



Designation: E2823 – 17

Standard Test Method for Analysis of Nickel Alloys by Inductively Coupled Plasma Mass Spectrometry (Performance-Based)¹

This standard is issued under the fixed designation E2823; 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 inductively coupled plasma mass spectrometric analysis of nickel and nickel alloys, as specified by Committee B02, and having chemical compositions within the following limits:

Element	Application Range (Mass Fraction %)
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 method.

Element	Quantification Range (µg/g)
Antimony	0.5–50
Bismuth	0.1–11
Gallium	2.9–54
Lead	0.4–21
Silver	1–35
Tin	2.2–97
Thallium	0.5–3.0

1.3 This method has only been interlaboratory tested for the elements and ranges specified. It may be possible to extend this method to other elements or different composition ranges provided that method validation that includes evaluation of method sensitivity, precision, and bias as described in this document is performed. Additionally, the validation study must evaluate the acceptability of sample preparation methodology

using reference materials and/or spike recoveries. The user is cautioned to carefully evaluate the validation data as to the intended purpose of the analytical results. Guide E2857 provides additional guidance on method validation.

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. Specific safety hazard statements are given in Section 9.*

2. Referenced Documents

2.1 ASTM Standards:²

- D1193 Specification for Reagent Water
- E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- 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
- E1479 Practice for Describing and Specifying Inductively Coupled Plasma Atomic Emission Spectrometers
- E1601 Practice for Conducting an Interlaboratory Study to Evaluate the Performance of an Analytical Method
- E2027 Practice for Conducting Proficiency Tests in the Chemical Analysis of Metals, Ores, and Related Materials

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.