



**NSAI**  
Standards

Irish Standard  
I.S. EN 60422:2013

# Mineral insulating oils in electrical equipment - Supervision and maintenance guidance

**I.S. EN 60422:2013**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

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SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

*This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):*

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EN 60422:2013

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## National Foreword

I.S. EN 60422:2013 is the adopted Irish version of the European Document EN 60422:2013, Mineral insulating oils in electrical equipment - Supervision and maintenance guidance

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

For relationships with other publications refer to the NSAI web store.

**Compliance with this document does not of itself confer immunity from legal obligations.**

*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

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EUROPEAN STANDARD

**EN 60422**

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2013

ICS 29.040.10

Supersedes EN 60422:2006

English version

**Mineral insulating oils in electrical equipment -  
Supervision and maintenance guidance  
(IEC 60422:2013)**

Huiles minérales isolantes dans les  
matériels électriques -  
Lignes directrices pour la maintenance et  
la surveillance  
(CEI 60422:2013)

Isolieröle auf Mineralölbasis in  
elektrischen Betriebsmitteln -  
Leitlinie zur Überwachung und Wartung  
(IEC 60422:2013)

This European Standard was approved by CENELEC on 2013-02-14. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document 10/894/FDIS, future edition 4 of IEC 60422, prepared by IEC TC 10 "Fluids for electrotechnical applications" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60422:2013.

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) 2013-11-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-02-14

This document supersedes EN 60422:2006.

EN 60422:2013 represents a major revision of EN 60422:2006, in order to bring in line this standard with latest development of oil condition monitoring, containing new limits for oil parameters, suggested corrective actions in the tables and new test methods.

The action limits for all oil tests have been revised and changes made where necessary to enable users to use current methodology and comply with requirements and regulations affecting safety and environmental aspects.

In addition, EN 60422:2013 incorporates changes introduced in associated standards since EN 60422:2006 was published.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

## Endorsement notice

The text of the International Standard IEC 60422:2013 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 60567	NOTE Harmonised as EN 60567.
IEC 60599	NOTE Harmonised as EN 60599.
IEC 61198	NOTE Harmonised as EN 61198.
ISO 12185	NOTE Harmonised as EN ISO 12185.

## 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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 ( $\tan \delta$ ) and d.c. resistivity	EN 60247	-
IEC 60296	2012	Fluids for electrotechnical applications - Unused mineral insulating oils for transformers and switchgear	EN 60296	2012
IEC 60475	-	Method of sampling insulating liquids	EN 60475	-
IEC 60666	2010	Detection and determination of specified additives in mineral insulating oils	EN 60666	2010
IEC 60814	-	Insulating liquids - Oil-impregnated paper and pressboard - Determination of water by automatic coulometric Karl Fischer titration	EN 60814	-
IEC 60970	-	Insulating liquids - Methods for counting and sizing particles	EN 60970	-
IEC 61125 + corr. September	1992 1992	Unused hydrocarbon-based insulating liquids - Test methods for evaluating the oxidation stability	EN 61125	1993
IEC 61619	-	Insulating liquids - Contamination by polychlorinated biphenyls (PCBs) - Method of determination by capillary column gas chromatography	EN 61619	-
IEC 62021-1	-	Insulating liquids - Determination of acidity - Part 1: Automatic potentiometric titration	EN 62021-1	-
IEC 62021-2	-	Insulating liquids - Determination of acidity - Part 2: Colourimetric titration	EN 62021-2	-
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	2012	Test method for quantitative determination of corrosive sulfur compounds in unused and used insulating liquids - Part 1: Test method for quantitative determination of dibenzylsulfide (DBDS)	EN 62697-1	2012
EN 14210	-	Surface active agents - Determination of interfacial tension of solutions of surface active agents by the stirrup or ring method	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 2049	-	Petroleum products - Determination of colour (ASTM scale)	-	-
ISO 2719	-	Determination of flash point - Pensky-Martens closed cup method	EN ISO 2719	-
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	EN ISO 3104	-
ISO 3675	-	Crude petroleum and liquid petroleum products - Laboratory determination of density - Hydrometer method	EN ISO 3675	-
ISO 4406	1999	Hydraulic fluid power - Fluids - Method for coding the level of contamination by solid particles	-	-
ASTM D971	-	Standard test method for interfacial tension of oil against water by the ring method	-	-
ASTM D1275	2006	Standard test method for corrosive sulfur in electrical insulating oils	-	-
DIN 51353	-	Testing of insulating oils; detection of corrosive sulfur; silver strip test	-	-



**IEC 60422**  
(Fourth edition – 2013)

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

**CEI 60422**  
(Quatrième édition – 2013)

**Huiles minérales isolantes dans les matériels  
électriques – Lignes directrices pour la  
maintenance et la surveillance**

**CORRIGENDUM 1**

**A.2 Sampling temperature at or above  
20 °C**

*Insert, after the first line of the second  
paragraph, the missing Formula (A.1):*

$$f = 2,24e^{(-0,04ts)} \quad (A.1)$$

**A.2 Température d'échantillonnage  
égale ou supérieure à 20 °C**

*La présente correction ne concerne que le  
texte anglais*

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**IEC 60422**

Edition 4.0 2013-01

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**

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

**Huiles minérales isolantes dans les matériels électriques – Lignes directrices pour la maintenance et la surveillance**





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### A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

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**IEC 60422**

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# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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**Huiles minérales isolantes dans les matériels électriques – Lignes directrices pour la maintenance et la surveillance**

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