

BS EN 60475:2011



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Method of sampling insulating liquids

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National foreword

This British Standard is the UK implementation of EN 60475:2011. It is identical to IEC 60475:2011. It supersedes BS 5263:1975, which is withdrawn.

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.

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

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EN 60475

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English version

Method of sampling insulating liquids (IEC 60475:2011)

Méthode d'échantillonnage des liquides
isolants
(CEI 60475:2011)

Verfahren zur Probennahme von
Isolierflüssigkeiten
(IEC 60475:2011)

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CENELEC

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

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Foreword

The text of document 10/848/FDIS, future edition 2 of IEC 60475, prepared by IEC/TC 10 "Fluids for electrotechnical applications" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60475:2011.

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) 2012-08-24
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2014-11-24

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Endorsement notice

The text of the International Standard IEC 60475:2011 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application of this document. 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 60567	2011	Oil-filled electrical equipment - Sampling of gases and analysis of free and dissolved gases - Guidance	EN 60567	2011
IEC 60970	-	Insulating liquids - Methods for counting and sizing particles	EN 60970	-

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INTRODUCTION

General caution, health, safety and environmental protection

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 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.

Environment

This standard is applicable to mineral oils and non-mineral oils, chemicals and used sample containers.

Attention is drawn to the fact that, some mineral oils in service may still be contaminated to some degree by PCBs. If this is the case, safety countermeasures should be taken to avoid risks to workers, the public and the environment during the life of the equipment, by strictly controlling spills and emissions. Disposal or decontamination of these oils should be carried out strictly according to local regulations. Every precaution should be taken to prevent release of mineral oil and non-mineral oil into the environment.

METHOD OF SAMPLING INSULATING LIQUIDS

1 Scope

This International Standard is applicable to the procedure to be used for insulating liquids in delivery containers and in electrical equipment such as power and instrument transformers, reactors, bushings, oil-filled cables, oil-filled tank-type capacitors, switchgear and load tap changers (LTCs).

This standard applies to liquids the viscosity of which at the sampling temperature is less than 1 500 mm²/s (or cSt). It applies to mineral oils and non-mineral oils (such as synthetic esters, natural esters, vegetable oils or silicones).

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

IEC 60970, *Insulating liquids – Methods for counting and sizing particles*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

delivery containers

containers such as drums, rail tankers, road tankers or flexible plastic bags used to store, transport and deliver batches of oil

3.2

electrical equipment

equipment filled with insulating oil such as power and instrument transformers, reactors, bushings, oil-filled cables, oil-filled tank-type capacitors, switchgear and load tap changers (LTCs)

3.3

sampling equipment

equipment used for sampling oil from delivery containers (e.g. sampling probes, such as dippers or siphons) and from electrical equipment (e.g. connecting tubing and drain valve adapters)

NOTE This also includes sample containers, waste oil containers and other accessories.

3.4

sample containers

containers such as syringes, bottles, ampoules or other devices used to store and transport samples of oil for analysis

NOTE This includes accessories such as valves, tubing or caps attached to the container.

4 General principles for the sampling of insulating liquids

4.1 New insulating liquids in delivery containers

4.1.1 Place of sampling

The sample shall be taken from the part of the delivery container where the insulating liquid is likely to be most heavily contaminated. To evaluate the quality of a consignment, two types of samples may be normally taken:

- a) composite sample: mixture of samples taken at the same level in several containers;
- b) individual sample: sample or mixture of samples taken at the same level in one container.

From a delivery, individual samples of 1 l may be taken from different containers for the electric strength test. Further tests may be carried out on these samples and a complete examination on the mixture of these (composite sample).

In certain cases, it may be useful to constitute an average sample within the container. An average sample is a mixture of samples taken at different levels in one container.

- 1) tankers: samples should be taken from each tanker as described in 4.1.4.2 below;
- 2) drums: samples should be taken as described in 4.1.4.3 below.

In the case of a single drum, this shall be sampled.

In case there is more than one drum of a lot of oil, sampling procedures should be negotiated between supplier and user. For example, samples can be taken from 10 % of drums or at least 2 drums, whichever the largest.

4.1.2 Quantity of sample to be taken

This depends on the tests to be performed and the procedures used.

Typically, 2 l are taken.

4.1.3 Sampling equipment

4.1.3.1 General

Since the results of the tests included in IEC requirements for insulating liquids can greatly depend on the impurities in the sample, it is essential to observe the following precautions:

- separate sampling equipment shall be reserved exclusively for each type of liquid. All seals and tubing used should be compatible with the insulating liquid to be sampled;
- the equipment shall be clean and dry, following the cleaning procedures described in 4.2.1.6. Particular care should be taken to ensure the absence of any traces of solid impurities, such as dust, fibres, etc. The use of rags for cleaning is not permitted.

4.1.3.2 Sampling probes

As examples, four types of sampling probes are described below. Other probes may also be used, provided they do not introduce any contamination. Stainless steel and aluminium are suitable.