

Australian Standard™

Alumina

Part 5: Determination of angle of flow

This Australian Standard was prepared by Committee MN-009, Alumina and Materials used in Aluminium Production. It was approved on behalf of the Council of Standards Australia on 4 May 2004 and published on 11 June 2004.

The following are represented on Committee MN-009:

Australasian Institute of Mining and Metallurgy

Australian Aluminium Council

Minerals Council of Australia

Royal Australian Chemical Institute

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 Standards may also be withdrawn.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 Web Shop 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.

Australian Standards™ and other products and services developed by Standards Australia are published and distributed under contract by SAI Global, which operates the Standards Web Shop.

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.org.au, or write to the Chief Executive, Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001.

Australian Standard™

Alumina

Part 5: Determination of angle of flow

Originated as AS 2879.5—1994.
Second edition 2004.

COPYRIGHT

© Standards Australia International

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

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

ISBN 0 7337 6057 0

PREFACE

This Standard was prepared by the Standards Australia Committee MN-009, Alumina and Materials used in Aluminium Production, as an editorially updated edition of AS 2879.5—1994, *Alumina*, Part 5: *Determination of angle of flow*.

In preparing the original Standard, acknowledgment was given to the following report: SMITH, T.K. Determination of the angle of flow of smelter-grade alumina, *Alumina Quality Workshop*. Proceedings. Perth, 1990, 279-290.

The objective of this Standard is to provide laboratories within the alumina refining industry and users of alumina in the aluminium smelting industry with a method to determine the angle of flow of alumina.

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

CONTENTS

	<i>Page</i>
1 SCOPE.....	4
2 REFERENCED DOCUMENT.....	4
3 DEFINITION.....	4
4 PRINCIPLE.....	4
5 APPARATUS.....	4
6 PREPARATION OF TEST SAMPLE.....	5
7 PROCEDURE.....	5
8 CALCULATIONS.....	6
9 PRECISION.....	6
10 TEST REPORT.....	7
APPENDIX A DERIVATION OF THE EQUATIONS AND RESERVOIR CONSTANT.....	9

STANDARDS AUSTRALIA

Australian Standard
Alumina

Part 5: Determination of angle of flow

1 SCOPE

This Standard specifies a method for the determination of the angle of flow of smelter-grade alumina. The method is suitable for determining the angle of flow in the range 30° to 50°.

2 REFERENCED DOCUMENT

The following document is referred to in this Standard:

AS

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

3 DEFINITION

For the purpose of this Standard, the definition below applies.

3.1 Angle of flow

The angle accorded by the side of the cone of residual material with the bottom of the test apparatus after the material under test has ceased to flow. For the purpose of calculation, it is assumed that the cone has straight sides.

4 PRINCIPLE

Alumina is poured through a series of funnels into a flat-bottomed reservoir. The alumina is allowed to flow out of the reservoir through an orifice. The angle of flow is calculated from the mass of test material used to fill the reservoir and that remaining in the reservoir at the completion of the test.

NOTE: The derivation of the equations used to calculate the angle of flow is presented in Appendix A.

5 APPARATUS**5.1 Filling funnel**

A funnel of 110 ±10 mm diameter, having an internal neck diameter of 10 ±2 mm.

5.2 Flow-regulating funnel

A smooth metal funnel of 65 ±5 mm diameter, having an internal neck diameter of 5.5 ±0.5 mm, and a length of 110 ±20 mm. The length of the funnel neck shall be 50 ±5 mm. The lower end of the stem shall be squared off.

5.3 Reservoir

Of internal diameter 72.5 ±0.1 mm, internal height 72.5 ±0.1 mm, with an orifice diameter 4 ±0.1 mm and wall and base thicknesses of 4.5 ±0.1 mm, and of 300 mL nominal capacity. The reservoir shall be made of aluminium with a smooth internal finish and a top that has been machined flat.