

Australian Standard<sup>®</sup>

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

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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.

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*This Standard was issued in draft form for comment as DR 88227.*

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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.

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## STANDARDS AUSTRALIA

## Australian Standard

## Guide to the effects of temperature on electrical equipment

## SECTION 1. SCOPE AND GENERAL

**1.1 SCOPE.** This guide is intended for use by engineers responsible for the determination of the effects of temperatures and temperature-rises of electrical equipment.

It applies more particularly to electrical contacts, connections and terminals.

It does not apply to the windings of rotating electrical machines or transformers.

This Standard presents an overview of the following:

- (a) Calculations of the temperature-rises of contacts, connections and terminals.
- (b) Permissible temperatures and temperature-rises for various electrical components.

**1.2 REFERENCED DOCUMENTS.** The following documents are referred to in this Standard:

## AS

1078	Guide to loading of oil-immersed transformers
1154	Insulator and conductor fittings for overhead power lines
1154.1	Part 1: Performance and general requirements
1852	International electrotechnical vocabulary—
1852(441)	Switchgear, controlgear and fuses
1939	Classification of degrees of protection provided by enclosures for electrical equipment
2768	Electrical insulating materials—Evaluation and classification based on thermal endurance
3000	SAA Wiring Rules
3008	Electrical installations—Selection of cables
3008.1	Part 1: Cables for alternating voltages up to and including 0.6/1 kV
3300	Approval and test specification—General requirements for household and similar electrical appliances

## BS

4579	Specification for performance of mechanical and compression joints in electrical cable and wire connectors
4579.1	Part 1: Compression joints in copper conductors
4579.2	Part 2: Compression joints in nickel, iron and plated copper conductors
4579.3	Part 3: Mechanical and compression joints in aluminium conductors

## IEC

216	Guide for the determination of thermal endurance properties of electrical insulating materials
216.1	Part 1: General guidelines for ageing and evaluation of test results
287	Calculation of the continuous current rating of cables (100% load factor)
943	Draft-Guide for the specification of permissible temperatures and temperature rises for parts of electrical equipment, in particular for terminals

Approval tests Engineering Recommendation C79	Fifty seventh chief engineers conference, April, 1972, classification C. The UK Electricity Council. Type approval tests for connections and terminations for aluminium conductors of insulated power cables.
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**1.3 DEFINITIONS.** For the purpose of this Standard the definitions given in AS 1852(441) and the following apply:

**1.3.1 Ambient air temperature ( $T_a$ )**—temperature, determined under prescribed conditions, of the air surrounding the complete equipment.

## NOTES:

1. For equipment installed inside an enclosure, it is the temperature of the air outside the enclosure.
2. The value of the ambient temperature may be influenced by the heat generated by the equipment, around which it is measured.
3. Standard values of ambient air temperature ( $T_{an}$ ) in this guide are—
  - (a) the weighted annual mean ambient air temperature ( $T_{an1}$ ) = 20°C; and
  - (b) the maximum ambient temperature ( $T_{an2}$ ) = 40°C.