

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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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 – Recommandations relatives à l'interprétation de l'analyse des gaz dissous et des gaz libres**





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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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

This fourth edition cancels and replaces the third edition published in 2015. This edition constitutes a technical revision.

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

- a) revision of Clause A.5 on bushings, at the request of IEC subcommittee 36A, in order to transfer to IEC 60599 the corresponding contents of IEC TR 61464 [1]<sup>1</sup> relating to DGA in bushings and include the new information on DGA in bushings available in CIGRE Technical Brochure 771 (2019) [2];

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<sup>1</sup> Numbers in square brackets refer to the Bibliography.

- b) revision of Clause A.3 on wind turbine transformers, in order to include in IEC 60599 the new information on DGA in wind turbine transformers available in CIGRE Technical Brochure 771 (2019) [2].

The text of this International Standard is based on the following documents:

Draft	Report on voting
10/1164/FDIS	10/1174/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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- 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 document 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 (2015) 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.