AS 60296:2017

Australian STANDARD

Fluids for electrotechnical applications—Unused mineral insulating oils for transformers and switchgear (IEC 60296, Ed. 4.0 (2012), MOD)

STANDARDS Australia

This Australian Standard® was prepared by Committee EL-008, Power Transformers. It was approved on behalf of the Council of Standards Australia on 13 March 2017.
This Standard was published on 8 May 2016.

The following are represented on Committee EL-008:

- Australian Chamber of Commerce and Industry
- Australian Industry Group
- Australian Institute of Petroleum
- Electricity Engineers Association (New Zealand)
- Energy Efficiency and Conservation Authority of New Zealand
- Energy Networks Australia
- Engineers Australia
- Rail Industry Safety and Standards Board

This Standard was issued in draft form for comment as DR AS 60296:2016.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that 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Standards may also be withdrawn.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 that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting **www.standards.org.au**

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at **mail@standards.org.au**, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard®

Fluids for electrotechnical applications—Unused mineral insulating oils for transformers and switchgear (IEC 60296, Ed. 4.0 (2012), MOD)

Originated as AS C62—1935.
Previous edition AS 1767.1—1999.
This edition 2017.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 1 76035 752 8

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-008, Power Transformers, to supersede AS 1767.1—1999, *Insulating liquids*, Part 1: *Specification for unused mineral insulating oils for transformers and switchgear*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to provide guidance to assist users when specifying unused mineral insulating oils for use in transformers and switchgear.

This Standard is an adoption with national modifications and has been reproduced from IEC 60296:2012, *Fluids for electrotechnical applications—Unused mineral insulating oils for transformers and switchgear* and has been varied as indicated in Appendix ZZ to take account of Australian conditions. For the purpose of this Standard, the IEC text and tables are amended, supplemented or replaced as set out in Appendix ZZ.

The title and designation of this Australian Standard has been changed to align with the IEC standard on which it is based.

This Standard is structured in the following layout:

(a) Preface.

(b) IEC 60296 (unedited from the Scope to the final Clause of the IEC Standard).

(c) Appendix ZZ—Australian variations to the IEC Standard.

As this Standard is reproduced from an International Standard, the following applies:

(i) In the source text ‘this International Standard’ should read ‘this Australian Standard’.

(ii) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian/New Zealand Standard*	
IEC		AS/NZS	
60076	Power transformers	60076	Power transformers
60076-2	Part 2: Temperature rise for liquid-immersed transformers	60076.2	Part 2: Temperature rise for liquid-immersed transformers (IEC 60076-2, Ed. 3.0 (2011) MOD)
		AS	
		1767	Insulating liquids
60156	Insulating liquids—Determination of the breakdown voltage at power frequency—Test method	1767.2.1	Part 2: Test methods, Method 2.1: Determination of the breakdown voltage at power frequency
60247	Insulating liquids—Measurement of relative permittivity, dielectric dissipation factor (tan δ) and d.c. resistivity	1767.2.2	Part 2: Test methods, Methods 2.2: Measurement of relative permittivity, dielectric dissipation factor (tan δ) and d.c. resistivity.

IEC		AS	
60422	Mineral insulating oils in electrical equipment—Supervision and maintenance guidance	60422*	Mineral insulating oils in electrical equipment—Supervision and maintenance guidance (IEC 60422:2013, MOD)
		1767	Insulating liquids
60475	Method of sampling insulating liquids dielectrics	1767.2.3	Part 2: Test methods Method 2.3: Method of sampling liquid dielectrics
60814	Insulating liquids—Oil-impregnated paper and pressboard—Determination of water by automatic coulometric Karl Fischer titration	1767.2.8	Method 2.8: Test methods—Determination of water in oiol-impregnated paper and pressboard by automatic coulometric Karl Fischer titration (IEC 60814, Ed.2.0 (1997) MOD)

Only normative references that have been adopted as Australian or Australian/New Zealand Standard have been listed.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annex or appendix to which they apply. A ‘normative’ annex or appendix is an integral part of a Standard, whereas an ‘informative’ annex or appendix is only for information and guidance.

* To be published.

CONTENTS

Page

INTRODUCTION

This International Standard does not purport to address all the safety problems associated with its use. It is the responsibility of the user of the standard to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.

The mineral insulating oils which are the subject of this standard should be handled with due regard to personal hygiene. Direct contact with the eyes may cause irritation. In the case of eye contact, irrigation with copious quantities of clean running water should be carried out and medical advice sought. Some of the tests specified in this standard involve the use of processes that could lead to a hazardous situation. Attention is drawn to the relevant standard for guidance.

This standard is applicable to mineral insulating oils, chemicals and used sample containers. The disposal of these items should be carried out according to local regulations with regard to their impact on the environment. Every precaution should be taken to prevent release of mineral insulating oil into the environment.

AUSTRALIAN STANDARD

Fluids for electrotechnical applications-Unused mineral insulating oils for transformers and switchgear (IEC 60296, Ed. 4.0 (2012), MOD)

1 Scope

This International Standard is applicable to specifications and test methods for unused mineral insulating oils (see Clause 3 for definitions). It applies to oil delivered to the agreed point and time of delivery, intended for use in transformers, switchgear and similar electrical equipment in which oil is required for insulation and heat transfer. These oils are obtained by refining, modifying and/or blending of petroleum products and other hydrocarbons.

Oils with and without additives are both within the scope of this standard.

This standard is applicable only to unused mineral insulating oils.

Recycled oils are beyond the scope of this standard.

NOTE Definitions and specifications for recycled oils will be covered by IEC 62701[1].

This standard does not apply to mineral insulating oils used as impregnants in cables or capacitors.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60076-2, *Power transformers – Part 2: Temperature rise for liquid-immersed transformers*

IEC 60156, *Insulating liquids – Determination of the breakdown voltage at power frequency – Test method*

IEC 60247, *Insulating liquids – Measurement of relative permittivity, dielectric dissipation factor (tan δ) and d.c. resistivity*

IEC 60422, *Mineral insulating oils in electrical equipment – Supervision and maintenance guidance*

IEC 60475, *Method of sampling liquid dielectrics*

IEC 60628:1985, *Gassing of insulating liquids under electrical stress and ionization*

IEC 60666, *Detection and determination of specified additives in mineral insulating oils*

IEC 60814, *Insulating liquids – Oil-impregnated paper and pressboard – Determination of water by automatic coulometric Karl Fischer titration*

1 In preparation.

