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Magnesium lithium alloys — Determination of lithium — Inductively coupled plasma optical emission spectrometric method

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 5, *Magnesium and alloys of cast or wrought magnesium.*

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Magnesium lithium alloys are the lightest metallic materials in the world and show several advantageous properties such as: excellent rigidity, high electric and thermal conductivity, good damping, electromagnetic, shielding, welding, matching and cold forming performances. Lithium is the most important element in magnesium lithium alloys, and can improve the deformation capability of alloys with further a decrease in weight. With the increasing demands of the world today for lightweight materials, energy saving, environmental protection and sustainable development, magnesium lithium alloys show broad application prospects in the fields of materials, transportation, electronics, medical products and so on.

Chemical compositions of magnesium and its alloys are widely standardized from major to trace contents in international and other national standards. However, there is no standard dealing with the determination of lithium content in magnesium lithium alloys.

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Magnesium lithium alloys — Determination of lithium — Inductively coupled plasma optical emission spectrometric method

1 Scope

This document specifies a method for the determination of lithium contents in magnesium lithium alloys by inductively coupled plasma (ICP) optical emission spectrometry.

The method is applicable to the determination of lithium content between 3,0 % and 16,0 % (mass fraction) in magnesium lithium alloys.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 648, *Laboratory glassware — Single-volume pipettes*

ISO 1042, *Laboratory glassware — One-mark volumetric flasks*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

Dissolution of a test portion in hydrochloric acid. Nebulization of the solution into an ICP optical emission spectrometer and measurement of the intensity of the emitted light from lithium.

Calibration based on a very close matrix matching of the calibration solutions to the sample shall be carried out. The advantage with this procedure is that all possible interferences from the matrix will be compensated, which will result in high accuracy. This is important to spectral interferences, which can be severe in highly alloyed matrixes.

All spectral interferences shall be kept at a minimum level. Therefore, it is essential to select the appropriate wavelengths. The wavelengths generally used for lithium are shown in Table 1 together with the possible interferences. Depending on the performance of each spectrometer, other wavelengths may be used, provided that interferences, sensitivity, resolution and linearity criteria have been carefully investigated.

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