BS EN 62770:2014

BSI Standards Publication

Fluids for electrotechnical applications — Unused natural esters for transformers and similar electrical equipment

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National foreword

This British Standard is the UK implementation of EN 62770:2014. It is identical to IEC 62770:2013.

The UK participation in its preparation was entrusted to Technical Committee GEL/10, Fluids for electrotechnical applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2014

ISBN 978 0 580 77526 0
ICS 29.040.01

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2014.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62770

April 2014

ICS 29.040

English version

Fluids for electrotechnical applications - Unused natural esters for transformers and similar electrical equipment

(IEC 62770:2013)

Fluides pour applications électrotechniques - Esters naturels neufs pour transformateurs et matériels électriques analogues
(CEI 62770:2013)

Flüssigkeiten für elektrotechnische Anwendungen - Neue natürliche Ester für Transformatoren und ähnliche elektrische Betriebsmittel
(IEC 62770:2013)

This European Standard was approved by CENELEC on 2013-12-24. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 10/909/FDIS, future edition 1 of IEC 62770, prepared by IEC TC 10 "Fluids for electrotechnical applications" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62770:2014.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-10-18
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-12-24

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Endorsement notice

The text of the International Standard IEC 62770:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60422	NOTE	Harmonised as EN 60422.
IEC 61039	NOTE	Harmonised as EN 61039.
IEC 61099	NOTE	Harmonised as EN 61099.
IEC 61868	NOTE	Harmonised as EN 61868.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60076-14	-	Power transformers - Part 14: Liquid-immersed power transformers using high-temperature insulation materials	EN 60076-14	-
IEC 60156	-	Insulating liquids - Determination of the breakdown voltage at power frequency - Test method	EN 60156	-
IEC 60247	-	Insulating liquids - Measurement of relative permittivity, dielectric dissipation factor (tan d) and d.c. resistivity	EN 60247	-
IEC 60296	-	Fluids for electrotechnical applications - Unused mineral insulating oils for transformers and switchgear	EN 60296	-
IEC 60475	-	Method of sampling insulating liquids	EN 60475	-
IEC 60666	-	Detection and determination of specified additives in mineral insulating oils	EN 60666	-
IEC 60814	-	Insulating liquids - Oil-impregnated paper and pressboard - Determination of water by automatic coulometric Karl Fischer titration	EN 60814	-
IEC 61100[1)]	-	Classification of insulating liquids according to fire point and net calorific value	EN 61100	-
IEC 61125	1992	Unused hydrocarbon based insulating liquids - Test methods for evaluating the oxidation stability	EN 61125	1993
IEC 61198	-	Mineral insulating oils - Methods for the determination of 2-furfural and related compounds	EN 61198	-
IEC 61619	-	Insulating liquids - Contamination by polychlorinated biphenyls (PCBs) - Method of determination by capillary column gas chromatography	EN 61619	-
IEC 61620	-	Insulating liquids - Determination of the dielectric dissipation factor by measurement of the conductance and capacitance - Test method	EN 61620	-

[1)] Withdrawn in 2009 and partially replaced by IEC 61039.

IEC 62021-3	-	Insulating liquids - Determination of acidity - Part 3: Test methods for non mineral insulating oils	EN 62021-3	-
IEC 62535	2008	Insulating liquids - Test method for detection of potentially corrosive sulphur in used and unused insulating oil	EN 62535	2009
IEC 62697-1	-	Test method for quantitative determination of corrosive sulfur compounds in unused and used insulating liquids - Part 1: Test method for quantitative determination of dibenzyldisulfide (DBDS)	EN 62697-1	-
ISO 2592	-	Determination of flash and fire points - Cleveland open cup method	-	-
ISO 2719	-	Determination of flash point - Pensky-Martens closed cup method	-	-
ISO 3016	-	Petroleum products - Determination of pour point	-	-
ISO 3104	-	Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity	-	-
ISO 3675	-	Crude petroleum and liquid petroleum products - Laboratory determination of density - Hydrometermethod	-	-
ISO 12185	-	Crude petrolelum and petroleum products - Determination of density - Oscillating U-tube method	-	-
ASTM D 1275	-	Standard Test Method for Corrosive Sulfur in Electrical Insulating Oils	-	-
OECD 201-203	-	Test Guidelines for ecotoxicity	-	-
OECD 301		Guideline for testing of chemicals adopted by European Council	-	-
US EPA	-	Office of Prevention, Pesticides and Toxic Substances (OPPTS)	-	-
835.311	-	Fate, Transport and Transformation Test Guidelines	-	-

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INTRODUCTION

Because of their higher fire points and better environmental compatibility relative to petroleum derived insulating mineral oil, the use of vegetable oils and other natural esters is on the rise as insulating and heat transfer fluids in electrical devices such as transformers.

This standard sets performance criteria for unused natural esters earmarked for electrical applications. However, the use of natural esters is recommended only for equipment that is not open to the atmosphere, e.g. sealed transformers and reactors because these fluids are prone to rapid oxidation.

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 limitation prior to use.

Unused natural esters which are the subject of this standard should be handled with due regard to personal hygiene. Direct contact with eyes should be avoided. In case of eye contact, irrigation with copious amounts of clean running water should be carried out and medical advice sought.

Performance of some of the tests mentioned in this standard could lead to a hazardous situation. Attention is drawn to the relevant standard test method for guidance.

The disposal of natural esters, chemicals and sample containers mentioned in this standard should be carried out in accordance with current national legislation with regard to the impact on the environment. Every precaution should be taken to prevent the release of natural esters into the environment.

FLUIDS FOR ELECTROTECHNICAL APPLICATIONS – UNUSED NATURAL ESTERS FOR TRANSFORMERS AND SIMILAR ELECTRICAL EQUIPMENT

1 Scope

This International Standard describes specifications and test methods for unused natural esters in transformers and similar oil-impregnated electrical equipment in which a liquid is required as an insulating and heat transfer medium.

Use of natural esters is not recommended for electrical equipment that is open to the atmosphere.

In this standard the term “natural esters” applies to insulating fluids for transformers and similar electrical equipment with suitable biodegradability and environmental compatibility. Such natural esters are vegetable oils obtained from seeds and oils obtained from other suitable biological materials and delivered to an agreed point, at a set time period. These oils are comprised of triglycerides.

Natural esters with additives are within the scope of this standard. Because of their different chemical composition, natural esters differ from insulating mineral oils and other insulating fluids that have high fire points, such as synthetic esters or silicone fluids.

Natural, ester-derived insulating fluids with low viscosity have been introduced but are not covered by this standard. Pertinent properties of such fluids are given in Annex B.

This standard is applicable only to unused natural esters. Reclaimed natural esters and natural esters blended with non-natural esters fluids are beyond the scope of this standard.

The chemical nomenclature and scientific notations used in the standard are in accordance with the IUPAC handbook (Quantities, Units and Symbols in Physical Chemistry).

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 60076-14, *Power transformers - Part 14: Liquid-immersed power transformers using high-temperature insulation materials*

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 and DC resistivity of insulating fluids*

IEC 60296, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60475, *Method of sampling liquid dielectrics*

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