
**Carbonaceous materials used in the
production of aluminium — Pitch for
electrodes — Determination of volatile
matter content**

*Produits carbonés utilisés pour la production de l'aluminium — Brais pour
électrodes — Détermination de la teneur en matière volatile*

(<https://standards.iteh.ai>)
Document Preview

ISO 12977:1999

<https://standards.iteh.ai/catalog/standards/iso/4361faa5-00ed-44a3-a351-8ffca3fce770/iso-12977-1999>



Reference number
ISO 12977:1999(E)

© ISO 1999

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 12977:1999

<https://standards.iteh.ai/catalog/standards/iso/4361faa5-00ed-44a3-a351-8ffca3fce770/iso-12977-1999>

© ISO 1999

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 734 10 79
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Contents

Page

Foreword.....	iv
1 Scope	1
2 Normative references	1
3 Term, definition and symbols.....	1
4 Principle.....	2
5 Reagents.....	3
6 Apparatus	3
7 Sampling and preparation of the test sample.....	4
8 Preparation of the test solutions.....	4
9 Preparation of the calibrant solution — solution C.....	5
10 Selection of chromatographic conditions.....	5
11 Calibration	5
12 Determination.....	6
13 Calculation and expression of results.....	6
14 Precision.....	8
15 Test report	9
Annex A (informative) Boiling points of the calibrant compounds.....	10

[ISO 12977:1999](https://standards.itech.ai/catalog/standards/iso/4361faa5-00ed-44a3-a351-8fca3fce770/iso-12977-1999)

<https://standards.itech.ai/catalog/standards/iso/4361faa5-00ed-44a3-a351-8fca3fce770/iso-12977-1999>

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 12977 was prepared by Technical Committee ISO/TC 47, *Chemistry*, Subcommittee SC 7, *Aluminium oxide, cryolite, aluminium fluoride, sodium fluoride, carbonaceous materials for the aluminium industry*.

Annex A of this International Standard is for information only.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 12977:1999

<https://standards.iteh.ai/catalog/standards/iso/4361faa5-00ed-44a3-a351-8ffca3fce770/iso-12977-1999>

Carbonaceous materials used in the production of aluminium — Pitch for electrodes — Determination of volatile matter content

1 Scope

This International Standard describes an empirical method for the determination of the volatile matter content of pitch by gas chromatographic analysis of its solution in toluene. Strict adherence to the procedure is essential because of the empirical nature of the method.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*.

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

ISO 6257, *Carbonaceous materials used in the production of aluminium — Pitch for electrodes — Sampling*.

3 Term, definition and symbols

3.1 Term and definition

For the purposes of this International Standard, the following term and definition applies.

3.1.1

volatile matter content

total percentage by mass of those components present in the pitch which have gas-chromatographic retention times corresponding to atmospheric pressure boiling points up to 360 °C under the conditions used

3.2 Symbols, subscripts and superscripts

3.2.1 Symbols

<i>A</i>	surface area of the chromatographic peak
<i>a</i>	slope of the regression line
<i>B</i>	equivalent boiling point at atmospheric pressure
<i>b</i>	intercept of the regression line

F	factor to convert tabulated peak areas to the corresponding percentages by mass in the original pitch sample
K_A	ratio of areas of dibenzothiophene to phenanthrene
K_T	ratio of retention times
m	mass of calibrant compound
R	reproducibility
R_f	response factor for calibrant compounds (5.2)
r	repeatability
T	retention time of the chromatographic peak
w_d	percentage by mass of dibenzothiophene present in sample

3.2.2 Subscripts and superscripts

A, B, C solutions A, B, C corresponding respectively to chromatograms A, B, C

d dibenzothiophene

i i -th peak

p phenanthrene

pitch pitch

T retention time

tot total surface area of calibrant compounds in the chromatogram

0 presence in the original pitch sample

' contribution resulting from the addition of the dibenzothiophene internal standard

4 Principle

A calibration analysis of a multicomponent test mixture of pure compounds comprising selected major components of coal tar together with an internal standard component is performed by gas chromatography under defined conditions on a chromatographic column having a non-polar stationary phase.

The results of this analysis establish a substantially rectilinear relationship between the chromatographic retention times of the individual components of the mixture and their atmospheric pressure boiling points. In addition, the analysis provides a mean relative response factor which relates the ratio of the total mass to total chromatographic peak area for the selected calibrants to the equivalent ratio for the internal standard.

Because the selected internal standard compound, dibenzothiophene, is also a normal component of coal tar it is necessary to perform the ensuing chromatographic analysis of the pitch on two solutions, one with and one without addition of the internal standard, thus enabling the area to mass response of the chromatograph to the internal standard to be calculated.

From the latter figure and from the mean relative response factor for the components in the calibration test mixture the amounts of material represented by the peaks of the test sample analysis chromatogram are calculated. These data, together with the previously established relationship between the chromatographic retention time and the