

ISO/DTS 4177:20XX(E)

~~ISO/TC 79/SC 5~~

~~Date: 2023-05~~

~~ISO/DTS 4177:20XX(E)~~

ISO/TC 79/SC 5

Secretariat: SAC

Date: 2023-07-10

Magnesium and magnesium alloys — Determination of chromium — Inductively coupled plasma optical emission spectrometric method

~~Magnésium et alliages de magnésium — Détermination de l'chrome — Méthode par spectrométrie d'émission atomique avec source à plasma induit~~

~~<https://standards.iteh.ai/catalog/standards/sist/c6ef7ce4-d0f1-459c-b9fd-0b0a7b258b8a/iso-dts-4177>~~

FDIS stage

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/DTS 4177

<https://standards.iteh.ai/catalog/standards/sist/c6ef7ce4-d0f1-459d-b9fd-0b0a7b258b8a/iso-dts-4177>

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office

CP 401 • Ch. de Blandonnet 8

CH-1214 Vernier, Geneva

Phone: + 41 22 749 01 11

E-mail: copyright@iso.org

Website: www.iso.org

Published in Switzerland

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/DTS 4177

<https://standards.iteh.ai/catalog/standards/sist/c6ef7ce4-d0f1-459d-b9fd-0b0a7b258b8a/iso-dts-4177>

Contents

Foreword	viii
Introduction	ix
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Reagents	1
6 Apparatus	2
6.1 Inductively coupled plasma optical emission spectrometer	2
6.1.1 General	2
6.1.2 Wavelength	2
6.1.3 Limit of detection	3
6.1.4 Linearity of the calibration curve	3
7 Sampling and sample preparation	3
8 Procedure	3
8.1 General	3
8.2 Test sample	3
8.3 Preparation of the test solution	3
8.4 Preparation of the calibration solutions	3
8.5 Adjustment of the apparatus	4
8.6 Measurement of the calibration solutions	4
8.7 Calibration curve	4
8.8 Measurements of the test solution	4
9 Expression of results	4
9.1 Method of calculation	4
9.2 Precision	5
10 Test report	5
Annex A (normative) Limit of detection	6
Annex B (informative) Information on the precision test	7
Annex C (informative) Graphical representation of precision data	8

Bibliography 10

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/DTS 4177

<https://standards.iteh.ai/catalog/standards/sist/c6ef7ce4-d0f1-459d-b9fd-0b0a7b258b8a/iso-dts-4177>

Foreword	iv
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Reagents	2
6 Apparatus	2
6.1 Inductively coupled plasma optical emission spectrometer	2
6.1.1 General	2
6.1.2 Wavelength	2
6.1.3 Limit of detection	3
6.1.4 Linearity of the calibration curve	3
7 Sampling and sample preparation	3
8 Procedure	3
8.1 General	3
8.2 Test sample	4
8.3 Preparation of the test solution	4
8.4 Preparation of the calibration solutions	4
8.5 Adjustment of the apparatus	4
8.6 Measurement of the calibration solutions	5
8.7 Calibration curve	5
8.8 Measurements of the test solution	5
9 Expression of results	5
9.1 Method of calculation	5
9.2 Precision	5
10 Test report	6
Annex A (normative) Limit of detection	7
Annex B (informative) Information on the precision test	8
Annex C (informative) Graphical representation of precision data	9

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/DTS 4177

<https://standards.iteh.ai/catalog/standards/sist/c6ef7ce4-d0f1-459d-b9fd-0b0a7b258b8a/iso-dts-4177>

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~~document 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).

Field Code Changed

~~Attention is drawn~~ISO draws attention to the possibility that ~~some of the elements~~implementation of this document may ~~be involve~~ the ~~subject~~use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights. ~~Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).~~

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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, 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.

Field Code Changed

Introduction

Magnesium and magnesium alloys are one kind of the light metallic materials and show several advantageous properties, such as such as low density, high specific stiffness and strength, good damping capacity, castability, weldability and machinability, etc. Chromium, as one of the hazardous elements ~~will have bad, has negative~~ effects on the environment and ~~the~~ health, so its content ~~must needs to~~ be strictly controlled within a certain low ~~contents~~ content. The sum of the mass contents of cadmium (Cd), mercury (Hg), arsenic (As) and chromium (Cr) ~~given~~ in ISO 8287 is defined to be less than 0,01_% in magnesium and its alloys, which ~~must needs~~ be inspected if used in food and medicine fields.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/DTS 4177

<https://standards.iteh.ai/catalog/standards/sist/c6ef7ce4-d0f1-459d-b9fd-0b0a7b258b8a/iso-dts-4177>

ISO/DTS 4177:2024 (E)

iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO/DTS 4177

<https://standards.iteh.ai/catalog/standards/sist/c6ef7ce4-d0f1-459d-b9fd-0b0a7b258b8a/iso-dts-4177>

Magnesium and magnesium alloys — Determination of chromium inductively coupled plasma optical emission spectrometric method

1 Scope

This document specifies an inductively coupled plasma optical emission spectrometric method (ICP-OES) for the determination of chromium contents between 0,001–0,01 % (mass fraction) and 0,050–0,1 % (mass fraction) in magnesium and magnesium alloys.

The method is limited to magnesium alloys containing less than 1,0 % (mass fraction) of cerium, 3,2 % (mass fraction) of gadolinium, 0,2 % (mass fraction) of neodymium and 1,6 % (mass fraction) of manganese.

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 <https://www.electropedia.org/>

4 Principle

After dissolution of a test sample with nitric acid and hydrochloric acid, the solution is nebulized into an inductively coupled plasma optical emission spectrometer and the intensity of the chromium emitted light is measured. The concentrations of chromium in the test solutions are derived from a magnesium-based calibration curve.

5 Reagents

During the analysis, use only reagents of recognized analytical grade and only grade 2 water as specified in ISO 3696, or water of equivalent purity.

5.1 **Pure magnesium**, purity $\geq 99,99$ % (mass fraction), free from chromium.

5.2 **Potassium dichromate**, reference reagent.

5.3 **Hydrochloric acid**, ρ about 1,19 g/ml.

5.4 **Nitric acid**, ρ about 1,42 g/ml.