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Fluids for electrotechnical applications - Mineral insulating oils for electrical equipment

ESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 60296:2020 sisaldb Euroopa standardi EN IEC 60296:2020 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 60296:2020 consists of the English text of the European standard EN IEC 60296:2020.
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NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 60296

August 2020

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Supersedes EN 60296:2012 and all of its amendments
and corrigenda (if any)

English Version

Fluids for electrotechnical applications - Mineral insulating oils
for electrical equipment
(IEC 60296:2020)

Fluides pour applications électrotechniques - Huiles
minérales isolantes pour matériel électrique
(IEC 60296:2020)

Flüssigkeiten für elektrotechnische Anwendungen -
Isolieröle auf Mineralölbasis für elektrische Betriebsmittel
(IEC 60296:2020)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 10/1117/FDIS, future edition 5 of IEC 60296, prepared by IEC/TC 10 "Fluids for electrotechnical applications" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60296:2020.

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) 2021-05-01
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-07-31

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60076-2	NOTE	Harmonized as EN 60076-2
IEC 60590	NOTE	Harmonized as HD 382 S1
IEC 60867	NOTE	Harmonized as EN 60867
ISO 2592	NOTE	Harmonized as EN ISO 2592

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60156	-	Insulating liquids - Determination of the breakdown voltage at power frequency - Test method	-	-
IEC 60247	-	Insulating liquids - Measurement of relative permittivity, dielectric dissipation factor ($\tan \delta$) and d.c. resistivity	EN 60247	-
IEC 60422	2013	Mineral insulating oils in electrical equipment - Supervision and maintenance guidance	EN 60422	2013
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 60628	1985	Gassing of insulating liquids under electrical stress and ionization	HD 488 S1	1987
IEC 60666	2010	Detection and determination of specified additives in mineral insulating oils	EN 60666	2010
IEC 60814	-	Insulating liquids - Oil-impregnated paper and pressboard - Determination of water by automatic coulometric Karl Fischer titration	EN 60814	-
IEC 60970	-	Insulating liquids - Methods for counting and sizing particles	EN 60970	-
IEC 61125	2018	Insulating liquids - Test methods for oxidation stability - Test method for evaluating the oxidation stability of insulating liquids in the delivered state	EN IEC 61125	2018

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61198	-	Mineral insulating oils - Methods for the determination of 2-furfural and related compounds	EN 61198	-
IEC 61619	-	Insulating liquids - Contamination by polychlorinated biphenyls (PCBs) - Method of determination by capillary column gas chromatography	EN 61619	-
IEC 61620	-	Insulating liquids - Determination of the dielectric dissipation factor by measurement of the conductance and capacitance - Test method	EN 61620	-
IEC 61868	-	Mineral insulating oils - Determination of kinematic viscosity at very low temperatures	EN 61868	-
IEC 62021-1	-	Insulating liquids - Determination of acidity - Part 1: Automatic potentiometric titration	EN 62021-1	-
IEC 62021-2	-	Insulating liquids - Determination of acidity - Part 2: Colourimetric titration	EN 62021-2	-
IEC 62535	2008	Insulating liquids - Test method for detection of potentially corrosive sulphur in used and unused insulating oil	EN 62535	2009
IEC 62697-1	-	Test methods for quantitative determination of corrosive sulfur compounds in unused and used insulating liquids - Part 1: Test method for quantitative determination of dibenzyl disulfide (DBDS)	EN 62697-1	-
IEC 62961	-	Insulating liquids - Test methods for the determination of interfacial tension of insulating liquids - Determination with the ring method	EN IEC 62961	-
ISO 2049	-	Petroleum products - Determination of colour (ASTM scale)	-	-
ISO 2719	-	Determination of flash point - Pensky-Martens closed cup method	EN ISO 2719	-
ISO 3016	-	Petroleum and related products from natural or synthetic sources - Determination of pour point	EN ISO 3016	-
ISO 3104	-	Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity	EN ISO 3104	-
ISO 3675	-	Crude petroleum and liquid petroleum products - Laboratory determination of density - Hydrometer method	EN ISO 3675	-
ISO 3819	-	Laboratory glassware - Beakers	EN ISO 3819	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 8754	-	Petroleum products - Determination of sulphur content - Energy-dispersive X-ray fluorescence spectrometry	EN ISO 8754	-
ISO 12185	-	Crude petroleum and petroleum products - Determination of density - Oscillating U-tube method	EN ISO 12185	-
ISO 14596	-	Petroleum products - Determination of sulphur content - Wavelength-dispersive X-ray fluorescence spectrometry	EN ISO 14596	-
ASTM D 1500	-	Standard Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)	-	-
ASTM D 6591	-	Standard Test Method for Determination of Aromatic Hydrocarbon Types in Middle Distillates - High Performance Liquid Chromatography Method with Refractive Index Detection	-	-
ASTM D 7042	-	Standard Test Method for Dynamic Viscosity and Density of Liquids by Stabinger Viscometer (and the Calculation of Kinematic Viscosity)	-	-
ASTM D 7896	-	Standard Test Method for Thermal Conductivity, Thermal Diffusivity and Volumetric Heat Capacity of Engine Coolants and Related Fluids by Transient Hot Wire Liquid Thermal Conductivity Method	-	-
DIN 51353	-	Testing of insulating oils; detection of corrosive sulfur; silver strip test	-	-
IP 346	-	Determination of polycyclic aromatics in lubricant base oils and asphaltene free petroleum fractions - Dimethylsulfoxide refractive method	-	-

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Fluids for electrotechnical applications – Mineral insulating oils for electrical equipment

Fluides pour applications électrotechniques – Huiles minérales isolantes pour matériel électrique





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INTERNATIONAL STANDARD

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Fluids for electrotechnical applications – Mineral insulating oils for electrical equipment

Fluides pour applications électrotechniques – Huiles minérales isolantes pour matériel électrique

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CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	10
4 Properties of oil	12
4.1 General	12
4.2 Functional properties	12
4.3 Production and stability	12
4.4 Performance	13
4.5 Health, safety and environment (HSE) properties	13
5 Classification, labelling, identification, general delivery requirements and sampling	13
5.1 Classification and labelling	13
5.1.1 Classes	13
5.1.2 Antioxidant (oxidation inhibitor) content	13
5.1.3 Lowest cold start energizing temperature (LCSET)	14
5.1.4 Labelling and ordering designation	14
5.2 Requirements	14
5.3 Miscibility and compatibility	14
5.4 Identification and general delivery requirements	15
5.5 Sampling	15
6 Properties, their significance and test methods	15
6.1 Viscosity	15
6.2 Pour point	16
6.3 Water content	16
6.4 Breakdown voltage	16
6.5 Density	16
6.6 Dielectric dissipation factor (DDF)	17
6.7 Colour and appearance	17
6.8 Acidity	17
6.9 Interfacial tension (IFT)	17
6.10 Sulphur content	17
6.11 Corrosive and potentially corrosive sulphur	17
6.12 Additives (see 3.3)	18
6.12.1 General	18
6.12.2 Antioxidants (see 3.4)	18
6.12.3 Metal passivators	18
6.12.4 Pour point depressants	18
6.13 Oxidation stability	19
6.14 Flash point	19
6.15 Polycyclic aromatics (PCAs) and polycyclic aromatic hydrocarbons (PAHs)	19
6.16 Polychlorinated biphenyl content (PCBs)	19
6.17 2-furfural (2-FAL) and related compounds content	19
6.18 DBDS content	20
6.19 Stray gassing under thermo-oxidative stress	20
7 Additional properties	24

7.1	General.....	24
7.2	Electrostatic charging tendency (ECT)	24
7.3	Gassing tendency	24
7.4	Thermal properties.....	25
7.5	Properties connected with consistency (aromatic content, distribution of PAHs, refractive index)	25
7.6	Lubricating properties	25
7.7	Particle content.....	25
7.8	Foaming.....	25
7.9	Transformer oil test equivalents	25
Annex A (normative)	Method for stray gassing under thermo-oxidative stress	26
A.1	Overview of the method	26
A.2	Required materials.....	26
A.3	Pretreatment of syringes	26
A.4	Procedure A: stray gassing under oxidative conditions (high oxygen content)	27
A.4.1	Pretreatment of mineral oil.....	27
A.4.2	Filling syringes with mineral oil	27
A.4.3	Incubation procedure	27
A.4.4	Dissolved gas analysis	27
A.5	Procedure B: stray gassing under inert conditions (low oxygen content)	27
A.6	Reporting.....	28
A.6.1	Test report.....	28
A.6.2	Evaluation of the stray gassing behaviour of the oil	28
A.7	Precision data.....	28
A.7.1	General	28
A.7.2	Repeatability	28
A.7.3	Reproducibility.....	28
A.8	Results of the RRT.....	29
A.8.1	General	29
A.8.2	Stray gassing pattern 1	29
A.8.3	Stray gassing pattern 2	30
A.8.4	Stray gassing pattern 3	31
A.8.5	Stray gassing pattern 4	32
Annex B (informative)	Potentially corrosive sulphur	33
B.1	Mechanism of copper sulphide deposition	33
B.2	Corrosive sulphur compounds in oil	33
B.3	Detection of corrosive sulphur compounds in oils containing passivators	33
B.3.1	General	33
B.3.2	Procedure 1	34
B.3.3	Procedure 2	34
Annex C (informative)	Contamination of oils with silicone.....	35
Annex D (informative)	Transformer oil test equivalents	36
Bibliography.....	38	
Figure A.1 – Syringes with and without copper.....	27	
Figure A.2 – Stray gassing pattern 1	29	
Figure A.3 – Stray gassing pattern 2	30	
Figure A.4 – Stray gassing pattern 3	31	

Figure A.5 – Stray gassing pattern 4	32
Table 1 – Meaning of the identifying letter codes in the ordering designation of mineral oil according to IEC 60296	14
Table 2 – Maximum viscosity and pour point of mineral insulating oil	16
Table 3 – General specifications, Type A (fully inhibited high grade oils)	21
Table 4 – General specifications, Type B (uninhibited and inhibited standard grade oils)	23
Table D.1 – Some transformer oil test equivalents	36

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**FLUIDS FOR ELECTROTECHNICAL APPLICATIONS –
MINERAL INSULATING OILS FOR ELECTRICAL EQUIPMENT****FOREWORD**

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International Standard IEC 60296 has been prepared by IEC technical committee 10: Fluids for electrotechnical applications.

This fifth edition cancels and replaces the fourth edition published in 2012. This edition constitutes a technical revision.

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

- This International Standard is applicable to specifications and test methods for unused and recycled mineral insulating oils in the delivered state.
- Within the transformer insulating oils, two groups, Type A and Type B, are defined, based on their performance.
- A new method for stray gassing under thermo-oxidative stress of mineral insulating oils, which has been tested in a joint round robin test (RRT) between CIGRE D1 and IEC technical committee 10, has been included.

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

FDIS	Report on voting
10/1117/FDIS	10/1118/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

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The mineral insulating oils which are the subject of this document should be handled in compliance with local regulations and suppliers safety data-sheets.

This document is applicable to mineral insulating oils, chemicals and used sample containers. The disposal of these items should be carried out according to local regulations with regard to their impact on the environment.