

AS 3108

(closely follows IEC  $\lambda$  1983)

Amendment 1 - March 1992  
" 2 - October 1992  
" 3 - September 1993

Under Revision 93038

Superseded by AS/NZS 3108:1994

AS 3108—1990

Australian Standard®

---

**Approval and test specification—  
Particular requirements for isolating  
transformers and safety isolating  
transformers**

---

K



**STANDARDS AUSTRALIA**



This Australian Standard was prepared by Committee EL/26, Protective Enclosures of Electrical Equipment. It was approved on behalf of the Council of Standards Australia on 15 June 1990 and published on 12 November 1990.

---

The following interests are represented on Committee EL/2:

Australian Consumers Association  
Australian Electrical and Electronic Manufacturers Association  
Confederation of Australian Industry  
Consumer Electronics Suppliers Association  
Electrical Apparatus Approvals Authorities  
Electrical Testing Laboratories  
Electricity Supply Association of Australia  
Institution of Engineers, Australia

---

*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which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.*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.*



AS 3108/Amdt 3/1993-09-13

**STANDARDS AUSTRALIA**

---

**Amendment No. 3**

**to**

**AS 3108—1990**

**Approval and test specification—  
Particular requirements for isolating transformers  
and safety isolating transformers**

---

**CORRECTION**

The 1990 edition of AS 3108 is amended as follows; the amendments should be inserted in the appropriate place.

**SUMMARY:** This Amendment applies to Clause 18.13 and Annex A.

**Published on 13 September 1993.**



STANDARDS AUSTRALIA

---

**Amendment No. 2**

to

**AS 3108—1990**

**Approval and test specification—Particular requirements for isolating transformers  
and safety isolating transformers**

---

**REVISED TEXT**

The 1990 edition of AS 3108 is amended as follows; the amendments should be inserted in the appropriate place.

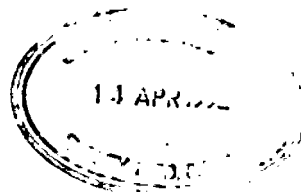
*SUMMARY:* This Amendment applies to Chapter 1, Clauses 18.11 and 19, Chapter 2, Section 1, Clause 11.1, Chapter 3, Section 1, Clause 11.1 and Annex A.

Published on 12 October 1992.

STANDARDS AUSTRALIA

---

Amendment No. 1  
to  
AS 3108—1990  
Approval and test specification—  
Particular requirements for isolating transformers and safety isolating transformers



---

REVISED TEXT

The 1990 edition of AS 3108 is amended as follows; the amendments should be inserted in the appropriate place.

**SUMMARY:** This Amendment applies to the Preface; Chapter 1, Clauses 2.1, 2.2, 2.31 to 2.35, 4.12, 7.1, 8.6.1, 10.1, 11, 14.1, 18.11, 18.12, 19.4, 21.3 and 26.3.1 and Table 6; Chapter 2, Clauses 2.102, 5.1, 5.2, 5.3, 7.1, 7.7, 7.9, 7.11, 11.2, 13, 13.2, 18.12, 18.101, 18.104, 19.2, 19.3, 19.5 and 21.2 and Appendix 2-1-A; Chapter 3, Section 2, Clauses 10, 10.1 and 18.12; Chapter 3, Section 3, Clauses 10 and 10.1; Chapter 3, Section 4, Clauses 10 and 10.1 and Annex A.

Published on 16 March 1992.

Approved for publication in New Zealand on behalf of the Standards Council of New Zealand on 13 March 1992.

Australian Standard®

---

**Approval and test specification—  
Particular requirements for isolating  
transformers and safety isolating  
transformers**

---

AS 3108—1990 first published in part as AS C126—1939.  
Second edition 1958.  
Revised and redesignated AS 3126—1981 (withdrawn  
February 1989).  
Revised and redesignated as part of AS 3108.1,  
AS 3108.2, AS 3108.3—1984.  
AS C167 first published 1962.  
Revised and redesignated AS 3167—1981 (withdrawn  
May 1987).  
Revised and redesignated as part of AS 3108.1,  
AS 3108.2, AS 3108.3—1984.  
AS 3108.1.2.3—1984 revised and redesignated  
AS 3108—1990.

## PREFACE

This Specification was prepared by Standards Australia's Committee on Electrical Approvals Standards, to supersede AS 3108.1-2-3—1984 from date of publication.

~~This Specification is in several Chapters as follows:~~  
**SEE AMENDMENT 1**

- (a) Chapter 1 gives general requirements for all isolating and safety isolating transformers, whatever their use. These requirements are supplemented (indicated by 'ADDITION') or modified (indicated by 'REPLACEMENT') as outlined in Chapters 2 and 3.
- (b) Chapter 2 gives supplementary requirements applicable to isolating transformers. It is divided into sections applicable to various types of transformers as follows:
  - (i) Section 1—Isolating transformers for general use and shaver transformers.
  - (ii) Section 2—Under consideration.
- (c) Chapter 3 gives supplementary requirements applicable to safety isolating transformers. It is divided into sections applicable to various types of transformers as follows:
  - (i) Section 1—Transformers for general use.
  - (ii) Section 2—Transformers for toys.
  - (iii) Section 3—Bell transformers.
  - (iv) Section 4—Transformers for Class III Luminaires incorporating incandescent lamps.

Each Section is independent of the other Sections and the additions or replacements which are indicated refer back to Chapter 1, General requirements.

While this Specification closely follows IEC 742 (first edition), *Isolating transformers and safety isolating transformers—Requirements*, some of the requirements of that publication have been modified to take account of local conditions. Where this Specification deviates technically from the IEC publication by way of additional or different requirements, the deviation is indicated by a rule in the margin against the clause, or part thereof, affected. An annex to the Specification lists the variations from IEC 742.

It should be noted that the format of this Specification follows that of IEC 742 but in places where IEC 742 does not provide titles for numbered paragraphs or designations for sub-paragraphs (such as in tabulations), in such places the paragraphs concerned have been given suitable titles and the sub-paragraphs have been given either letter or Roman numeral designations, as appropriate.

AS 3100 and its series of particular Specifications specify essential safety requirements which have been proved to be satisfactory for many years. Some of the requirements of IEC Publication 742 are not included in the AS 3100 series. Even though such requirements have been included in Chapter 1 of this Standard, all of them have not been included in Chapter 2 and Chapter 3. Where these requirements have been deleted from the particular Specification the words 'not required' have been used. Where a requirement of Chapter 1 of this Standard does not apply because of the nature of the transformer being covered by Chapter 2 and Chapter 3, the words 'not applicable' are used. This is consistent with the IEC approach. The expression 'not required' has been used to clearly differentiate between the requirements which are 'not applicable' and those which are contained in IEC 742 but are additional to the essential safety requirements presently specified in the AS 3100 series of Specifications.

In this Specification the requirements proper appear in 'normal' type and the test requirements appear in 'italic' type. Explanatory matters are contained in Notes to the clauses, in a smaller size of the 'normal' type.

The subdivision of Chapters 2 and 3 is intended to allow the further insertion of requirements for other types of transformers.

Preparation of this Specification was undertaken to progressively align Australian Approval and Test Specifications with IEC Standards. It incorporates amendments No 1, 2 and 3 to AS 3108.1-2-3—1984 and changes to Clauses 13.2, 18.11 and 21.7.4 of Chapter 1 and to Clauses 7.1 and 7.11 of Chapter 2.

~~SEE AMENDMENT 1~~

© 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.

AMDT  
No. 1  
MAR.  
1992

**Page 2 Preface**

1 After the first paragraph, *add* the following new paragraph:

The Standards Association of New Zealand wishes to advise that this Specification will supersede NZS 1379, Parts 1 and 2:1960, NZS 2207:1968 and NZS 2247:1968 12 months from the date of publication of this Amendment.

2 At the end of the Preface, *add* the following new paragraph:

Standards Australia and Standards Association of New Zealand advise that this Specification will be published as a Joint Australian/New Zealand Standard at the next printing.

**This Amendment forms part of the Specification on publication.**



## CONTENTS

	<i>Page</i>
<b>CHAPTER 1 GENERAL REQUIREMENTS</b>	
1 SCOPE, OBJECT AND REFERENCED DOCUMENTS ....	4
2 DEFINITIONS ....	5
3 GENERAL REQUIREMENTS ....	8
4 GENERAL NOTES ON TESTS ....	8
5 RATING ....	10
6 CLASSIFICATION ....	10
7 MARKING ....	10
8 PROTECTION AGAINST ELECTRIC SHOCK ....	13
9 CHANGE OF INPUT VOLTAGE SETTING ....	15
10 OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD ....	16
11 NO-LOAD OUTPUT VOLTAGE ....	16
12 SHORT-CIRCUIT VOLTAGE ....	16
13 HEATING ....	16
14 SHORT-CIRCUIT AND OVERLOAD PROTECTION ....	20
15 MECHANICAL STRENGTH ....	22
16 PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE	22
17 INSULATION RESISTANCE AND ELECTRIC STRENGTH ....	23
18 CONSTRUCTION ....	24
19 COMPONENTS ....	26
20 INTERNAL WIRING ....	27
21 SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS	27
22 TERMINALS FOR EXTERNAL CONDUCTORS ....	31
23 PROVISION FOR EARTHING ....	35
24 SCREWS AND CONNECTIONS ....	36
25 CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION ....	38
26 RESISTANCE TO HEAT; ABNORMAL HEAT, FIRE AND TRACKING ....	40
27 RESISTANCE TO RUSTING ....	41
<b>APPENDICES</b>	
1A TESTS DURING PRODUCTION ....	42
1B EXAMPLES OF CONSTRUCTION OF WINDINGS TO BE USED AS A GUIDE FOR CLAUSE 8.6 ....	43
1C EXAMPLES OF POINTS OF APPLICATION OF TEST VOLTAGES ....	46
1D MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES ....	48
1E EXAMPLES OF POINTS OF MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES ....	53
<b>CHAPTER 2 SUPPLEMENTARY REQUIREMENTS FOR ISOLATING TRANS- FORMERS</b> ....	55
SECTION 1 ISOLATING TRANSFORMERS FOR GENERAL USE AND SHAVER TRANSFORMERS ....	56
<b>CHAPTER 3 SUPPLEMENTARY REQUIREMENTS FOR SAFETY ISOLATING TRANSFORMERS</b> ....	61
SECTION 1 SAFETY ISOLATING TRANSFORMERS FOR GENERAL USE ....	62
SECTION 2 TRANSFORMERS FOR TOYS ....	65
SECTION 3 BELL TRANSFORMERS ....	69
SECTION 4 TRANSFORMERS FOR CLASS III LUMINAIRES INCORPORATING INCANDESCENT LAMPS ....	75
ANNEX A LIST OF VARIATIONS BETWEEN THIS SPECIFICATION AND IEC 742 ....	84
ANNEX B REQUIREMENT FROM THE 1984 EDITION....	91

## STANDARDS AUSTRALIA

## Australian Standard

## Approval and test specification for isolating transformers and safety isolating transformers

## CHAPTER 1 GENERAL REQUIREMENTS

## 1 SCOPE, OBJECT AND REFERENCED DOCUMENTS

**1.1 Scope and application** This Specification is applicable to stationary or portable, single-phase or polyphase, air cooled isolating and safety isolating transformers, associated or otherwise, having a rated supply voltage not exceeding 1000 V a.c. and  $1000\sqrt{2}$  V unsmoothed d.c. and rated frequency not exceeding 500 Hz, the rated output not exceeding:

- (a) For isolating transformers:
  - (i) 25 kV.A for single-phase transformers
  - (ii) 40 kV.A for polyphase transformers
- (b) For safety isolating transformers;
  - (i) 10 kV.A for single-phase transformers
  - (ii) 16 kV.A for polyphase transformers.

The no-load and rated output voltages do not exceed:

- (A) For isolating transformers 1000 V a.c. and  $1000\sqrt{2}$  V unsmoothed d.c.
- (B) For safety isolating transformers 50 V a.c. r.m.s., and/or  $50\sqrt{2}$  unsmoothed d.c. direct current, between conductors or between any conductor and earth.

Rated values, appropriate to each type of transformer are indicated in Chapter 2 and Chapter 3.

## NOTES:

1. This Specification is applicable to those isolating transformers used when the installation rules call for the separation of circuits for the supply of equipment or of certain parts of the circuit (shavers, portable tools, lawn mowers, etc).
2. This Specification is applicable to safety isolating transformers used for the supply of circuits for safety extra-low voltages equipment (toys, bells, portable tools, handlamps, etc).
3. It also applies to transformers associated with specific items of equipment, to the extent indicated by other Australian Standards.
4. This Specification is applicable to dry type or encapsulated transformers. It is not applicable to transformers filled with oil, sand or similar substances.
5. In locations where special environmental conditions prevail, particular requirements may be necessary in accordance with AS 3000.
6. This Specification is not applicable to medical safety isolating transformers.

**1.2 Object** The main purpose of this Standard is to establish safety requirements for isolating transformers and safety isolating transformers.

**1.201 Referenced documents** The following documents are referred to in this Standard:

## STANDARDS

## AS

- 1042 Direct-acting indicating electrical measuring instruments and their accessories
- 1099.2Bd Dry-heat test for heat-dissipating specimens with gradual change of temperature
- 1852 International electrotechnical vocabulary
- 1939 Classification of degrees of protection provided by enclosures for electrical equipment
- 2005 Low voltage fuses—Fuses with enclosed fuse-links
- 2420 Fire test methods for solid insulating materials and non-metallic enclosures used in electrical equipment
- 2768 Classification of insulating materials for electrical machinery and apparatus on the basis of thermal stability in service
- 3000 SAA Wiring Rules

## APPROVAL AND TEST SPECIFICATIONS

- 3109 Appliance couplers for household and similar general use
- 3109.1 General requirements