



NSAI
Standards

Irish Standard
I.S. EN IEC 60296:2020

Fluids for electrotechnical applications - Mineral insulating oils for electrical equipment

I.S. EN IEC 60296:2020

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National Foreword

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EN IEC 60296

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2020

ICS 29.040.10

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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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

EN IEC 60296:2020 (E)

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.

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-07-31

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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 d) 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

EN IEC 60296:2020 (E)

<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 dibenzylidene 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	-	-

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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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IEC 60296

Edition 5.0 2020-06

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 ELECTROTECHNICAL COMMISSION

**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.

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