IEC 60836

Edition 3.0 2015-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Specifications for unused silicone insulating liquids for electrotechnical purposes

Spécifications pour liquides isolants silicones neufs pour usages électrotechniques

IEC 60836:2015-07(en-fr)

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COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.040.10

ISBN 978-2-8322-2789-3

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CONTENTS

FOREWORD ... 3
1 Scope ... 5
2 Normative references ... 5
3 Terms and definitions ... 6
4 Properties ... 6
4.1 General properties ... 6
4.2 Properties relating to health, safety and environment (HSE) ... 7
4.2.1 Handling ... 7
4.2.2 Disposal ... 7
5 General delivery requirements and identification ... 7
6 Storage and maintenance ... 7
7 Sampling ... 7
8 Properties and test methods ... 8
8.1 Colour and appearance ... 8
8.1.1 Colour ... 8
8.1.2 Appearance ... 8
8.2 Density ... 8
8.3 Kinematic viscosity ... 8
8.4 Flash point ... 8
8.5 Fire point ... 8
8.6 Refractive index ... 8
8.7 Pour-point ... 8
8.8 Water content ... 8
8.9 Acidity ... 8
8.10 Breakdown voltage ... 8
8.11 Dielectric dissipation factor, permittivity, d.c. resistivity ... 8
8.12 Gassing under electrical stress and ionization ... 8
8.13 Flammability ... 9
9 Individual specifications ... 9
9.1 General ... 9
9.2 Silicone transformer liquid ... 9
9.3 Other silicone liquids for electrotechnical purposes ... 10
Bibliography ... 11

Table 1 – Specification of silicone transformer liquid ... 9
Table 2 – Minimum requirements for silicone liquids ... 10

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SPECIFICATIONS FOR UNUSED SILICONE INSULATING LIQUIDS FOR ELECTROTECHNICAL PURPOSES

FOREWORD

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The International Standard IEC 60836 has been prepared by IEC technical committee 10: Fluids for electrotechnical applications.

This third edition cancels and replaces the second edition published in 2005. This edition constitutes a technical revision.

This edition includes the following major technical changes with regard to the second edition:

a) classification of liquids according to IEC 61039 have been adapted with respect to the latest edition of IEC 61039:2008;
b) classification of liquids according to IEC 61100:1992 have been removed as IEC 61100 has been withdrawn;
c) minimum requirements for other silicone liquids for electrotechnical purposes have been added.

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

FDIS	Report on voting
10/961FDIS	10/968/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

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SPECIFICATIONS FOR UNUSED SILICONE INSULATING LIQUIDS FOR ELECTROTECHNICAL PURPOSES

1 Scope

This International Standard covers specifications and test methods for unused silicone liquids intended for use in transformers and other electrotechnical equipment.

The specified characteristics of silicone transformer liquid classified as L-NTUK-8360300 (in accordance with IEC 61039) are described in Table 1.

Besides the standard transformer applications there are other applications of silicone liquids, such like cable accessories, capacitors, electrical magnets etc. The specified characteristics and minimum requirements for these liquids are described in Table 2.

NOTE Maintenance of used silicone liquid in electrotechnical equipment is covered in a separate publication IEC 60944.

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 60156:1995, *Insulating liquids – Determination of the breakdown voltage at power frequency – Test method*

IEC 60247, *Insulating liquids – Measurement of relative permittivity, dielectric dissipation factor (tan δ) and d.c. resistivity*

IEC 60296, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60475, *Method of sampling insulating liquids*

IEC 60628, *Gassing of insulating liquids under electrical stress and ionization*

IEC 60814, *Insulating liquids – Oil-impregnated paper and pressboard – Determination of water by automatic coulometric Karl Fischer titration*

IEC 60944, *Guide for the maintenance of silicone transformer liquids*

IEC 61039:2008, *Classification of insulating liquids*

IEC 62021-3, *Insulating liquids – Determination of acidity – Part 3: Test methods for non-mineral insulating oils*

ISO 2211, *Liquid chemical products – Measurement of colour in Hazen units (platinum-cobalt scale)*

ISO 2592, *Determination of flash and fire points – Cleveland open cup method*

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ISO 2719, *Determination of flash point – Pensky Martens closed cup method*

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*

ISO 3675, *Crude petroleum and liquid petroleum products – Laboratory determination of density – Hydrometer method*

ISO 5661, *Petroleum products – Hydrocarbon liquids – Determination of refractive index*

ISO 12185, *Crude petroleum and petroleum products – Determination of density – Oscillating U-tube method*

3 Terms and definitions

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

3.1
silicone insulating liquids
liquid organopolysiloxanes whose molecular structure consists mainly of linear chains of alternating silicon and oxygen atoms, with hydrocarbon groups attached to the silicon atoms

3.2
silicone transformer liquid
polydimethyl siloxane, without additives, primarily for use in transformers

Note 1 to entry: According to IEC 61039, this type is classified as L-NTUK-8360300.

3.3
other silicone liquids for electrotechnical purposes
polydimethyl siloxane, without additives, applied for electrotechnical purposes

Note 1 to entry: Classification of other fluids for electrotechnical purposes according to IEC 61039 shall be made in relation to their main application and their fire point, e.g. a liquid for capacitors with a fire point of less than 300 °C is classified as L-NCUO-8360300.

4 Properties

4.1 General properties

As defined in 3.2, silicone liquid for transformers has high flash and fire points and is therefore difficult to ignite. If combustion occurs, heat release rate is much lower than that of hydrocarbon oils.

In addition to use at similar working temperatures to those of transformers containing mineral transformer oil, silicone insulating liquids may also be used in appropriately designed electrotechnical equipment operating at higher temperatures.

The solubility of water in silicone liquids is greater than in mineral oils. Other physical characteristics which are important for the design of electrotechnical equipment, e.g. heat transfer, may also be different from those of mineral transformer oil and will need to be taken fully into account by the designer.

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