INTERNATIONAL STANDARD

ISO 20260

First edition
2019-07

Magnesium and magnesium alloys — Determination of mercury

Magnésium et alliages de magnésium — Dosage du mercure

Reference number
ISO 20260:2019(E)

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Published in Switzerland

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Foreword

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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 is the lightest of all the common metals and has been prepared for industry use as metal ingots and alloys since these have the best strength-to-weight ratio of any of the commonly used structural alloys. Chemical compositions of magnesium and its alloys are widely standardized from major to trace quantities. Mercury has generally been a non-analysing element to monitor because it seems to be volatilized on heating due to its low boiling point. Thus, mercury has not been prescribed solely in standards, but has been included as impurities in standards. ISO 8287 for unalloyed magnesium specifies that the sum of hazardous elements, including mercury, in all materials should be less than 0,01 % mass fraction. ISO 16220 for magnesium alloy ingots and casting denotes the impure elements should not be less than 0,01 % separately.

However, there exists no standardized analytical methods for determination of mercury in magnesium and magnesium alloys. Moreover, a new global mercury treaty called the Minamata Convention that came into effect in 2020, which regulates and controls mercury globally, has encouraged the development of the analysis of mercury on some trading materials and products.

This document specifies the methods for determination of trace levels of mercury in magnesium and magnesium alloys.

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Magnesium and magnesium alloys — Determination of mercury

1 Scope

This document specifies the methods for the determination of mercury in magnesium and magnesium alloys by inductively coupled plasma (ICP) atomic mass spectrometric analysis and by atomic absorption spectrometric analysis.

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 384, *Laboratory glass and plastics ware — Principles of design and construction of volumetric instruments*

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*

ISO 4787, *Laboratory glassware — Volumetric instruments — Methods for testing of capacity and for use*

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 Classification of methods for determination

The method for the determination of tin shall be in accordance with any one of the following methods.

a) ICP mass spectrometric analysis (Method A).

   This method is applicable to magnesium and magnesium alloy of 0,000 01 % (mass fraction) or over up to and including 0,01 % (mass fraction) in mercury content.

b) Atomic absorption spectrometric analysis (Method B).

   This method is applicable to magnesium and magnesium alloy of 0,000 02 % (mass fraction) or over up to and including 0,001 % (mass fraction) in mercury content.

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