
**Nickel, ferronickels and nickel
alloys — Determination of phosphorus
content — Phosphovanadomolybdate
spectrophotometric method**

*Nickel, ferronickels et alliages de nickel — Détermination de
la teneur en phosphore — Méthode spectrophotométrique au
phosphovanadomolybdate*



This document is a preview generated by EUS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

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	3
7 Sampling and sample preparation	3
8 Procedure	4
8.1 Test portion	4
8.2 Blank test	4
8.3 Determination	4
8.3.1 Preparation of the test solution	4
8.3.2 Removal of chromium	4
8.3.3 Complexation	4
8.3.4 Colour development and extraction	5
8.3.5 Spectrophotometric measurement	5
8.4 Establishment of the calibration curve	5
8.5 Check test	6
9 Expression of results	6
9.1 Calculation	6
9.2 Precision	6
9.2.1 Laboratory tests	6
9.2.2 Statistical analysis	7
10 Test report	7
Bibliography	9

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 155, *Nickel and nickel alloys*.

This second edition cancels and replaces the first edition (ISO 11400:1992), which has been technically revised. The main changes are as follows:

- the title has been reworded;
- [Clause 2](#) has been updated;
- [Clause 3](#) has been added and the subsequent clauses have been renumbered;
- [Clause 4](#) (the former Clause 3) has been partially reworded;
- in [Clause 5](#) (the former Clause 4): the references of several reagents have been added;
- [Clause 6](#) (the former Clause 5) has been partially reworded, namely [6.1](#);
- [Clause 8](#) (the former Clause 7) has been partially rearranged regarding the numbering of the paragraphs;
- in [8.4](#) (the former 7.7), [Table 2](#) has been added;
- [8.5](#), "Check samples" has replaced 7.8, "Number of determinations";
- the Bibliography has been added.

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.

Nickel, ferronickels and nickel alloys — Determination of phosphorus content — Phosphovanadomolybdate spectrophotometric method

1 Scope

This document specifies a spectrophotometric method for the determination of the phosphorus content in nickel, ferronickels and nickel alloys between 0,000 5 % (by mass) and 0,05 % (by mass).

Arsenic, chromium, hafnium, niobium, silicon, tantalum, titanium and tungsten interfere, but the interferences can be avoided by complexation or volatilization (for chromium). The lowest phosphorus content [0,000 5 % (by mass)] can only be reached in samples with low contents of these interfering elements.

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*

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

Dissolution of a test portion in a mixture of nitric and hydrochloric acids. Fuming with perchloric acid in a perfluoroalkoxy copolymer (PFA) or polytetrafluoroethylene (PTFE) beaker and removal of chromium as volatile chromylchloride.

Complexation of silicon and refractory elements with hydrofluoric acid.

Conversion of phosphorus to phosphovanadomolybdic acid in a perchloric and nitric acid solution.

After addition of citric acid to complex arsenic, extraction of phosphovanadomolybdic acid with 4-methyl-2-pentanone.

Spectrophotometric measurement at a wavelength of 355 nm.

5 Reagents

During the analysis, unless otherwise specified, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity (see ISO 3696).