

Australian Standard[®]

**LOW VOLTAGE SWITCHGEAR
AND CONTROLGEAR —**

**MOULDED-CASE CIRCUIT
BREAKERS FOR RATED
VOLTAGES UP TO AND
INCLUDING 600 V a.c. AND
250 V d.c**

This Australian standard was prepared by Committee EL/6, Industrial Switchgear and Controlgear. It was approved on behalf of the Council of the Standards Association of Australia on 31 January 1985 and published on 4 April 1985.

The following interests are represented on Committee EL/6:

Australian Electrical and Electronic Manufacturers Association

Australian British Chamber of Commerce

Bureau of Steel Manufacturers of Australia

Confederation of Australian Industry

Department of Defence

Department of Defence Support

Electrical Contractors Associations of Australia

Electricity Supply Association of Australia

Institution of Engineers Australia

Metropolitan Water Sewerage and Drainage Board, Sydney

Railways of Australia Committee

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

Australian Standard[®]

**LOW VOLTAGE SWITCHGEAR
AND CONTROLGEAR —**

**MOULDED-CASE CIRCUIT
BREAKERS FOR RATED
VOLTAGES UP TO AND
INCLUDING 600 V a.c. AND
250 V d.c**

First published (as AS C411)	1970
AS 2184 first published	1978
Second edition	1980
Third edition	1985

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 3708 6

PREFACE

This edition of this standard was prepared by the Association's Committee on Industrial Switchgear and Controlgear to supersede AS 2184-1980, Moulded-case Circuit-breakers (up to and including 600 V a.c. and 250 V d.c.) (Interrupting rating 10 kA and more).

This edition is technically identical with the previous edition except as follows:

- (a) Clause 1.1—the addition of Note 2.
- (b) Clause 1.3. This clause now lists the standards referred to in this standard. In the previous edition it was titled exemptions and gave exemption from tests to this standard for circuit-breakers certified by test as complying with either NEMA Standards Publication ABI—1975 or Underwriters' Laboratories Inc. Standard No. 489.

When this standard was first published in 1970 (as AS C411) it was closely aligned with the above NEMA and UL standards and it was appropriate to consider circuit-breakers certified by tests as complying therewith as also complying with previous editions of this standard. It is now no longer considered to be appropriate for such circuit-breakers to be exempted from tests to this standard.

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

CONTENTS

	<i>Page</i>
SECTION 1. SCOPE AND GENERAL	
1.1 Scope	5
1.2 Object	5
1.3 Referenced Documents	5
SECTION 2. DEFINITIONS	
2.1 Application	6
2.2 Moulded-case Circuit-breaker	6
2.3 Components	6
2.4 Operation	6
2.5 Operating Times	6
2.6 Electrical Values	6
SECTION 3. CLASSIFICATION	
3.1 Designation of Circuit-breaker	8
3.2 Classes	8
SECTION 4. CHARACTERISTICS	
4.1 Summary of Characteristics	8
4.2 Type of Moulded-case Circuit-breaker	8
4.3 Rated Voltage	8
4.4 Frame Sizes	8
4.5 Rated Continuous Current	8
4.6 Rated Frequency	8
4.7 Interrupting Rating	8
4.8 Circuit-breakers with Other Ratings	8
SECTION 5. MARKING	
5.1 Marking	9
5.2 Location	9
SECTION 6. STANDARD CONDITIONS OF OPERATION IN SERVICE	
6.1 Service Conditions	10
6.2 Conditions of Installation	10
6.3 Shape and Symmetry of Voltages	10
SECTION 7. DESIGN AND CONSTRUCTION	
7.1 Mechanical Design	11
7.2 Temperature Rise	11
7.3 Dielectric Properties	11
7.4 Operating Conditions	11
7.5 Adjustable Trip Elements	12
7.6 Instantaneous Trip Calibration	12
7.7 Mechanical Endurance	12
7.8 Accessories	12

SECTION 8. TESTS

8.1 Tests-General	13
8.2 Type Tests	13
8.3 Routine Production Tests	17

APPENDICES

A Test Quantities	21
B Special Information to be given by the Purchaser	24
C Accessories	25
D Clearances and Creepage Distances for Moulded-case Circuit-breakers	26

TABLES

7.2.1	Temperature-rise Limits for Insulated Coils	11
7.4.2	Maximum Tripping Time	12
8.2.1	Type and Sequence of Tests	13
8.2.2 (A)	Cable Ratings	14
8.2.2 (B)	Busbar Ratings	14
8.2.5	Cycles for Endurance Test	15
8.2.9.5	Power Factor of Test Circuit	17
8.2.9.6	Time Constant of Test Current	17

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

**LOW VOLTAGE SWITCHGEAR AND CONTROLGEAR —
MOULDED-CASE CIRCUIT-BREAKERS FOR RATED VOLTAGES UP TO AND
INCLUDING 600 V a.c. AND 250 V. d.c.**

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies requirements for single-pole and multipole moulded-case air-break circuit-breakers, including circuit-breakers incorporating replaceable current limiting fuses, having voltage ratings up to and including 600 V a.c. and 250 V d.c. and interrupting ratings of 10 kA or more.

It does not apply to single-pole and multipole circuit-breakers intended for installation in rail or road vehicles or in aircraft.

NOTES:

1. Although this standard is intended to apply only to circuit-breakers having an interrupting rating of 10 kA or more, the interrupting rating tests (see Clause 8.2.9) are used to verify claimed breaking capacities between 3 kA and 10 kA of circuit-breakers falling within the scope of AS 3111.
2. Additional requirements may apply to miniature over-current circuit-breakers in approvals regulations.

1.2 OBJECT. The object of this standard is to state the following:

- (a) The characteristics of circuit-breakers.
- (b) The conditions with which circuit-breakers must comply with reference to —

- (i) their operation and behaviour in normal service;
 - (ii) their operation and behaviour under fault conditions; and
 - (iii) their dielectric properties.
- (c) The tests intended for confirming that these conditions have been met and the methods to be adopted for these tests.
 - (d) The data to be marked on the apparatus.

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

- | | |
|---------|--|
| AS 3111 | Approval and Test Specification for Miniature Overcurrent Circuit-breakers |
| AS 3100 | Approval and Test Specification for Definitions and General Requirements for Electrical Materials and Equipment |
| AS C320 | Classification of Insulating Materials for Electrical Machinery and Apparatus on the Basis of Thermal Stability in Service |