(Technically equivalent to ISO 797-1973)

Australian Standard®

Aluminium and aluminium alloys

Part 2: Determination of silicon—Gravimetric method

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STANDARDS AUSTRALIA

This Australian Standard was prepared by Committee CH/10, Analysis of Metals. It was approved on behalf of the Council of Standards Australia on 2 January 1990 and published on 11 June 1990.

The following interests are represented on Committee CH/10:

Aluminium Development Council

Australian Lead Development Association

Bureau of Steel Manufacturers of Australia

Copper Technical Data Centre

National Association of Testing Authorities

Railways of Australia Committee

Royal Australia Chemical Institute

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PREFACE

This Standard was prepared by the Standards Australia Committee on the Analysis of Metals under the direction of the Chemical Standards Board. This Standard is technically equivalent to ISO 797—1973, *Aluminium and aluminium alloys—Determination of silicon—Gravimetric method*. It is Part 2 of a series of Standards for the chemical analysis of aluminium and aluminium alloys.

The Committee 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 2:

Tomago Aluminium Co Pty Ltd
Boyne Smelters Pty Ltd
Comalco Aluminium (Bell Bay) Limited
Alcoa of Australia Ltd
Pasminco Metals/BHAS Pty Ltd
Sims Metal Ltd
Department of Defence, Materials Research Laboratories

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Part 2—Determination of silicon—Gravimetric method

1 SCOPE. This Standard sets out a gravimetric method for the determination of silicon in aluminium and aluminium alloys. This method is applicable to the determination of silicon in aluminium and aluminium alloys in the range 0.30% to 8% The method does not apply completely to the following special cases, for which it is modified as described in Appendix A or Appendix B:

(a) Aluminium-silicon alloys (silicon content greater than 3%) and aluminium-magnesium alloys (see Appendix A).

(b) Aluminium alloys containing tin or antimony (see Appendix B).

2 REFERENCED DOCUMENTS.

AS
2612 Aluminium and aluminium alloys—Sampling and preparation of solid samples for optical emission spectrometry

2850 Chemical analysis—Interlaboratory test programs—For determining precision of analytical method(s)—Guide to the planning and conduct

3 PRINCIPLE. After pretreatment with sodium hydroxide, the sample is acidified with perchloric acid and the silica dehydrated, filtered, dried, calcined and weighed. The silica is then volatilized using hydrofluoric acid, and the silicon determined by the difference in mass between the residue and the calcined silica.

4 REAGENTS.

4.1 General requirements. Except where otherwise specified, only reagents of recognized analytical grade and distilled water or water of an equivalent purity shall be used.

4.2 Solids.

4.2.1 Sodium hydroxide pellets.

4.3 Solutions.

4.3.1 Hydrobromic acid (ϱ_{20} 1.49 g/mL).

4.3.2 Hydrochloric acid (50 mL/L). Dilute 5 mL of hydrochloric acid (ϱ_{20} 1.16 g/mL) to 100 mL with water.

4.3.3 Hydrofluoric acid (ϱ_{20} 1.15 g/mL).

4.3.4 Nitric acid (ϱ_{20} 1.42 g/mL).

4.3.5 Perchloric acid (ϱ_{20} 1.54 g/mL).

NOTE: Perchloric acid (ϱ_{20} 1.67 g/mL) may also be used. 100 mL of perchloric acid (ϱ_{20} 1.54 g/mL) is equivalent to 79 mL of perchloric acid (ϱ_{20} 1.67 g/mL).

4.3.6 Perchloric acid (350 mL/L). Dilute 35 mL of perchloric acid (4.3.5) to 100 mL with water.

4.3.7 Sulfuric acid (500 mL/L). Add 50 mL of sulfuric acid (ϱ_{20} 1.84 g/mL) to water, cool and dilute to 100 mL.

4.3.8 Bromine water, saturated solution.

4.3.9 Hydrogen peroxide, 6% (*V*/*V*). Dilute 17 mL of hydrogen peroxide (36% *V*/*V*) to 100 mL with water.

4.3.10 Sodium hydroxide solution (50 g/L). Dissolve 50 g of sodium hydroxide pellets (4.2.1) in water, cool and dilute to 1 L with water. Store in a plastics container.

5 APPARATUS. Ordinary laboratory apparatus is required. The sample dissolution shall be carried out in a basin or beaker inert to sodium hydroxide, e.g. nickel, silver, PTFE, stainless steel, and of approximately 250 mL capacity and having a diameter of between 120 mm and 150 mm.

6 SAMPLING. Samples for analysis shall be obtained from ingots in accordance with the procedure specified in AS 2612.