
**Steel and cast iron — Determination
of copper content — Flame atomic
absorption spectrometric method**

*Aciers et fontes — Détermination de la teneur en cuivre — Méthode
par spectrométrie d'absorption atomique dans la flamme*



This document is a preview generated by EUS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2022

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
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Reagents	1
6 Apparatus	2
6.1 Atomic absorption spectrometer	2
6.1.1 Minimum precision	3
6.1.2 Limit of detection	3
6.1.3 Calibration linearity	3
6.1.4 Characteristic concentration	3
6.2 Ancillary equipment	3
7 Sampling	3
8 Procedure	3
8.1 Test portion	3
8.2 Blank test	4
8.3 Determination	4
8.3.1 Preparation of the test solution	4
8.3.2 Preparation of the calibration solutions	4
8.3.3 Adjustment and optimization of atomic absorption spectrometer	6
8.3.4 Spectrometric measurements	7
8.4 Plotting the calibration curve	7
9 Expression of results	7
10 Precision	8
11 Test report	8
Annex A (normative) Procedures for the determination of instrumental criteria	10
Annex B (informative) Additional information on the international interlaboratory precision test	13
Annex C (informative) Graphical representation of precision data	14
Bibliography	15

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. 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.

This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 1, *Methods of determination of chemical composition*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 459/SC 2, *Methods of chemical analysis for iron and steel*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 4943:1985), which has been technically revised. The main changes are as follows:

- extension of the determination range;
- re-organization of a precision test;
- re-assessment of the precision data.

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.

Steel and cast iron — Determination of copper content — Flame atomic absorption spectrometric method

1 Scope

This document specifies a flame atomic absorption spectrometric method for the determination of copper in steel and cast iron.

The method is applicable to copper contents in the range of 0,003 % (mass fraction) to 3,0 % (mass fraction).

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*

ISO 14284, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology 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

Dissolution of a test portion in a mixture of hydrochloric, nitric and perchloric acids.

Nebulization of the test solution into an air/acetylene flame of an atomic absorption spectrometer. Spectrometric measurement of the atomic absorption of the 324,7 nm or 327,4 nm spectral line emitted by a copper hollow-cathode lamp.

NOTE Other suitable radiation sources can also be used.

5 Reagents

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and only grade 2 water as specified in ISO 3696.

5.1 Pure iron, containing less than 0,000 5 % (mass fraction) of copper or having a very low and known copper content.