



Standard Test Methods for Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys¹

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^{ε1} NOTE—Editorial changes were made in November 2000.

1. Scope

1.1 These test methods² cover the chemical analysis of stainless, heat-resisting, maraging, and other similar chromium-nickel-iron alloys having chemical compositions within the following limits:

Element	Concentration Range, %
Aluminum	0.002 to 5.50
Boron	0.001 to 0.20
Carbon	0.01 to 1.50
Chromium	0.01 to 35.00
Cobalt	0.01 to 15.00
Columbium (Niobium)	0.01 to 4.00
Copper	0.01 to 5.00
Lead	0.001 to 0.50
Manganese	0.01 to 20.00
Molybdenum	0.01 to 7.00
Nickel	0.01 to 48.00
Nitrogen	0.001 to 0.50
Phosphorus	0.002 to 0.35
Selenium	0.01 to 0.50
Silicon	0.01 to 4.00
Sulfur	0.002 to 0.50
Tantalum	0.01 to 0.80
Tin	0.001 to 0.05
Titanium	0.01 to 4.50
Tungsten	0.01 to 4.50
Vanadium	0.005 to 1.00
Zirconium	0.001 to 0.20

1.2 The test methods in this standard are contained in the sections indicated below:

Aluminum, Total, by the 8-Quinolinel Gravimetric Method (0.20 to 7.00 %)	Sections 119
Aluminum, Total, by the 8-Quinolinel Photometric Method (0.003 to 0.20 %)	71
Carbon, Total, by the Combustion—Thermal Conductivity Method	^{2a}

Carbon, Total, by the Combustion Gravimetric Method (0.05 to 1.50 %)	Sections 98
Chromium by the Atomic Absorption Method (0.006 to 1.00 %)	202
Chromium by the Peroxydisulfate Oxidation—Titration Method (0.10 to 35.00 %)	212
Chromium by the Peroxydisulfate-Oxidation Titrimetric Method	^{2b}
Cobalt by the Ion-Exchange—Potentiometric Titration Method (2 to 15. %)	53
Cobalt by the Nitroso-R-Salt Photometric Method (0.01 to 5.0 %)	61
Copper by the Neocuproine Photometric Method (0.01 to 5.00 %)	109
Copper by the Sulfide Precipitation-Electrodeposition Gravimetric Method (0.01 to 5.00 %)	82
Lead by the Ion-Exchange—Atomic Absorption Method (0.001 to 0.50 %)	127
Manganese by the Periodate Photometric Method (0.01 to 5.00 %)	8
Molybdenum by the Ion Exchange—8-Hydroxyquinoline Gravimetric Method	242
Molybdenum by the Photometric Method (0.01 to 1.50 %)	190
Nickel by the Dimethylglyoxime Gravimetric Method (0.1 to 48.0 %)	172
Phosphorus by the Alkalimetric Method (0.02 to 0.35 %)	164
Phosphorus by the Molybdenum Blue Photometric Method (0.002 to 0.35 %)	18
Silicon by the Gravimetric Method (0.05 to 4.00 %)	46
Sulfur by the Gravimetric Method	^{2c}
Sulfur by the Combustion-Iodate Titration Method (0.005 to 0.5 %)	37
Sulfur by the Chromatographic Gravimetric Method	^{2b}
Tin by the Solvent Extraction—Atomic Absorption Method (0.002 to 0.10 %)	180
Tin by the Sulfide-Iodometric Titration Method (0.01 to 0.05 %)	90
Titanium, Total, by the Diantiprylmethane Spectrophotometric Method (0.01 to 0.35 %)	231
Vanadium by the Atomic Absorption Method (0.006 to 0.15 %)	221

1.3 Test methods for the determination of several elements not included in this standard can be found in Test Methods E 30 and Test Methods E 1019.

1.4 Some of the concentration ranges given in 1.1 are too broad to be covered by a single test method and therefore this standard contains multiple test methods for some elements. The user must select the proper test method by matching the information given in the Scope and Interference sections of each method with the composition of the alloy to be analyzed.

1.5 The values stated in SI units are to be regarded as standard. In some cases, exceptions allowed in Practice E 380 are also used.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the*

¹ These test methods are under the jurisdiction of ASTM Committee E01 on Analytical Chemistry for Metals, Ores, and Related Materials and are the direct responsibility of Subcommittee E01.01 on Iron, Steel, and Ferroalloys.

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² These test methods represent revisions of methods covered by ASTM Methods E 30 and E 38 which appear in this publication.

^{2a} Discontinued April 25, 1986. Its replacement appears as part of ASTM Method E 1019, found in *Annual Book of ASTM Standards*, Vol 03.05.

^{2b} Discontinued May 30, 1980.

^{2c} Discontinued April 29, 1988.