

AS 3768—1990

Australian Standard[®]

**Guide to the effects of temperature
on electrical equipment**

This Australian Standard was prepared by Committees EL/6, Industrial Switchgear and Controlgear, and EL/7, Power Switchgear. It was approved on behalf of the Council of Standards Australia on 9 January 1990 and published on 16 July 1990.

The following interests are represented on Committees EL/6 and EL/7:

Australian—British Chamber of Commerce
Australian Electrical and Electronic Manufacturers Association
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Electricity Contractors Association of Australia
Independent Electrical Switchboard Manufacturers Association
Institution of Engineers, Australia
Railways of Australia Committee
Testing Authorities
Water Board, Sydney
Workcover Authority, New South Wales

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which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.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 3768—1990

Australian Standard[®]

**Guide to the effects of temperature
on electrical equipment**

First published as AS 3768—1990.

Incorporating:
Amdt 1—1995

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

ISBN 0 7262 6125 4

PREFACE

This Standard was prepared jointly by the Standards Australia Committees on Industrial Switchgear and Controlgear and Power Switchgear, as a guide for engineers responsible for the determination of temperatures of components forming parts of electrical equipment.

It is based on the Central Office draft of IEC Technical report 943 (1989) *Guide for the specification of permissible temperature and temperature rise for parts of electrical equipment, in particular for terminals*, but is presented differently to make it easier to read and extract information relevant to particular applications.

A considerable amount of explanatory material for the development of the equations has not been included in this guide and reference should be made to IEC 943 for any further details.

© 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	3
1.2 REFERENCED DOCUMENTS	3
1.3 DEFINITIONS	3
1.4 NOTATION	5
SECTION 2. TEMPERATURES AND TEMPERATURE-RISES OF EQUIPMENT COMPONENTS	
2.0 GENERAL	6
2.1 TEMPERATURE AND TEMPERATURE-RISE LIMITS	6
2.2 COMMENTS ON TABLE 2.1	6
2.3 VARIATIONS IN THE TEMPERATURE OF THE MEDIUM (FLUID) SURROUNDING THE COMPONENT	10
SECTION 3. EFFECT OF TEMPERATURE ON CONTACT LIFE	
3.1 MECHANISM OF CONTACT AGEING	12
3.2 CONTACT MATERIALS, THEIR USE AND PRECAUTIONS TO BE TAKEN ..	12
3.3 EFFECT OF THERMAL CYCLING	13
SECTION 4. TEMPERATURE-RISES OF CONDUCTORS CONNECTING ELECTRICAL EQUIPMENT	
4.1 TEMPERATURE-RISE (ΔT_s) OF A CONDUCTOR WITH RESPECT TO ITS FLUID ENVIRONMENT TEMPERATURE (T_e)	15
4.2 TEMPERATURE-RISE (ΔT_o) IN THE VICINITY OF CONTACTS AND CONNECTION TERMINALS	18
SECTION 5. CURRENT RATINGS OF CABLES AND BUSBARS AND TEMPERATURE AND TEMPERATURE RISE OF TERMINALS CONNECTED THERETO	
5.1 CONNECTING CABLES AND BARS FOR TEMPERATURE-RISE TESTS ON EQUIPMENT	23
5.2 CURRENT RATINGS OF CIRCUIT CONDUCTORS FOR ELECTRICAL INSTALLATIONS	23
5.3 TEMPERATURE RISE OF BUSBARS	23
5.4 TEMPERATURE AND TEMPERATURE RISE OF EQUIPMENT TERMINALS—INFLUENCE ON CONNECTED CONDUCTORS	23
SECTION 6. THERMAL DETERIORATION OF ELECTRICAL INSULATION MATERIALS	
6.1 GENERAL	30
6.2 CABLE INSULATION	30
6.3 CURRENT RATING OF INSULATED CONDUCTORS	31
APPENDICES	
A RECOMMENDED CLAMPING TORQUES FOR BOLTED (SCREWED) TERMINALS AND CONNECTIONS	33
B CHARACTERISTICS OF CONDUCTOR AND CONTACT METALS	34
C TEMPERATURE—RISES OF A 10 mm SQUARE COPPER BAR CARRYING 335 A ..	35
D DERIVATION OF THE TEMPERATURE RISE OF A CONDUCTOR IN THE VICINITY OF A TERMINAL, WITH COOLING BY RADIATION AND NATURAL CONVECTION	36
E CALCULATION OF TEMPERATURE-RISE AT THE JUNCTION OF TWO 1 CM SQUARE COPPER BARS	40
F SYMBOLS AND UNITS USED IN THIS STANDARD	42

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-