



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

This standard is issued under the fixed designation E353; 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 These test methods cover the chemical analysis of stainless, heat-resisting, maraging, and other similar chromium-nickel-iron alloys having chemical compositions within the following limits:

Element	Composition 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
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:

	Sections
Aluminum, Total, by the 8-Quinolinol Gravimetric Method (0.20 % to 7.00 %)	119
Aluminum, Total, by the 8-Quinolinol Spectrophotometric Method (0.003 % to 0.20 %)	71
Carbon, Total, by the Combustion–Thermal Conductivity Method	Discontinued
Carbon, Total, by the Combustion Gravimetric Method (0.05 % to 1.50 %)	Discontinued
Chromium by the Atomic Absorption Method (0.006 % to 1.00 %)	202

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.

Current edition approved Sept. 15, 2014. Published November 2014. Originally approved in 1968. Last previous edition approved in 2006 as E353 – 93 (2006). DOI: 10.1520/E0353-14.

	Sections
Chromium by the Peroxydisulfate Oxidation–Titration Method (0.10 % to 35.00 %)	212
Chromium by the Peroxydisulfate–Oxidation Titrimetric Method	Discontinued
Cobalt by the Ion-Exchange–Potentiometric Titration Method (2 % to 15 %)	53
Cobalt by the Nitroso-R-Salt Spectrophotometric Method (0.01 % to 5.0 %)	61
Copper by the Neocuproine Spectrophotometric 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 Spectrophotometric Method (0.01 % to 5.00 %)	8
Molybdenum by the Ion Exchange–8-Hydroxyquinoline Gravimetric Method	242
Molybdenum by the Spectrophotometric 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 Spectrophotometric Method (0.002 % to 0.35 %)	18
Silicon by the Gravimetric Method (0.05 % to 4.00 %)	46
Sulfur by the Gravimetric Method	Discontinued
Sulfur by the Combustion–Iodate Titration Method (0.005 % to 0.5 %)	Discontinued
Sulfur by the Chromatographic Gravimetric Method	Discontinued
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 carbon and sulfur not included in this standard can be found in Test Methods E1019.