

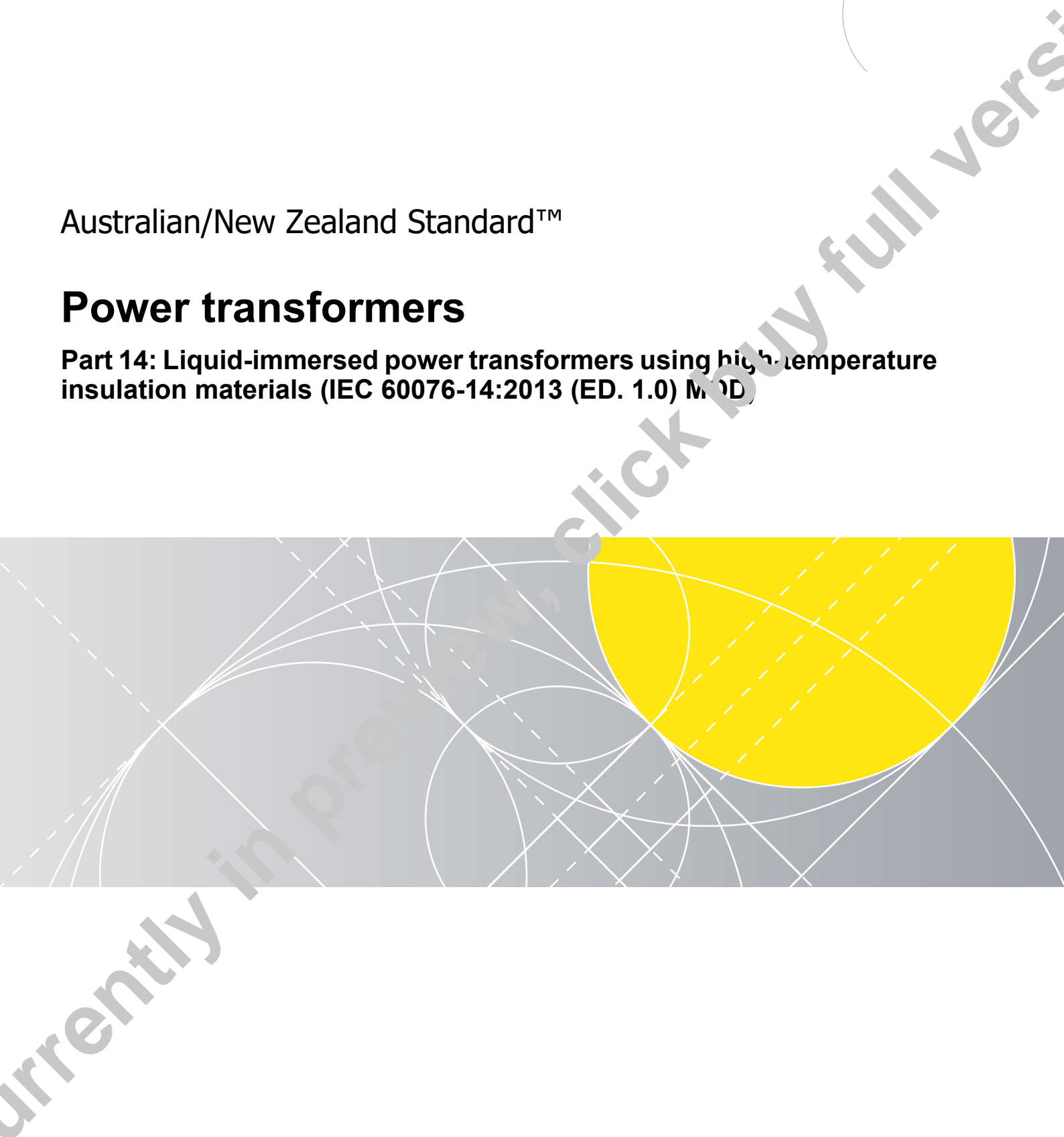
AS/NZS 60076.14:2025



Australian/New Zealand Standard™

Power transformers

Part 14: Liquid-immersed power transformers using high temperature insulation materials (IEC 60076-14:2013 (ED. 1.0) MOD)



AS/NZS 60076.14:2025

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee EL-008, Power Transformers. It was approved on behalf of Standards Australia's Standards Development and Accreditation Committee on 03 July 2025 and by the New Zealand Standards Approval Board on 02 July 2025.

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- Australian Industry Group
- Australian Institute of Petroleum
- CIGRE Australia
- Electrical Regulatory Authorities Council, Australia
- Electricity Engineers Association of New Zealand
- Energy Efficiency & Conservation Authority of New Zealand
- Energy Networks Australia
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using high-temperature insulation materials
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How to read this Standard

This page explains the meaning of the language and structure of this Standard.

Refer to Standards Australia's [Standardisation Guide 006](#) for more details about drafting rules.

Australian and Australian/New Zealand Standards are voluntary unless they are referenced in legislation or called up in contracts.

Requirements

To conform to a Standard, all requirements in the Standard need to be met.

A requirement is any statement in the Standard which uses the word "shall".

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The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

- (a) "should" means that something is recommended.
- (b) "may" means that something is permitted.
- (c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

- (i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.
- (ii) The Scope states what the Standard is about, what it covers and what it does not cover.
- (iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.
- (iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

- (1) A normative appendix sets additional requirements that need to be conformed to.
- (2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.
- (3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

This Standard is a modified adoption of an International Standard. It makes changes to the international text.

The changes to the international text are shown in boxes in the text. These boxes have the heading "National Variations".

To use this Standard in Australia/New Zealand, the changes in the national variation boxes need to be followed.

Preface

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

The objective of this document is to specify requirements for liquid-immersed power transformers employing either high temperature insulation or combinations of high-temperature and conventional insulation, operating at temperatures above conventional limits.

This document is applicable to the following:

- (a) Power transformers in accordance with AS/NZS 60076.1.
- (b) Converter transformers according to IEC 61378 series.
- (c) Transformers for wind turbine applications in accordance with IEC 60076-16.
- (d) Arc furnace transformers.
- (e) Reactors in accordance with AS/NZS 60076.6.

This part of AS/NZS 60076 may be applicable as a reference for the use of high-temperature insulation materials in other types of transformers and reactors.

This document is an adoption with national modifications and has been reproduced from, IEC 60076-14:2013, *Power transformers — Part 14: Liquid-immersed power transformers using high-temperature insulation materials*.

The modifications are additional requirements and are set out in national variation boxes (NVBs) which give instructions where the IEC content is to be modified for use in Australia and New Zealand. For copyright reasons, it is not possible to directly modify the international content.

As this document has been reproduced from an international document, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. “Normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Page

Preface	v
FOREWORD	x
INTRODUCTION	xii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Insulation systems	5
4.1 General	5
4.2 Winding insulation types	6
4.2.1 General	6
4.2.2 Summary of winding/system insulation types	6
4.2.3 Hybrid winding types	7
4.2.4 High-temperature insulation winding	9
5 Temperature rise limits	10
5.1 General	10
5.2 Thermally upgraded paper (TUP)	12
5.3 Cellulose used in ester liquid	12
6 Components and materials	12
6.1 General	12
6.2 Leads and cables	12
7 Special design considerations	13
7.1 Short-circuit considerations	13
7.2 Dielectric requirements	13
7.3 Temperature requirements	13
7.4 Overload	15
8 Required information	16
8.1 Information to be provided by the purchaser	16
8.1.1 Ambient temperatures and loading cycle	16
8.1.2 Other unusual service conditions	17
8.2 Information to be provided by the manufacturer	17
8.2.1 Thermal characteristics	17
8.2.2 Guarantees	17
9 Rating plate and additional information	17
9.1 Rating plate	17
9.2 Transformer manual	18
10 Test requirements	18
10.1 Routine, type and special tests	18
10.2 Dissolved gas analysis	18
10.3 OD cooled compact transformers	18
10.4 Evaluation of temperature-rise tests for windings with multiple hot-spots	18
10.5 Dielectric type tests	20
11 Supervision, diagnostics, and maintenance	20
11.1 General	20
11.2 Transformers filled with mineral insulating oil	20
11.3 Transformers filled with high-temperature insulating liquids	20
Annex A (informative) Insulation materials	22
Annex B (informative) Rapid temperature increase and bubble generation	28
Annex C (informative) Ester liquid and cellulose	31

Annex D Insulation system coding	45
Bibliography	48

Currently in preview, click buy full version

List of Figures

Page

Figure 1 – Example of semi-hybrid insulation windings	7
Figure 2 – Example of a mixed hybrid insulation winding	8
Figure 3 – Example of full hybrid insulation windings	9
Figure 4 – Example of high-temperature insulation system	10
Figure 5 – Temperature gradient conductor to liquid	14
Figure 6 – Modified temperature diagram for windings with mixed hybrid insulation system	19
Figure A.1 – Example of a thermal endurance graph	23
Figure B.1 – Bubble evolution temperature chart	29
Figure C.1 – Tensile strength ageing results of TUP in mineral oil and natural ester liquid	32
Figure C.2 – Composite tensile strength ageing results of TUP in mineral oil and natural ester liquid ...	33
Figure C.3 – DP ageing results of TUP in mineral oil and natural ester liquid	33
Figure C.4 – Composite DP ageing results of TUP in mineral oil and natural ester liquid	35
Figure C.5 – Tensile strength ageing results of kraft paper in mineral oil and natural ester liquid	35
Figure C.6 – Composite tensile strength ageing results of kraft paper in mineral oil and natural ester liquid	36
a) – 150 °C	37
b) – 170 °C	37
Figure C.8 – Composite DP ageing results of kraft paper in mineral oil and natural ester liquid	37
Figure C.9 – Infrared spectra of kraft paper aged in liquid at 110 °C for 175 days	40
Figure C.10 – Unit life versus temperature of TUP ageing data (least squares fit)	41
Figure C.11 – Unit life versus temperature of kraft paper ageing data (least squares fit)	41

List of Tables

Page

Table 1 – Preferred insulation system thermal classes	5
Table 2 – Winding/system insulation comparison	6
Table 3 – Maximum continuous temperature rise limits for transformers with hybrid insulation systems	11
Table 4 – Maximum continuous temperature rise limits for transformers with high-temperature insulation systems	12
Table 5 – Suggested maximum overload temperature limits for transformers with hybrid insulation systems	15
Table 6 – Suggested maximum overload temperature limits for transformers with high-temperature insulation systems	16
Table A.1 – Typical properties of solid insulation materials	25
Table A.2 – Typical enamels for wire insulation	26
Table A.3 – Typical performance characteristics of unused insulating liquids	27
Table C.1 – Effect of moisture solubility limits on cellulose moisture reduction	39
Table C.2 – Comparison of ageing results	40
Table C.3 – Maximum temperature rise for ester liquid/cellulose insulation systems	41
Table C.4 – Suggested maximum overload temperature limits for ester liquid/cellulose insulation systems	42

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60076-14 has been prepared by IEC technical committee 14: Power transformers.

This first edition of IEC 60076-14 is an International Standard which cancels and replaces the second edition of the Technical Specification IEC/TS 60076-14 published in 2009. It constitutes a technical revision.

This International Standard includes the following significant technical changes with respect to the Technical Specification:

- a) the hot-spot relationship to thermal class is now defined;
- b) a new 140 thermal class is defined;

- c) the number of insulation systems is reduced to only three: conventional, hybrid and high-temperature;
- d) homogeneous high-temperature insulation system has been changed to just high-temperature insulation system;
- e) winding definitions were introduced to define variations in the hybrid insulation system;
- f) the system example drawings have been revised for clarity;
- g) all suggested limits corresponding to Part 7 loading guide have been defined in a similar format;
- h) moisture equilibrium curves for high-temperature materials have been added to the moisture and bubble generation annex;
- i) an annex has been added to introduce the concept of thermal enhancement of cellulose by ester;
- j) some guide information, such as overload temperature limit suggestions was retained, but most of the other informative text was moved into informative annexes.

The text of this standard is based on the following documents:

FDIS	Report on voting
14/755/FDIS	14/759/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60076 series can be found, under the general title *Power transformers*, on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

This part of IEC 60076 standardizes liquid-immersed transformers that use high-temperature insulation. As a system, the solid insulation may encompass a broad range of materials with varying degrees of thermal capability. The insulating and cooling liquids also vary substantially, ranging from mineral oil to a number of liquids that also have a range of thermal capability.

This international standard is not intended to stand alone, but rather builds on the information and guidelines documented in other parts of the IEC 60076 series. Accordingly, this document follows two guiding principles. The first principle is that liquid-immersed transformers are well known and are well defined in other parts of this series and therefore, the details of these transformers are not repeated in this international standard, except where reference has value, or where repetition is considered appropriate for purposes of emphasis or comparison.

The second principle is that the materials used in normal liquid-immersed transformers, typically kraft paper, pressboard, wood, mineral oil, paint and varnish, which operate within temperature limits given in IEC 60076-2, are well known and are considered normal or conventional. All other insulation materials, either solid or liquid that have a thermal capability higher than the materials used in this well-known system of insulation materials are considered high-temperature. Consequently, this standard or normal insulation system is defined as the “conventional” insulation system for comparison purposes and these normal thermal limits are presented for reference to illustrate the differences between other higher-temperature systems.

This international standard addresses loading, overloading, testing and accessories in the same manner. Only selected information for the “conventional” transformers is included for comparison purposes or for emphasis. All other references are directed to the appropriate IEC document.