Irish Standard
I.S. EN 60599:2016

Mineral oil-filled electrical equipment in service - Guidance on the interpretation of dissolved and free gases analysis

I.S. EN 60599:2016

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National Foreword

I.S. EN 60599:2016 is the adopted Irish version of the European Document EN 60599:2016, Mineral oil-filled electrical equipment in service - Guidance on the interpretation of dissolved and free gases analysis

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60599

January 2016

ICS 17.220.99; 29.040.10; 29.180

Supersedes EN 60599:1999

English Version

Mineral oil-filled electrical equipment in service - Guidance on the interpretation of dissolved and free gases analysis (IEC 60599:2015)

Matériels électriques remplis d'huile minérale en service - Lignes directrices pour l'interprétation de l'analyse des gaz dissous et des gaz libres
(IEC 60599:2015)

In Betrieb befindliche, mit Mineralöl befüllte elektrische Geräte - Leitfaden zur Interpretation der Analyse gelöster und freier Gase
(IEC 60599:2015)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

Ref. No. EN 60599:2016 E

European foreword

The text of document 10/967/FDIS, future edition 3 of IEC 60599, prepared by IEC/TC 10 "Fluids for electrotechnical applications" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60599:2016.

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) 2016-07-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-10-21

This document supersedes EN 60599:1999.

EN 60599:2016 includes the following significant technical changes with respect to EN 60599:1999:

a) revision of 5.5, 6.1, 7, 8, 9, 10, A.2.6, A.3, A.7;

b) addition of new subclause 4.3;

c) expansion of the Bibliography;

d) revision of Figure 1;

e) addition of Figure B.4.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60050-191	1990	International Electrotechnical Vocabulary - Chapter 191: Dependability and quality of service	-	-
IEC 60050-192	2015	International electrotechnical vocabulary - Part 192: Dependability	-	-
IEC 60050-212	2010	International Electrotechnical Vocabulary - Part-212: Electrical insulating solids, liquids and gases	-	-
IEC 60050-604	1987	International Electrotechnical Vocabulary - Chapter 604: Generation, transmission and distribution of electricity - Operation	-	-
IEC 60475	-	Method of sampling insulating liquids	EN 60475	-
IEC 60567	2011	Oil-filled electrical equipment - Sampling of gases and analysis of free and dissolved gases - Guidance	EN 60567	2011
IEC 61198	-	Mineral insulating oils - Methods for the determination of 2-furfural and related compounds	EN 61198	-

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IEC 60599

Edition 3.0 2015-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Mineral oil-filled electrical equipment in service – Guidance on the interpretation of dissolved and free gases analysis

Matériels électriques remplis d'huile minérale en service – Lignes directrices pour l'interprétation de l'analyse des gaz dissous et des gaz libres

IEC 60599:2015-09(en-fr)

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IEC 60599

Edition 3.0 2015-09

INTERNATIONAL STANDARD

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Mineral oil-filled electrical equipment in service – Guidance on the interpretation of dissolved and free gases analysis

Matériels électriques remplis d'huile minérale en service – Lignes directrices pour l'interprétation de l'analyse des gaz dissous et des gaz libres

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MINERAL OIL-FILLED ELECTRICAL EQUIPMENT IN SERVICE – GUIDANCE ON THE INTERPRETATION OF DISSOLVED AND FREE GASES ANALYSIS

FOREWORD

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International Standard IEC 60599 has been prepared by IEC technical committee 10: Fluids for electrotechnical applications.

This third edition cancels and replaces the second edition published in 1999 and Amendment 1:2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) revision of 5.5, 6.1, 7, 8, 9, 10, A.2.6, A.3, A.7;
b) addition of new sub-clause 4.3;
c) expansion of the Bibliography;
d) revision of Figure 1;
e) addition of Figure B.4.

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

FDIS	Report on voting
10/967/FDIS	10/973/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.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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

Dissolved and free gas analysis (DGA) is one of the most widely used diagnostic tools for detecting and evaluating faults in electrical equipment filled with insulating liquid. However, interpretation of DGA results is often complex and should always be done with care, involving experienced insulation maintenance personnel.

This International Standard gives information for facilitating this interpretation. The first edition, published in 1978, has served the industry well, but had its limitations, such as the absence of a diagnosis in some cases, the absence of concentration levels and the fact that it was based mainly on experience gained from power transformers. The second edition attempted to address some of these shortcomings. Interpretation schemes were based on observations made after inspection of a large number of faulty oil-filled equipment in service and concentrations levels deduced from analyses collected worldwide.

MINERAL OIL-FILLED ELECTRICAL EQUIPMENT IN SERVICE – GUIDANCE ON THE INTERPRETATION OF DISSOLVED AND FREE GASES ANALYSIS

1 Scope

This International Standard describes how the concentrations of dissolved gases or free gases may be interpreted to diagnose the condition of oil-filled electrical equipment in service and suggest future action.

This standard is applicable to electrical equipment filled with mineral insulating oil and insulated with cellulosic paper or pressboard-based solid insulation. Information about specific types of equipment such as transformers (power, instrument, industrial, railways, distribution), reactors, bushings, switchgear and oil-filled cables is given only as an indication in the application notes (see Annex A).

This standard may be applied, but only with caution, to other liquid-solid insulating systems.

In any case, the indications obtained should be viewed only as guidance and any resulting action should be undertaken only with proper engineering judgment.

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 60050-191:1990, *International Electrotechnical Vocabulary – Chapter 191: Dependability and quality of service* (available at http://www.electropedia.org)

IEC 60050-192:2015, *International Electrotechnical Vocabulary – Part 192: Dependability* (available at http://www.electropedia.org)

IEC 60050-212:2010, *International Electrotechnical Vocabulary – Part 212: Electrical insulating solids, liquids and gases* (available at http://www.electropedia.org)

IEC 60050-604:1987, *International Electrotechnical Vocabulary – Chapter 604: Generation, transmission and distribution of electricity – Operation* (available at http://www.electropedia.org)

IEC 60475, *Method of sampling insulating liquids*

IEC 60567:2011, *Oil-filled electrical equipment – Sampling of gases and analysis of free and dissolved gases – Guidance*

IEC 61198, *Mineral insulating oils – Methods for the determination of 2-furfural and related compounds*