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Aluminium oxide primarily used for the production of aluminium — Sampling

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FOREWORD

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Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2927 was drawn up by Technical Committee ISO/TC 47, *Chemistry,* and circulated to the Member Bodies in September 1972.

It has been approved by the Member Bodies of the following countries :

Australia	Hungary	Spain
Austria	India	Sweden
Belgium	Israel	Switzerland
Canada	Italy	Thailand
Czechoslovakia	Netherlands	Turkey
Egypt, Arab Rep. of	Poland	United Kingdom
France	Portugal	U.S.S.R.
Germany	South Africa, Rep. of	

The Member Body of the following country expressed disapproval of the document on technical grounds :

New Zealand

This International Standard has also been approved by the International Union of Pure and Applied Chemistry (IUPAC).

Printed in Switzerland

Aluminium oxide primarily used for the production of aluminium — Sampling

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies *the practical requirements* for the taking of a representative sample intended for chemical analysis and measurement of the physical characteristics of aluminium oxide primarily used for the production of aluminium.

It applies to aluminium oxide during transport, loading, unloading, continuous flow and storage, as well as to aluminium oxide after storage, for example :

— when transported by a conveyor (belt, pipe, slat, etc.);

— when stored in, or unloading from, a container, silo or tank, etc;

— when in a heap, in a ship's hold, or in open silos, etc.

NOTE — This International Standard has been established in the interim period until general methods for the sampling of chemical products, at present under study, have been developed. It will be revised when general methods are available.

2 PRINCIPLE

Sampling without reduction of particle size, by removal of increments of constant mass, manually or mechanically, according to circumstances.

Storage of the increments and transport at ambient temperature in closed containers.

The sample shall remain in the same physical and chemical state in which it is found at the time of sampling until the time of its laboratory examination.

3 SAMPLING FROM BELT, PIPE, OR SLAT CONVEYOR

3.1 Apparatus

3.1.1 Any suitable manual or mechanical equipment, for example Archimedean screws or inclined chutes.

3.1.2 Sample vessels, preferably of plastics materials.

3.2 Procedure

3.2.1 *Bulk sample — Number of increments*

One increment taken over the entire width of the chute, at intervals of time representing 1/20th of the continuous operating time of the conveyor (minimum quantity : 2 kg).

3.2.2 *Laboratory sample*

For aluminium oxide with particle sizes ranging between a few micrometres and 300 μm, a laboratory sample of 500 g is sufficient.

For reduction of the bulk sample to the laboratory sample, use classic methods for the sub-division of powdered materials, following the recommendations for handling described in the fifth and subsequent paragraphs of 3.2.3.

3.2.3 *Method of sampling*

First check that the sampling device is empty. Then operate the device at least three times, rejecting the sample obtained before beginning the actual sampling.

Always take the sample from the flow, never from the belt or the slats.

Take the sample in a single operation from the full width of the flow.

Sample only during continuous flow at maximum capacity, and never during an interruption to the feed or the unloading.

If the sample is taken mechanically, ensure that the collecting vessel is completely empty of any other product at the time of sampling. Guard against any dust filling the collecting vessels during the period between two sampling operations.

Avoid any free fall of the samples during their passage from the collector to the quartering or receiving stages. Transfer the samples by means of the Archimedean screws or inclined chutes (3.1.1).

Avoid the use of hoppers or loading funnels and any accumulation after sampling which might cause segregation of different particle sizes.

In order to minimize the effect of atmospheric conditions, carry out the sampling, quartering and final sample collection as quickly as possible in a water-protected room.

4 SAMPLING DURING THE UNLOADING BY GRAVITY OF CONTAINERS, TANKS, OR SILOS

4.1 Apparatus

4.1.1 Any suitable manual or mechanical equipment, for example Archimedean screws or inclined chutes.

4.1.2 Sample vessels, preferably of plastics materials.

4.2 Procedure

4.2.1 *Bulk sample — Number of increments*

4.2.1.1 CONTAINERS OF CAPACITY LESS THAN 20 m^3

Four representative increments of not less than 1 kg.

4.2.1.2 CONTAINERS OF CAPACITY FROM 20 TO 100 m^3

One increment of not less than 1 kg per 10 m^3.

4.2.2 *Laboratory sample*

500 g (see 3.2.2).

4.2.3 *Method of sampling*

Take the sample at full flow at the normal unloading aperture and not at a point specially narrowed for sampling purposes.

Take equal quantities of material at regular intervals throughout the continuous emptying of the container, tank, or silo. Follow a programme of quartering or mixing of the samples depending upon whether various samples are to be analyzed according to their position in the container or whether a single sample representative of the load is to be analyzed.

Sample with the manual or mechanical device (4.1.1) in the flow, taking care to avoid any free fall of the material or any rapid movement of the sample by pressure. Take every precaution to avoid any loss of the sample by fine particles blowing away.

If the sample is taken mechanically, ensure that the collecting vessel is completely empty of any other product at the time of sampling. Guard against any dust filling the collecting vessels during the period between two sampling operations.

Avoid any free fall of the sample during its passage from the collector to the quartering or receiving stages. Transfer the samples by means of the Archimedean screws or inclined chutes (4.1.1).

Avoid the use of hoppers or loading funnels and any accumulation after sampling which might cause segregation of different particle sizes.

In order to minimize the effect of atmospheric conditions, carry out the sampling, quartering and final sample collection as quickly as possible in a water-protected room.

5 SAMPLING FROM A HEAP, THE HOLD OF A SHIP, OR OPEN SILOS

5.1 Apparatus

5.1.1 Archimedean screw probe, of aluminium, stainless steel, or plastics materials (effective filling length 50 cm).

5.1.2 Archimedean screws, or inclined chutes.

5.1.3 Sample vessels, preferably of plastics materials.

5.2 Procedure

5.2.1 *Bulk sample — Number of increments*

5.2.1.1 FROM A HEAP OR THE HOLD OF A SHIP CONTAINING MORE THAN 100 m^3

Ten to fifteen increments of not less than 1 kg each per batch.

5.2.2 *Laboratory sample*

500 g (see 3.2.2).

5.2.3 *Procedure*

Carry out the sampling vertically, over the entire top of the heap when possible, using the whole length of the sampling probe (5.1.1). In other cases, sample each level corresponding to the length of the probe by preparing these levels or stages on the heap or at the time of unloading of the holds or silos.

Use the sampler in such a manner that the increment taken will be confined to the contents of the sampler after it has been completely emptied following a trial filling.

The sampling is only valid if the probe is filled uniformly without interruption.

If the sample is taken mechanically, ensure that the collecting vessel is completely empty of any other product at the time of sampling. Guard against any dust filling the collecting vessels during the period between sampling operations.

Avoid any free fall of the samples during their passage from the collector to the quartering or receiving stages. Transfer the samples by means of the Archimedean screws or inclined chutes (5.1.2).

Avoid the use of hoppers or loading funnels and any accumulation after sampling which might cause segregation of different particle sizes.

In order to minimize the effect of atmospheric conditions, carry out the sampling, quartering and final sample collection as quickly as possible in a water-protected room.

6 PREPARATION AND STORAGE OF THE LABORATORY SAMPLE

For chemical analysis, store and convey the laboratory samples at ambient temperature in closed containers, without any special precautionary measures other than those normally taken for samples for chemical analysis.

Where measurement of the physical characteristics is concerned, take specific precautions to avoid any changes in particle size, absorption index, apparent density, etc.

In order to keep displacement of the granules and agglomerates with respect to each other to a minimum, the sample shall be placed without settling in a flask filled to the brim and stoppered, so that only the amount of air normally included between the solid particles remains.

The flask shall be airtight in order to prevent moisture exchange with the outside atmosphere.

If the sample is to be transported over long distances, it is advisable to surround the flask with suitable padding (foam rubber, etc.), to avoid repeated impacts against the rigid external packing.

The use of non-rigid sacks or bags, even if they are tightly sealed, should never be permitted. The usual plastics flasks are particularly recommended.

7 SAMPLING REPORT

The sampling report shall include the following particulars :

a) the reference of the method used;

b) the proportion of the lot constituting the bulk sample, and the number of increments taken in making it up;

c) the number of laboratory samples prepared, with an indication of their distinguishing characteristics (packing, mass, destination, etc);

d) any unusual features noted during the sampling;

e) any operations not included in this International Standard, or regarded as optional.

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