



Standard Test Method for Analysis of Magnesium and Magnesium Alloys by Atomic Emission Spectrometry¹

This standard is issued under the fixed designation B954; 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 analysis of magnesium and its alloys by atomic emission spectrometry. The magnesium specimen to be analyzed may be in the form of a chill cast disk, casting, sheet, plate, extrusion or some other wrought form or shape. The elements covered in the scope of this method are listed in the table below.

Element	Mass Fraction Range (Wt %)
Aluminum	0.001 to 12.0
Beryllium	0.0001 to 0.01
Boron	0.0001 to 0.01
Cadmium	0.0001 to 0.05
Calcium	0.0005 to 0.05
Cerium	0.01 to 3.0
Chromium	0.0002 to 0.005
Copper	0.001 to 0.05
Dysprosium	0.01 to 1.0
Erbium	0.01 to 1.0
Gadolinium	0.01 to 3.0
Iron	0.001 to 0.06
Lanthanum	0.01 to 1.5
Lead	0.005 to 0.1
Lithium	0.001 to 0.05
Manganese	0.001 to 2.0
Neodymium	0.01 to 3.0
Nickel	0.0005 to 0.05
Phosphorus	0.0002 to 0.01
Praseodymium	0.01 to 0.5
Samarium	0.01 to 1.0
Silicon	0.002 to 5.0
Silver	0.001 to 0.2
Sodium	0.0005 to 0.01
Strontium	0.01 to 4.0
Tin	0.002 to 0.05
Titanium	0.001 to 0.02
Yttrium	0.02 to 7.0
Ytterbium	0.01 to 1.0
Zinc	0.001 to 10.0
Zirconium	0.001 to 1.0

NOTE 1—The mass fraction ranges given in the above scope are estimates based on two manufacturers observations and data provided by a supplier of atomic emission spectrometers. The range shown for each element does not demonstrate the actual usable analytical range for that element. The usable analytical range may be extended higher or lower

based on individual instrument capability, spectral characteristics of the specific element wavelength being used and the availability of appropriate reference materials.

1.2 This test method is suitable primarily for the analysis of chill cast disks as described in Sampling Practice B953. Other forms may be analyzed, provided that: (1) they are sufficiently massive to prevent undue heating, (2) they allow machining to provide a clean, flat surface which creates a seal between the specimen and the spark stand, and (3) reference materials of a similar metallurgical condition (spectrochemical response) 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.* Specific safety and health statements are given in Section 10.

2. Referenced Documents

2.1 ASTM Standards:²

- B953 Practice for Sampling Magnesium and Magnesium Alloys for Spectrochemical Analysis
- E135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials
- E305 Practice for Establishing and Controlling Atomic Emission Spectrochemical Analytical Curves
- E406 Practice for Using Controlled Atmospheres in Spectrochemical Analysis
- E826 Practice for Testing Homogeneity of a Metal Lot or Batch in Solid Form by Spark Atomic Emission Spectrometry
- E1257 Guide for Evaluating Grinding Materials Used for Surface Preparation in Spectrochemical Analysis
- E1329 Practice for Verification and Use of Control Charts in Spectrochemical Analysis
- E1507 Guide for Describing and Specifying the Spectrometer of an Optical Emission Direct-Reading Instrument

¹ This test method is under the jurisdiction of ASTM Committee B07 on Light Metals and Alloys and is the direct responsibility of Subcommittee B07.04 on Magnesium Alloy Cast and Wrought Products.

Current edition approved Oct. 1, 2015. Published November 2015. Originally approved in 2007. Last previous edition approved in 2007 as B954 – 07. DOI: 10.1520/B0954-15.

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.