
**Carbonaceous materials used in the
production of aluminium — Cold-ramming
pastes — Determination of volatile-matter
content of unbaked pastes**

*Produits carbonés utilisés pour la production de l'aluminium — Pâtes de
brasquage à froid — Détermination de la teneur en matières volatiles des
pâtes crues*



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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

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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.

The main task of technical committees is to prepare International Standards. 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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed every three years with a view to deciding whether it can be transformed into an International Standard.

Attention is drawn to the possibility that some of the elements of ISO/TS 14425 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 14425 was prepared by Technical Committee ISO/TC 47, *Chemistry*, Subcommittee SC 7, *Aluminium oxide, cryolite, aluminium fluoride, sodium fluoride, carbonaceous products for the aluminium industry*.

Carbonaceous materials used in the production of aluminium — Cold-ramming pastes — Determination of volatile-matter content of unbaked pastes

1 Scope

This Technical Specification describes a method for the determination of the volatile-matter content of unbaked cold-ramming pastes used in aluminium manufacture.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this Technical Specification. For dated references, subsequent amendments to, or revisions of, this publication do not apply. However, parties to agreements based on this Technical Specification are encouraged to investigate the possibility of applying the most recent edition of the normative document 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 14422:1999, *Carbonaceous materials used in the production of aluminium — Cold-ramming pastes — Sampling*.

3 Principle

A test portion of the cold-ramming paste contained in a lidded crucible is heated for 15 min in a furnace at 925 °C and the loss in mass is measured. The result, expressed as a percentage of the test portion mass, is the volatile-matter content.

4 Apparatus

Ordinary laboratory apparatus and the following:

4.1 Two silica crucibles, squat form, with lids, capacity approximately 50 ml, prepared for the determination by being heated in the electric furnace (4.2) at 925 °C ± 5 °C for a minimum period of 30 min, then placed in a desiccator to cool to ambient temperature and stored in the desiccator until required for use.

4.2 Electric furnace, capable of being maintained at 925 °C ± 5 °C and recovering the set temperature within 2 min of insertion of the crucibles (4.1) containing the test portions.

5 Sampling

Prepare a representative laboratory sample of cold-ramming paste in accordance with ISO 14422.

6 Preparation of test portions

Take two test portions, each of $10 \text{ g} \pm 0,1 \text{ g}$, from the laboratory sample (see clause 5) in accordance with 6.5.3 of ISO 14422:1999.

7 Procedure

Weigh a prepared crucible and lid (4.1) to the nearest 0,001 g. Transfer one test portion (see clause 6) to the crucible, replace the lid, then reweigh to the nearest 0,001 g.

Weigh a second prepared crucible and lid, transfer the second test portion to it, replace the lid and reweigh to the nearest 0,001 g.

Place the lidded crucibles with their contents in the electric furnace (4.2), maintained at $925 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$, for 15 min. Remove the lidded crucibles and contents from the furnace and place them in a desiccator to cool to ambient temperature. Weigh the lidded crucibles and contents to the nearest 0,001 g.

8 Calculation and expression of results

Calculate the volatile-matter content V of each sample, as a percentage by mass, from the following equation:

$$V = \frac{100(M_2 - M_3)}{M_2 - M_1}$$

where

M_1 is the mass of the prepared crucible and lid, in grams;

M_2 is the mass of the same prepared crucible and lid but containing the test portion before heating, in grams;

M_3 is the mass of the same crucible and lid containing the test portion after heating, in grams.

Calculate the volatile-matter content of the cold-ramming paste as the arithmetic mean of the results of the two determinations calculated as above, expressed to one decimal place.

If the results of the two individual determinations differ by more than 0,5 % by mass, reject the results and repeat the procedure given in clause 7 with fresh test portions.

9 Precision

9.1 Repeatability

The means of the results of duplicate determinations carried out in the same laboratory by the same operator with the same apparatus but at different times on representative test portions taken from the same laboratory sample should not differ by more than 0,4 % absolute.

9.2 Reproducibility

The means of the results of duplicate determinations carried out in each of two laboratories on representative test portions taken from the same laboratory sample in each laboratory should not differ by more than 0,9 % absolute.