

Australian Standard[®]

General purpose and blended cements



This Australian Standard® was prepared by Committee BD-010, Cement. It was approved on behalf of the Council of Standards Australia on 27 September 2010.
This Standard was published on 22 October 2010.

The following are represented on Committee BD-010:

- Australian Procurement and Construction Council
 - Austroads
 - Cement and Concrete Association of New Zealand
 - Cement, Concrete and Aggregates Australia
 - Concrete Institute of Australia
 - Concrete Masonry Association
 - Engineers Australia
 - Portland Cement Association New Zealand
-

This Standard was issued in draft form for comment as DR AS 3972.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that 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Standards may also be withdrawn.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 that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting **www.standards.org.au**

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at **mail@standards.org.au**, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard[®]

General purpose and blended cements

Originated in part as AS A2—1925.
Previous edition AS 3972—1997.
Third edition 2010.

COPYRIGHT

© Standards Australia Limited

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, unless otherwise permitted under the Copyright Act 1968.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 0 7337 9698 2

PREFACE

This Standard was prepared by Standards Australia Committee BD-010, Cement, to supersede AS 3972—1997, *Portland and blended cements*.

Global warming has become a significant issue in the last decade and the Australian Government is embarking on programs to reduce Australia's carbon emissions. Cement is recognized as an energy intensive material and there has been considerable pressure from the Government and consumers to reduce its environmental effect in terms of greenhouse gas emission reductions.

The objective of this revision is to allow an increase in the proportion of mineral additions within the existing performance based specifications. This change is to permit a reduction in the 'carbon footprint' of cement manufacture and help meet the Government's program for the reduction of greenhouse gas emissions.

Changes to the previous edition are as follows:

- (a) Increase in the allowable proportion of mineral additions in general purpose cement from 5% to 7.5%.
- (b) Introduction of a new type of cement—general purpose limestone cement (Type GL)—that contains 8 to 20% limestone.
- (c) Permitting the use of up to 5% minor additional constituents in general purpose cement.
- (d) Placing a limit of 0.10% by mass of chlorides in cement.
- (e) Includes additional compliance requirements for sampling, testing and labelling.
- (f) A new normative Appendix B, which is essentially the (unchanged) requirements from AS 3974—1991, *Evaluation of uniformity of cement strength from a single source*. Following publication of this revision, AS 3974 will be withdrawn.

Type GL cement has been primarily introduced to allow manufacturers to further develop and trial limestone addition and the use of Type GL cement in critical applications should be carefully considered.

Within two years of the publication of this Standard the allowable proportion of mineral additions within general purpose cement will be amended to the optimum level proven by additional testing and the lower limit of Type GL will be amended accordingly.

For concrete, grouts, and mortars where long-term durability is required or where there is risk from one or a combination of salinity, salt water, alkali-silica reactive (ASR) aggregates or sulfate attack, further technical requirements may be applicable.

It should also be noted that generally the use of supplementary cementitious materials such as fly ash, ground granulated iron blast furnace slag, and amorphous silica significantly increases the durability of concrete and also reduce the carbon footprint of both cement and concrete.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

CONTENTS

	<i>Page</i>
1 SCOPE.....	4
2 NORMATIVE REFERENCES	4
3 MATERIALS.....	5
4 CEMENT TYPES AND COMPOSITION	6
5 PRODUCT CONFORMITY	8
6 PACKING, MARKING AND DELIVERY OF BAGGED CEMENT	9
7 DELIVERY AND MARKING OF BULK CEMENT	9
APPENDICES	
A PERFORMANCE-BASED SPECIFICATION FOR CEMENT.....	11
B EVALUATION OF UNIFORMITY OF CEMENT STRENGTH FROM A SINGLE SOURCE.....	16
BIBLIOGRAPHY	22

STANDARDS AUSTRALIA

Australian Standard

General purpose and blended cements

1 SCOPE

This Standard specifies minimum requirements for hydraulic cements including general purpose and blended cements. It does not purport to provide for all the requirements that may be needed in specific applications of such cements.

NOTES:

- 1 Information on the interpretation of this Standard as a performance-based specification of cement is given in Appendix A.
- 2 Some additional information on applications and limitation of this Standard is included in the Preface.

2 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS

- | | |
|---------|--|
| 2350 | Methods of testing portland, blended and masonry cements |
| 2350.2 | Method 2: Chemical composition |
| 2350.7 | Method 7: Determination of temperature rise during hydration of portland and blended cements |
| 2350.9 | Method 9: Determination of residue on the 45 µm sieve |
| 2350.13 | Method 13: Determination of drying shrinkage of cement mortars |
| 2350.14 | Method 14: Length change of cement mortars exposed to sulfate solution |
| 3582 | Supplementary cementitious materials for use with portland and blended cement |
| 3582.1 | Part 1: Fly ash |
| 3582.2 | Part 2: Slag—Ground granulated iron blast-furnace |
| 3583 | Methods of test for supplementary cementitious materials for use with portland cement |
| 3583.13 | Part 13: Determination of chloride ion content |

AS/NZS

- | | |
|---------|---|
| 2350 | Methods of testing portland, blended and masonry cements |
| 2350.1 | Method 1: Sampling |
| 2350.4 | Method 4: Setting time |
| 2350.5 | Method 5: Determination of soundness |
| 2350.8 | Method 8: Fineness index by air permeability |
| 2350.11 | Method 11: Compressive strength |
| 3582 | Supplementary cementitious materials for use with portland and blended cement |
| 3582.3 | Part 3: Amorphous silica |

EN

- | | |
|-------|--|
| 933 | Tests for geometrical properties of aggregates |
| 933-9 | Part 9: Assessment of fines—Methylene blue test |
| 13639 | Determination of total organic carbon in limestone |