

Australian Standard<sup>®</sup>

---

**DRY-TYPE POWER  
TRANSFORMERS**

---

[Title allocated by Defence Cataloguing Authority:  
TRANSFORMER, POWER, (Dry-Type) NSC 6120]

This Australian standard was prepared by Committee EL/8, Static Electrical Machinery. It was approved on behalf of the Council of the Standards Association of Australia on 31 July 1984 and published on 9 November 1984.

---

The following interests are represented on Committee EL/8:

Australian-British Trade Association  
Australian Electrical and Electronic Manufacturers Association Ltd  
Confederation of Australian Industry  
Defence Standardization Committee  
Electrical Testing Laboratories  
Electricity Supply Association of Australia  
Electricity Supply Engineers Association of New South Wales  
Institution of Engineers, Australia  
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which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.*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.*

---

*This standard was issued in draft form for comment as DR 83196.*

Australian Standard<sup>®</sup>

---

**DRY-TYPE POWER  
TRANSFORMERS**

---

First published ..... 1984

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

ISBN 0 7262 3510 5

## PREFACE

This standard was prepared by the Association's Committee on Static Electrical Machinery. It is based closely on and follows the text of IEC 726: Dry-type Power Transformers.

Where the standard differs from IEC 726 and changes have been made in compliance with Australian requirements, these changes are indicated by a rule in the margin. Only minor deviations from IEC 726 have been made and these are of an editorial nature. Some additional text has been added for further explanation of clauses and the information required with enquiry and order, set out in Appendix A, has been slightly varied to meet Australian conditions.

---

## CONTENTS

	<i>Page</i>
<b>SECTION 1. SCOPE AND GENERAL</b>	
1.1 Scope . . . . .	3
1.2 Application . . . . .	3
1.3 Referenced Documents . . . . .	3
1.4 Service Conditions . . . . .	3
1.5 Definitions . . . . .	3
1.6 Tappings and Connections . . . . .	4
1.7 Requirements with Regard to Ability to Withstand Short-circuit . . . . .	4
<b>SECTION 2. RATING</b>	
2.1 General . . . . .	5
2.2 Rated Power . . . . .	5
2.3 Preferred Values of Rated Power . . . . .	5
2.4 Operation of Higher than Rated Voltage . . . . .	5
2.5 Rating Plates . . . . .	5
<b>SECTION 3. COOLING METHODS AND TEMPERATURE RISE</b>	
3.1 Identification According to Cooling Method . . . . .	6
3.2 Temperature-rise Limits . . . . .	6
<b>SECTION 4. INSULATION LEVELS</b>	
4.1 Insulation Levels . . . . .	8
<b>SECTION 5. TESTS</b>	
5.1 General Requirements for Type, Routine and Special Tests . . . . .	9
5.2 Measurement of Sound Level (special test) . . . . .	11
5.3 Short-circuit Test (special test) . . . . .	11
5.4 Measurement of Zero Sequence Impedance (special test) . . . . .	11
5.5 Tolerances . . . . .	11
<b>SECTION 6. ENCLOSURES</b>	
6.1 Degree of Protection Provided by Enclosures . . . . .	12
<b>APPENDICES</b>	
A Information Required with Enquiry and Order . . . . .	13
B Unusual Environmental Conditions . . . . .	15

© 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.

## STANDARDS ASSOCIATION OF AUSTRALIA

**Australian Standard**  
for  
**DRY-TYPE POWER TRANSFORMERS**

## SECTION 1. SCOPE AND GENERAL

**1.1 SCOPE.** This standard specifies requirements for dry-type power transformers (including auto-transformers) having highest voltage for equipment values up to and including 36 kV.

The following small and special dry-type transformers are not covered by this standard:

- (a) Single-phase transformers rated at less than 1 kV.A and polyphase transformers rated at less than 5 kV.A.
- (b) Instrument transformers (covered by AS 1243 and AS 1675).
- (c) Transformers for semiconductor converters (AS 1955).
- (d) Starting transformers.
- (e) Testing transformers.
- (f) Traction transformers mounted on rolling stock.
- (g) Flameproof transformers.
- (h) Welding transformers.
- (j) Voltage regulating transformers.
- (k) Small power transformers in which safety is a special consideration.

Where Australian standards do not exist for the transformers mentioned above or for other special transformers, this standard may be applicable as a whole or in parts.

**1.2 APPLICATION.** Dry-type transformers shall comply with this standard and with the appropriate requirements of AS 2374. Where the requirements of this standard and AS 2374 conflict, the requirements of this standard shall prevail.

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

- AS 1018 Recommendations for Partial Discharge Measurements
- AS 1243 Voltage Transformers for Measurement and Protection
- AS 1675 Current Transformers for Measurement and Protection
- AS 1824 Insulation Coordination
- AS 1852 International Electrotechnical Vocabulary
- AS 1939 Classification of Degrees of Protection Provided by Enclosures for Electrical Equipment
- AS 1955 Semiconductor Convertors
- AS 2374 Power Transformers
  - Part 1—General Requirements
  - Part 2—Temperature Rise
  - Part 3—Insulation Levels and Dielectric Tests

- Part 4—Tappings and Connections
- Part 5—Ability to Withstand Short-circuit
- Part 6—Sound Levels

AS XXXX Electrical Insulating Materials—Evaluation and Classification Based on Thermal Endurance.\*

**1.4 SERVICE CONDITIONS.**

**1.4.1 Normal service conditions.** This standard gives detailed requirements for transformers for use under the following conditions:

- (a) Altitude. A height above sea level not exceeding 1000 m.

NOTE: For greater altitudes, see Clause 1.4.2.

- (b) Temperature of cooling air.

- (i) For outdoor transformers, never below  $-25^{\circ}\text{C}$  and never exceeding  $40^{\circ}\text{C}$ .

- (ii) For indoor transformers, never below  $-5^{\circ}\text{C}$  and never exceeding  $40^{\circ}\text{C}$ .

In addition, an average air temperature never exceeding—

A. in any one day . . . . .  $30^{\circ}\text{C}$ ; and

B. in any one year . . . . .  $20^{\circ}\text{C}$ .

NOTE: For higher temperatures, see Clause 1.4.2.

- (c) Wave shape of supply voltage. A supply voltage of which the wave shape is approximately sinusoidal.

- (d) Symmetry of polyphase supply voltages. For polyphase transformers, supply voltages which are approximately symmetrical.

**1.4.2 Provision for unusual service conditions.** The purchaser shall specify in his enquiry any conditions not covered by the normal service conditions in Clause 1.4.1. (See Appendix B.)

Supplementary requirements, within defined limits, for the rating and testing of transformers designed for other than the normal service conditions listed in Clause 1.4.1, such as high temperature of cooling air or altitude above 1000 m are given in Clauses 3.2.2, 3.2.3 and 4.1.2.

For temperature conditions outside the limits covered by the supplementary requirements and special operating conditions, e.g. restricted cooling air circulation, the temperature rise is to be subject to agreement between the purchaser and the manufacturer.

**1.5 DEFINITIONS.** For the purpose of this standard, the definitions in AS 1852 and AS 2374 and the following apply.

\* In course of publication, see DR 83050 (draft revision of AS C320 1958).