Australian Standard®

# METHODS FOR THE ANALYSIS OF ZIRCON SAND CONCENTRATES

## Part 11—DETERMINATION OF ACID DEMAND VALUE

This Australian standard was prepared by Committee MN/4, Heavy Mineral Sands. It was approved on behalf of the Council of the Standards Association of Australia on 29 May 1984 and published on 2 July 1984.

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The following interests are represented on Committee MN/4:

Australian Foundry Institute

Chamber of Mines of W.A. (Incorporated)

CSIRO, Division of Mineral Chemistry

CSIRO, Division of Mineralogy

NSW Chamber of Mines and Extractive Industries

Oil and Colour Chemists Association Australia

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## PREFACE

This standard was prepared by the Association's Committee on Heavy Mineral Sands under the direction of the Minerals Standards Board. The significance of the acid demand value has been questioned, but in view of its usefulness by foundrymen as a guide to binder requirements for zircon sand moulds, the industry has requested the preparation of this standard.

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STANDARDS ASSOCIATION OF AUSTRALIA

# Australian Standard
# METHODS FOR THE ANALYSIS OF ZIRCON SAND CONCENTRATES

## PART 11—DETERMINATION OF ACID DEMAND VALUE

**1 SCOPE.** This standard sets out a method for the determination of the acid demand value of zircon sand concentrates.

NOTE: Clause 9 describes the procedure for obtaining acid demand values at pH 3.00, pH 4.00 and pH 5.00. However, in some cases, a determination at a single pH value (preferably 5.00) may give significant information.

**2 APPLICATION.** The method is applicable to all zircon sand concentrates.

**3 REFERENCED DOCUMENTS.** The following standards are referred to in this standard:

AS 1006 Solid Stem General Purpose Thermometers

AS 2165 Burettes and Bulb Burettes

AS 2166 One-mark Pipettes.

**4 DEFINITION.** For the purpose of this standard, the following definition applies:

*Acid demand value*—the volume (in millilitres) of 0.1 mol/L hydrochloric acid which will react with 100 g of zircon sand.

**5 PRINCIPLE.** The zircon sand concentrate is stirred with dilute hydrochloric acid. The solid is filtered off and the resulting solution titrated with dilute sodium hydroxide solution. The acid demand value at pH 3, pH 4 and pH 5 is calculated from the amount of hydroxide solution required to titrate the acidic solution to these pH values.

**6 REAGENTS.**

**6.1 Water.** The water used shall be distilled water, boiled and adjusted to pH 7.0 with either hydrochloric acid (0.001 mol/L) or sodium hydroxide solution (0.001 mol/L).

**6.2 Hydrochloric acid (approximately 0.1 mol/L).** Add 10 mL of hydrochloric acid ($\rho_{20}$ 1160 kg/m$^3$) to 800 mL of water and mix. Dilute to 1 L in a volumetric flask and mix. Standardize against sodium hydrogen carbonate using methyl orange as indicator.

**6.3 Sodium hydroxide solution (approximately 0.05 mol/L).** Add 2.00 g of sodium hydroxide pellets to 500 mL of water and mix. Dilute to 1 L in a volumetric flask and mix. Standardize against the hydrochloric acid (6.2) using methyl orange as indicator.

**7 APPARATUS.**

**7.1 Volumetric glassware.** Class B one-mark pipettes and burettes complying with AS 2166 and AS 2165 respectively.

**7.2 Balance.** A balance accurate and readable to the nearest 0.1 g.

**7.3 Mechanical stirrer.** A mechanical stirrer with a glass impeller, capable of maintaining a constant speed over a period of 15 min.

**7.4 pH meter.** A pH meter, accurate to the nearest 0.05 unit. The pH meter shall be calibrated immediately prior to use against solutions having pH of 4.00 and 7.00.

NOTE: Solutions having these pHs can be obtained by the use of commercially available tablets.

**7.5 Magnetic stirrer.**

**7.6 Thermometer.** A mercury-in-glass thermometer complying with AS 1006.

**8 SAMPLES.** Samples shall be taken by the specified sampling procedure* and used without further particle size reduction.

**9 PROCEDURE.**

**9.1 Test portion.** Weigh 100 ± 0.1 g of zircon sand concentrate into a clean, dry 250 mL beaker.

* In course of preparation.