Australian Standard™

# Methods for the analysis of zircon sand concentrates

## Part 5: Determination of zirconium plus hafnium content (Gravimetric method)



Standards Australia

This Australian Standard was prepared by Committee MN-004, Heavy Mineral Sands. It was approved on behalf of the Council of Standards Australia on 1 October 2003 and published on 1 December 2003.

---

The following are represented on Committee MN-004:

Australian Institute of Mining and Metallurgy

Chamber of Minerals and Energy of Western Australia

Additional interests participating in the preparation of this Standard:

Producers of heavy mineral sand concentrates

---

**Keeping Standards up-to-date**

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about Standards can be found by visiting the Standards Australia web site at www.standards.com.au and looking up the relevant Standard in the on-line catalogue.

Alternatively, the printed Catalogue provides information current at 1 January each year, and the monthly magazine, *The Global Standard*, has a full listing of revisions and amendments published each month.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.com.au, or write to the Chief Executive, Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001.

---

*This Standard was issued in draft form for comment as DR 03335.*

Australian Standard™

# Methods for the analysis of zircon sand concentrates

# Part 5: Determination of zirconium plus hafnium content (Gravimetric method)

Originated as AS 2489.5—1982.
Second edition 2003.



Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 5579 8

# PREFACE

This Standard was prepared by the Standards Australia Committee MN-004, Heavy Mineral Sands, to supersede the AS 2489.5—1982, *Methods for the analysis of zircon sand concentrates,* Part 5: *Determination of ziriconium plus hafnium content (Gravimetric method)*. The objective of this Standard is to provide a method for use in settling disputes arising from discrepancies between buyer and seller in the determination of zirconium plus hafnium in zircon sand concentrates.

The Committee had previously organized an inter-laboratory test program to obtain information on the repeatability and reproducibility of the method. The following laboratories participated in the test program to provide the data given in Table 1:

ARM Laboratories

Government Chemical Laboratories, W.A.

Mineral Deposits Limited

R K Newman and Company Pty Limited

This revision confirms the gravimetric method for the determination of zirconium plus hafnium content in zircon sand concentrates. Editorial changes have been made to bring the Standard into line with current style.

Following the withdrawal of the majority of the Standards in AS 2489 series, only AS 2489.11 and this Standard remain.

CONTENTS

STANDARDS AUSTRALIA

# Australian Standard

# Methods for the analysis of zircon sand concentrates

## Part 5: Determination of zirconium plus hafnium content (Gravimetric method)

## 1 SCOPE

This Standard sets out a gravimetric method for the determination of the zirconium plus hafnium content of zircon sand concentrates.

The method is applicable to zircon sand concentrates containing more than 65 percent $ZrO_2$ + $HfO_2$. Niobium does not interfere at the levels experienced.

## 2 OBJECTIVE

The objective of this Standard is to provide producers and users of zircon sand concentrates with a basic chemical method for the determinations.

## 3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS
2243 Safety in laboratories (series)

2508 Safe storage and handling information card (series)

2884 Heavy mineral sand concentrates—Sampling
2884.1 Part 1: Moving streams
2884.2 Part 2: Sampling from stationary situations
2884.3 Part 3: Preparation of samples

BS
4237 Report on reproducibility of methods of chemical analysis used in the iron and steel industry

## 4 PRINCIPLE

The test portion is decomposed by fusion with sodium tetrafluoroborate then sulfuric acid is added until dissolution is completed and silica is removed. To precipitate zirconium and hafnium ammonium hydroxide is added. The resulting precipitate is then washed and filtered and re-dissolved with hydrochloric acid. Mandelic acid is added to re-precipitate zirconium and hafnium which are transferred to the crucible and ignited until constant mass is achieved.

## 5 SAFETY

For information on laboratory safety, reference should be made to the relevant parts of AS 2243 and AS 2508.



 