



Designation: E 607 – 90 (Reapproved 1996)

Standard Test Method for Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique, Nitrogen Atmosphere¹

This standard is issued under the fixed designation E 607; 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 covers the spectrochemical analysis of aluminum and aluminum alloys for the following elements in the concentration ranges indicated:

Element	Concentration Range, %
Silicon	0.001 to 23.0
Copper	0.001 to 20.0
Magnesium	0.001 to 11.0
Zinc	0.001 to 10.0
Tin	0.001 to 7.5
Nickel	0.001 to 4.0
Iron	0.001 to 3.0
Lithium	0.0001 to 3.0
Cobalt	0.001 to 2.0
Manganese	0.001 to 2.0
Chromium	0.001 to 1.0
Silver	0.001 to 1.0
Zirconium	0.001 to 1.0
Lead	0.002 to 0.7
Bismuth	0.001 to 0.7
Cadmium	0.001 to 0.5
Titanium	0.001 to 0.5
Beryllium	0.0001 to 0.5
Vanadium	0.001 to 0.15
Calcium	0.001 to 0.05
Gallium	0.001 to 0.05
Boron	0.0001 to 0.05
Sodium	0.0001 to 0.05

1.2 The test method is applicable primarily to the control analysis of chill-cast samples. Other forms may be analyzed, provided that (1) they are sufficiently massive to prevent undue heating; (2) they permit machining flat surfaces having a minimum dimension of approximately 30 by 30 mm (1.2 in. by 1.2 in.); and (3) reference materials of similar metallurgical condition and chemical composition are available.

1.3 *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.*

2. Referenced Documents

2.1 ASTM Standards:

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 E01.04 on Aluminum and Magnesium.

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E 130 Practice for Designation of Shapes and Sizes of Graphite Electrodes²

E 135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials²

E 158 Practice for Fundamental Calculations to Convert Intensities into Concentrations in Optical Emission Spectrochemical Analysis²

E 172 Practice for Describing and Specifying the Excitation Source in Emission Spectrochemical Analysis²

E 227 Test Method for Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique²

E 305 Practice for Establishing and Controlling Spectrochemical Analytical Curves²

E 406 Practice for Using Controlled Atmospheres in Spectrochemical Analysis³

E 716 Practices for Sampling Aluminum and Aluminum Alloys for Spectrochemical Analysis³

E 876 Practice for Use of Statistics in the Evaluation of Spectrometric Data³

3. Terminology

3.1 *Definitions*—Refer to Terminology E 135.

4. Summary of Test Method

4.1 A self-initiating oscillatory capacitor discharge in nitrogen gas is produced between a prepared flat surface of the specimen and the tip of a shaped graphite electrode. The radiant energies of selected analytical lines and an internal standard line are measured by photomultipliers. The output current of each tube during the exposure period is accumulated and stored as a charge on an associated capacitor. At the end of the exposure period, the capacitor potentials corresponding to the analytical lines relative to the potential for the internal standard line are automatically measured and recorded. The recording system may be calibrated in terms of relative radiant energies or in percent concentration. Refer to Test Method E 227 for the analysis of aluminum and its alloys using an air atmosphere.

² Annual Book of ASTM Standards, Vol 03.05.

³ Annual Book of ASTM Standards, Vol 03.06.