

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 806

ALUMINIUM OXIDE PRIMARILY USED
FOR THE PRODUCTION OF ALUMINIUM

DETERMINATION OF LOSS OF MASS AT 1000 °C AND 1200 °C

1st EDITION
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BRIEF HISTORY

The ISO Recommendation R 806, *Aluminium oxide primarily used for the production of aluminium – Determination of loss of mass at 1000 °C and 1200 °C*, was drawn up by Technical Committee ISO/TC 47, *Chemistry*, the Secretariat of which is held by the Ente Nazionale Italiano di Unificazione (UNI).

Work on this question by the Technical Committee began in 1961 and led, in 1964, to the adoption of a Draft ISO Recommendation.

In July 1966, this Draft ISO Recommendation (No. 1028) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Austria	Ireland	Sweden
Belgium	Italy	Switzerland
Brazil	Japan	Turkey
Bulgaria	Korea, Rep. of	U.A.R.
Canada	Netherlands	United Kingdom
Chili	Norway	U.S.A.
Czechoslovakia	Poland	U.S.S.R.
France	Romania	Yugoslavia
Germany	South Africa,	
Hungary	Rep. of	
India	Spain	

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in August 1968, to accept it as an ISO RECOMMENDATION.

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INTRODUCTION

Aluminium oxide for industrial use undergoes a loss of mass when it is heated. Up to 300 °C this loss of mass is due solely to the loss of moisture absorbed by the alumina due to its porosity. At high temperatures the loss of mass observed is due in part to the residual water of constitution significantly increased by the loss by dissociation of certain impurities (carbonates, sulphates, etc.). The total loss of mass depends on the length of time the material is kept at these temperatures, on the content of water and impurities, and on the nature of the impurities.

As there is no specific temperature at which loss of water can be obtained exclusively and quantitatively, 1000 °C and 1200 °C have been chosen arbitrarily as ignition temperatures for the determination of loss of mass on heating.

Neither of these two determinations can be considered as a criterion of the state of calcination of aluminium oxide for industrial use. They can be carried out either separately or simultaneously.

1. SCOPE

This ISO Recommendation describes the methods for the determination of loss of mass by ignition at 1000 °C and 1200 °C.

2. PRINCIPLE

Ignition of two test portions taken from the same aluminium oxide sample, previously dried at 300 °C, and ignited, one at 1000 °C and the other at 1200 °C for 2 hours.

3. APPARATUS

Ordinary laboratory apparatus and

- 3.1 *Platinum crucible*, approximately 30 mm in diameter and 40 mm deep, fitted with platinum lid.
- 3.2 *Electric oven*, natural convection, controlled at 300 ± 10 °C.
- 3.3 *Electric furnace*, controlled at 1000 ± 10 °C.
- 3.4 *Electric furnace*, controlled at 1200 ± 10 °C.
- 3.5 *Desiccator*, preferably containing freshly activated alumina or phosphorus pentoxide (use of calcium chloride should be avoided).

4. PROCEDURE

4.1 Test portion

Ignite the crucible and lid (3.1) in the electric furnace controlled at 1200 ± 10 °C (3.4) for 15 minutes. Remove from the furnace, place in the desiccator (3.5) and weigh after cooling (mass B_3).

Then weigh approximately 5 g of the crude sample * into the crucible. Place the uncovered crucible containing the test portion and the lid in the electric oven controlled at 300 ± 10 °C (3.2) and keep there for 2 hours. Cover the crucible with the lid, remove from the oven, place in desiccator (3.5) and after cooling, weigh (mass M_1).

The mass of the test portion dried at 300 °C is given by the difference $M_1 - B_3$.

4.2 Determination

4.2.1 *Loss of mass at 1000 °C.* Place the uncovered crucible containing the test portion prepared as indicated in clause 4.1 and the lid in the electric furnace controlled at 1000 ± 10 °C (3.3) and keep there for 2 hours.

Cover the crucible with the lid, remove from the furnace, place in desiccator (3.5) and weigh as quickly as possible, immediately after cooling (mass M_2).

4.2.2 *Loss of mass at 1200 °C.* Place the uncovered crucible containing another test portion prepared as indicated in clause 4.1, and the lid in the electric furnace controlled at 1200 ± 10 °C (3.4) and keep there for 2 hours. Cover the crucible with the lid, remove from the furnace, place in desiccator (3.5) and weigh as quickly as possible, immediately after cooling (mass M_3).

4.3 Blank test

4.3.1 *Principle.* Determination of any variation of mass of the platinum crucible and lid (3.1) after each determination.

4.3.2 *Procedure.* Carefully empty the crucible and weigh it with its lid (mass B_f).

5. EXPRESSION OF RESULTS

5.1 The loss of mass between 300 and 1000 °C is given as a percentage by the following formula :

$$\frac{(M_1 - M_2) - (B_3 - B_f)}{(M_1 - B_3)} \times 100$$

5.2 The loss of mass between 300 and 1200 °C is given as a percentage by the following formula :

$$\frac{(M_1 - M_3) - (B_3 - B_f)}{(M_1 - B_3)} \times 100$$

* See ISO Recommendation R 802, *Aluminium oxide primarily used for the production of aluminium - Preparation and preservation of test samples*, clause 2.2.