

Australian Standard™

**Power transformers**

**Part 1.2: Minimum Energy Performance  
Standard (MEPS) requirements for  
distribution transformers**



This Australian Standard was prepared by Committee EL-008, Power Transformers. It was approved on behalf of the Council of Standards Australia on 14 February 2003. This Standard was published on 3 March 2003.

---

The following are represented on Committee EL-008:

Australasian Railway Association  
Australian Chamber of Commerce and Industry  
Australian Electrical and Electronic Manufacturers Association  
Australian Greenhouse Office  
Australian Institute of Petroleum  
Electricity Supply Association of Australia  
Institution of Engineers Australia  
Testing Interests (Australia)

---

#### **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 Standards may also be withdrawn.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](http://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](mailto:mail@standards.org.au), or write to the Chief Executive, Standards Australia, GPO Box 476, Sydney, NSW 2001.

---

*This Standard was issued in draft form for comment as DR 02282.*

# Australian Standard™

## Power transformers

### Part 1.2: Minimum Energy Performance Standard (MEPS) requirements for distribution transformers

First published as AS 2374.1.2—2003.  
Reissued incorporating Amendment No.1 (August) 2005.

#### **COPYRIGHT**

© Standards Australia

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 GPO Box 476, Sydney, NSW 2001, Australia

ISBN 0 7337 5080 X

## PREFACE

This Standard was prepared by the Standards Australia Committee EL-008, Power Transformers.

*This Standard incorporates Amendment No. 1 (August 2005). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.*

The objective of this Standard is to provide industry in general, and manufacturers and suppliers of transformers specifically, with Minimum Energy Performance Standard (MEPS) requirements and high power efficiency levels, for oil-immersed and dry-type distribution transformers with power ratings from 10 kVA to 2500 kVA intended to be used on 11 kV and 22 kV networks. The intention of MEPS is to increase energy efficiency by eliminating low efficiency transformers from the market and to encourage the use of high efficiency transformers.

The minimum power efficiency levels specified in this Standard are in accordance with world best practice at the time of publication. The intention is that these levels will remain in place for a minimum of four years and will be reviewed in accordance with international trends. High power efficiency levels are also included as a guide to future MEPS levels. Transformers which meet the high power efficiency levels may be advertised as ‘high efficiency’.

This Standard is published with the approval of the combined State and Territory regulatory authorities responsible for energy efficiency regulation and is structured to be suitable for reference in legislation calling up Minimum Energy Performance Standards. It is anticipated that regulatory authorities will give mandatory effect to this Standard in law.

In 2003, Government officials and industry agreed that MEPS will not take effect earlier than 1 April 2004. Because legislation referencing this Standard has to be introduced by States and Territories individually, interested persons should contact the relevant regulatory authority to ascertain the date that MEPS for these products applies in that jurisdiction. Contact details for these regulatory authorities are available from [www.energyrating.gov.au](http://www.energyrating.gov.au).

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.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

## CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE .....	4
1.2 OBJECTIVE.....	4
1.3 SYMBOLS .....	5
1.4 REFERENCED DOCUMENTS .....	5
1.5 DEFINITIONS .....	5
1.6 MARKING .....	6
SECTION 2 MINIMUM POWER EFFICIENCY	
2.1 MINIMUM POWER EFFICIENCY LEVELS.....	7
SECTION 3 HIGH POWER EFFICIENCY	
3.1 HIGH POWER EFFICIENCY CLASSIFICATION .....	9
SECTION 4 TEST REQUIREMENTS AND CALCULATIONS	
4.1 TEST FACILITY.....	11
4.2 TESTS .....	11
4.3 TEST EQUIPMENT.....	11
4.4 MEASUREMENT ACCURACIES .....	11
4.5 FREQUENCY .....	11
4.6 CORRECTED NO LOAD LOSS.....	11
4.7 LOAD LOSS .....	11
4.8 REFERENCE TEMPERATURE .....	12
4.9 POWER FACTOR CORRECTIONS.....	12
4.10 CALCULATIONS.....	12
SECTION 5 APPLICATION AND TEST RESULT FORMATS	
5.1 APPLICATION FOR REGISTRATION .....	13
APPENDICES	
A FORMAT OF APPLICATION FOR REGISTRATION OF A TRANSFORMER FOR MEPS .....	14
B LOSS CAPITALIZATION PRACTICES .....	18

**STANDARDS AUSTRALIA****Australian Standard  
Power transformers****Part 1.2: Minimum Energy Performance Standard (MEPS) requirements for  
distribution transformers****SECTION 1 SCOPE AND GENERAL****1.1 SCOPE**

This standard applies to dry-type and oil-immersed type, three-phase and single-phase power transformers with power ratings from 10 kVA to 2500 kVA and system highest voltage up to 24 kV. This standard does not apply to certain categories of special transformers such as—

- (a) transformers other than those on 11 or 22 kv networks;
- (b) instrument transformers;
- (c) auto transformers;
- (d) traction transformers mounted on rolling stock;
- (e) starting transformers;
- (f) testing transformers;
- (g) welding transformers;
- (h) three phase transformers with three or more windings per phase;
- (i) arc-furnace transformers;
- (j) earthing transformers;
- (k) rectifier or converter transformers;
- (l) uninterruptible power supply (ups) transformers;
- (m) transformers with an impedance less than 3% or more than 8%;
- (n) voltage regulating transformers;
- (o) transformers designed for frequencies other than 50 hertz;
- (p) gas-filled dry-type transformers; or
- (q) flameproof transformers.

**1.2 OBJECTIVE**

The objective of this Standard is to permit the calculation of transformer efficiency, and to specify the permissible minimum power efficiency of distribution transformers under certain defined load conditions. This Standard is intended to be used as an instrument for regulation by State and Territory authorities of the Commonwealth of Australia responsible for energy efficiency regulation.

NOTE: In addition to the requirements of this Standard, consideration may also be given to the loss capitalization or total cost of ownership of a transformer. An example illustrating this principle is given in Appendix B.



**SAI GLOBAL**

This is a free 6 page sample. Access the full version online.

The remainder of this document  
is available for purchase online at

**[www.saiglobal.com/shop](http://www.saiglobal.com/shop)**

SAI Global also carries a wide range of publications from a wide variety of Standards Publishers:



Click on the logos to search the database online.