Australian Standard™

Insulating liquids

Part 2: Test methods
Method 2.4: Detection and determination of specified anti-oxidant additives in insulating oils

[Based on and including the full text of IEC 60666:1979]

This Australian Standard was prepared by Committee EL/8, Power Transformers. It was approved on behalf of the Council of Standards Australia on 16 February 1999 and published on 5 May 1999.

The following interests are represented on Committee EL/8:

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PREFACE

This Standard was prepared by the Standards Australia Committee EL/8, Power Transformers.

It is based on but not equivalent to, and has been reproduced from, IEC 60666:1979, *Detection and determination of specified anti-oxidant additives in insulating oils.*

In January 1997, IEC commenced numbering its Standards from 60000 by adding 60000 to the number of each existing Standard. This coordinates IEC numbering with ISO numbering. During the transition period an IEC Standard might be identified by its new number or its old number (e.g. IEC 60050 or IEC 50).

Appendix ZZ lists variations to IEC 60666 for application in Australia. For the purposes of this Standard, the IEC text is amended, supplemented or replaced as set out in Appendix ZZ. These variations are indicated throughout this Standard by a marginal bar located adjacent to each clause or part thereof affected. Reference to Appendix ZZ is especially important in cases where additional text or clauses have been introduced.

This Standard is Part 2.4 of a series comprising the following:

AS
1767 Insulating liquids
1767.1 Part 1: Specification for unused mineral insulating oils for transformers and switchgear
1767.2 Part 2: Test methods
1767.2.1 Method 2.1: Determination of the breakdown voltage at power frequency
1767.2.3 Method 2.3: Method of sampling liquid dielectrics
1767.2.4 Method 2.4: Detection and determination of specified anti-oxidant additives in insulating oils (this Standard)
1767.2.5 Method 2.5: Unused hydrocarbon-based insulating liquids—Test methods for evaluating the oxidation stability
1767.2.7 Method 2.7: Determination of PCB contamination in insulating liquids by capillary column gas chromatography—Identification of congeners

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

As this Standard is reproduced from an International Standard, its number does not appear on each page of text and its identity is shown only on the cover and title pages.

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AUSTRALIAN STANDARD

Insulating liquids

Part 2:
Test methods
Method 2.4: Detection and determination of specified anti-oxidant additives in insulating oils

1. Scope

The methods described are to be used for the detection and determination of specified antioxidant additives in new hydrocarbon insulating oils. The detection methods are to be applied to assess whether or not a hydrocarbon insulating oil contains an anti-oxidant additive as specified by the supplier.

The determination methods are used for the quantitative determination of anti-oxidant additives previously detected by the appropriate detection method.

Note. - In certain cases, the methods described may also be used for oils in service.

SECTION I – METHODS FOR THE DETECTION OF ANTI-OXIDANT ADDITIVES

2. Detection of 2.6-di-tert-butyl-paracresol (DBPC) by thin layer chromatography

2.1 *Summary of the method*

The anti-oxidant additive is extracted from the oil with a suitable solvent. The solvent from the extract is evaporated and the residue analyzed by thin layer chromatography with the aid of a specific reagent.

2.2 *Reagents*

- Methanol, analytical grade.
- *n*-heptane, analytical grade.
- Phosphomolybdic acid: solution of 5 g phosphomolybdic acid in 100 ml isopropanol.
- Ammonia solution, analytical grade (density at 20 °C: 0.91 g/cm^3).
- Di-isopropyl ether, analytical grade.

2.3 *Equipment*

- Usual thin layer chromatography (TLC) equipment.
- Silica-gel coated plates.
- Microsyringe.

2.4 *Procedure*

- Extract 50 ml of the insulating oil three times with 20 ml portions of methanol.

- Combine the extracts and evaporate the methanol to a final volume of about 5 ml taking care to avoid overheating. It is best to carry out the evaporation under a nitrogen stream.