### INTERNATIONAL STANDARD



First edition 1989-10-15

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## Aluminium ores – Determination of vanadium content – BPHA spectrophotometric method

Minerais alumineux — Dosage du vanadium — Méthode spectrophotométrique au BPHA



Reference number ISO 9208 : 1989 (E)

#### 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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 9208 was prepared by Technical Committee ISO/TC 129, *Aluminium ores*.

Annex A forms an integral part of this International Standard. Annex B is for information only.

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International Organization for Standardization

Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

# Aluminium ores — Determination of vanadium content — BPHA spectrophotometric method

#### 1 Scope

This International Standard specifies a BPHA spectrophotometric method for the determination of the vanadium content of aluminium ores. It is applicable to ores containing between 0,005 % (m/m) and 0,4 % (m/m) of vanadium pentoxide.

#### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5725 : 1986, Precision of test methods – Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests.

ISO 8558 : 1985, Aluminium ores — Preparation of pre-dried test samples.

#### **3** Principle

Decomposition of the test portion by sintering followed by a brief fusion with sodium peroxide. Dissolution of the melt in water and removal of titanium and iron by filtration of the resultant hydrous oxides. Acidification and dilution of the filtrate. Measurement of an aliquot and oxidation of all the vanadium to the pentavalent state with potassium permanganate. Solvent extraction of the vanadium into chloroform as the *N*-benzoyl-*N*-phenylhydroxylamine complex from hydrochloric acid solution. Determination of the vanadium content of the extract by spectrophotometry.

#### 4 Reagents

During the analysis, use only reagents of analytical reagent grade, and only distilled water or water of equivalent purity.

#### 4.1 Sodium peroxide.

Use only the dry, free-flowing, off-white to pale yellow granules or powder.

WARNING – Sodium peroxide must be protected against humidity and must not be used once it has begun to agglomerate.

**4.2** Iron(III) oxide, powder [ <0,001 % (*m*/*m*) V<sub>2</sub>O<sub>5</sub>].

4.3 Sodium sulfate, 10 g/l solution.

Dissolve 10 g of the anhydrous salt in 1 litre of water.

#### 4.4 Sodium sulfite, 30 g/l solution.

Dissolve 30 g of anhydrous sodium sulfite in 1 litre of water.

This solution should be freshly prepared on the day of use.

**4.5** Sulfuric acid (*ρ*<sub>20</sub> 1,84 g/ml), diluted 1 + 1.

4.6 Potassium permanganate, 1 g/l solution.

**4.7** *N*-benzoyl-*N*-phenylhydroxylamine (BPHA), 2,5 g/l solution in chloroform.

This solution is stable for several months if stored in a glass container and kept in a cool, dark place. The presence of 1 % (V/V) to 2 % (V/V) ethanol as stabilizer in chloroform has no deleterious effect.

WARNING — The reagent *N*-benzoyl-*N*-phenylhydroxylamine is reported to be carcinogenic by skin absorption.

4.8 Chloroform, washed and dried.

Extract one volume of chloroform three times with equal volumes of water. Dry over anhydrous sodium sulfate in a glass container.

Prepare fresh daily.