



Standard Test Method for Analysis of Nickel Alloys by Graphite Furnace Atomic Absorption Spectrometry¹

This standard is issued under the fixed designation E1834; 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 describes the graphite furnace atomic absorption spectrometric analysis of nickel, such as specified by ASTM Committee B02, and having chemical compositions within the following limits:

Element	Application Range (Wt. %)
Aluminum	0.01 - 6.00
Boron	0.01 - 0.10
Carbon	0.01 - 0.15
Chromium	0.01 - 33.00
Copper	0.01 - 35.00
Cobalt	0.01 - 20.00
Iron	0.05 - 50.00
Magnesium	0.01 - 0.020
Molybdenum	0.01 - 30.0
Niobium	0.01 - 6.0
Nickel	25.00 - 100.0
Phosphorous	0.001 - 0.025
Silicon	0.01 - 1.50
Sulfur	0.0001 - 0.01
Titanium	0.0001 - 6.0
Tungsten	0.01 - 5.0
Vanadium	0.0005 - 1.0

1.2 The following elements may be determined using this test method:

Element	Quantification Range ($\mu\text{g/g}$)
Bismuth	0.2 - 3
Lead	0.6 - 12
Selenium	0.7 - 10
Tellurium	0.4 - 6

1.3 This test method has only been interlaboratory-tested for the elements and ranges specified. It may be possible to extend this test method to other elements or different concentration ranges provided that a test method validation study that includes an instrument performance evaluation as described in Practice E1770 is performed. Additionally, the validation study shall evaluate the acceptability of sample preparation methodology using reference materials or spike recoveries, or both. The user is cautioned to carefully evaluate the validation data as to the intended purpose of the analytical results.

1.4 *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. For specific hazards statements see Note 2 and Section 9.*

2. Referenced Documents

2.1 ASTM Standards:²

- D1193 Specification for Reagent Water
- E50 Practices for Apparatus, Reagents, and Safety Considerations for Chemical Analysis of Metals, Ores, and Related Materials
- E55 Practice for Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition
- E88 Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition
- E135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials
- E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
- E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
- E1329 Practice for Verification and Use of Control Charts in Spectrochemical Analysis
- E1770 Practice for Optimization of Electrothermal Atomic Absorption Spectrometric Equipment
- E2027 Practice for Conducting Proficiency Tests in the Chemical Analysis of Metals, Ores, and Related Materials

2.2 ISO Standards:³

- ISO Guide 31 Contents of certificates of reference materials
- ISO Guide 34 Quality system guidelines for the production of reference materials
- ISO Guide 98-3 Uncertainty of measurement Part 3: Guide to the expression of uncertainty in measurement (GUM:1995) – 1st Ed.

¹ This test method is under the jurisdiction of ASTM Committee E01 on Analytical Chemistry for Metals, Ores, and Related Materials and is the direct responsibility of Subcommittee E01.08 on Ni and Co and High Temperature Alloys.

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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 American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.