

Australian Standard[®]

**A method of temperature-rise
assessment by extrapolation for
partially type-test assemblies (PTTA) of
low-voltage switchgear and controlgear
(IEC 60890, Ed. 1.0 (1987) MOD)**

STANDARDS
Australia



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- Australasian Railway Association
 - Australian Chamber of Commerce and Industry
 - Australian Electrical and Electronic Manufacturers Association
 - Bureau of Steel Manufacturers of Australia
 - Engineers Australia
 - National Electrical Switchboard Manufacturers Association
 - Testing Interests (Australia)
-

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PREFACE

This Standard was prepared by the Standards Australia Committee EL-006, Industrial Switchgear and Controlgear, to supersede AS 4388—1996, *A method of temperature-rise assessment by extrapolation for partially type-tested assemblies (PTTA) of low-voltage switchgear and controlgear*, from the date of publication.

The objective of this Standard is to provide Australian and New Zealand electrical industries with methods to determine the temperature rise of air inside low-voltage switchgear and switchgear assemblies by extrapolation of results obtained by tests carried out on other assemblies.

This Standard was revised to introduce a new Annex ZA, which contains information on operating current, power loss and advisable maximum temperatures of copper busbars.

This Standard is an adoption with national modifications and has been reproduced from, IEC/TR 60890, Ed. 1.0 (1987), *A method of temperature-rise assessment by extrapolation for partially-tested assemblies (PTTA) of low-voltage switchgear and controlgear*, including its Corrigendum: 1988 and Amendment 1:1995, and has been varied as indicated to take account of Australian/New Zealand conditions.

Variations to IEC/TR 60890, Ed. 1.0 (1987) are indicated at the appropriate places throughout this standard. Strikethrough (*example*) identifies IEC text, tables and figures that, for the purposes of this Australian Standard, are deleted. Where text, tables or figures are added, each is set in its proper place and identified by shading (*example*). Added figures are not themselves shaded, but are identified by a shaded border.

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The terms 'normative' and 'informative' are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

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Any table, figure or text of the international standard that is struck through is not part of this standard. Any Australian/New Zealand table, figure or text that is added is part of this standard and is identified by shading.

1 Introduction

In IEC Publication 60439-1, in the series of type tests, a temperature-rise is specified. However, for certain types of assemblies for which the performance of a temperature-rise test is either not feasible or economically not justifiable a calculation of the temperature rise in the form of extrapolation from data found by tests on other assemblies may be made instead. Such assemblies are then called partially type-tested assemblies (PTTA).

Various methods of calculations can be conceived and are acceptable. The factors and coefficients set out in this report have been derived from measurements on numerous assemblies and the method has been verified by comparison with test results. The method described in this report is therefore one possible method and may for partially type-tested assemblies be used to prove compliance with the requirements of sub-clauses 8.2.1 of IEC Publication 60439-1. This report applies to PTTAs only.

2 Scope

The following method is applicable to enclosed PTTA or partitioned sections of PTTA without forced ventilation.

NOTE 1 - The influence of the materials and wall thickness usually used for enclosures are negligible on the steady state temperatures. The method is therefore applicable to enclosures made of sheet steel, sheet aluminium, cast iron, insulating material and the like.

NOTE 2 - For open-type and heat-radiant PTTA, no temperature-rise assessment is needed if it is obvious that no excessive air temperatures are likely to arise.

3 Object

The proposed method is intended to determine the temperature rise of the air inside the enclosure.

NOTE - The air temperature within the enclosure is equal to the ambient air temperature outside the enclosure plus the temperature rise of the air inside the enclosure caused by the power losses of the installed equipment.

Unless otherwise specified, the ambient air temperature outside the PTTA is the air temperature indicated for indoor installation of the PTTA (average value over 24 h) of 35°C. If the ambient air temperature outside the PTTA at the place of use exceeds 35°C, this higher temperature is deemed to be the ambient air temperature of the PTTA.

4 Conditions for application

This method of calculation is only applicable if the following conditions are fulfilled:

- there is an approximately even distribution of power losses inside the enclosure;