5. Interferences

5.1 The elements usually present in titanium and its alloys do not interfere.

6. Apparatus

6.1 *Instrument*—The general features of the typical instrument are shown in Fig. 1.

6.2 *Graphite Crucibles*, made of high-purity graphite of the dimensions recommended by the instrument manufacturer.

6.3 *Flux*—Wire baskets consisting of platinum or high-purity nickel of dimensions that meet the requirements of the

[1] This test method is under the jurisdiction of ASTM Committee E-1 on Analytical Chemistry for Metals, Ores and Related Materials and is the direct responsibility of Subcommittee E01.06 on Titanium, Zirconium, Tungsten, Molybdenum, Tantalum, Niobium, Hafnium, and Rhenium.

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[2] *Annual Book of ASTM Standards*, Vol 03.05.