International Standard

ISO 10050

Lubricants, industrial oils and related products (class L) — Family T (Turbines) — Specifications of triaryl phosphate ester turbine control fluids (category ISO-L-TCD)

Lubrifiants, huiles industrielles et produits connexes (classe L) — Famille T (Turbines) — Spécifications pour les fluides de régulation de turbines à base d'esters de triaryl phosphate (catégorie ISO-L-TCD)

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources*, Subcommittee SC 4, *Classifications and specifications*.

This second edition cancels and replaces the first edition (ISO 10050:2005), which has been technically revised.

The main changes are as follows:

— addition of precisions about the composition of the products;

— addition of safety precautions;

— updates of the specifications:

  — the temperature for elastomer compatibility has been lowered to 60 °C to reflect the conditions of use;

  — the corrosiveness to copper test has been added;

— the maintenance and use guide IEC 60978 has been replaced by ISO 11365.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Lubricants, industrial oils and related products (class L) — Family T (Turbines) — Specifications of triaryl phosphate ester turbine control fluids (category ISO-L-TCD)

WARNING — The handling and use of products as specified in this document can be hazardous, if suitable precautions are not observed. This document does not purport to address all the safety problems associated with its use. It is the responsibility of the users of this document to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This document specifies the characteristics of unused triaryl phosphate ester fluids for turbine governor controls and other hydraulic systems in electrical power stations. Fluids used in this application are classified under category TCD of ISO 6743-5.

2 Normative references

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.

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48-2, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 2: Hardness between 10 IRHD and 100 IRHD*

ISO 760, *Determination of water — Karl Fischer method (General method)*

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 2160, *Petroleum products — Corrosiveness to copper — Copper strip test*

ISO 2592, *Petroleum and related products — Determination of flash and fire points — Cleveland open cup method*

ISO 3016, *Petroleum and related products from natural or synthetic sources — Determination of pour point*

ISO 3104, *Petroleum products — Transparent and opaque liquids — Determination of kinematic viscosity and calculation of dynamic viscosity*

ISO 3170, *Petroleum liquids — Manual sampling*

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

ISO 4259-2, *Petroleum and related products — Precision of measurement methods and results — Part 2: Interpretation and application of precision data in relation to methods of test*

ISO 4406, *Hydraulic fluid power — Fluids — Method for coding the level of contamination by solid particles*

ISO 6247, *Petroleum products — Determination of foaming characteristics of lubricating oils*

ISO 6614, *Petroleum products — Determination of water separability of petroleum oils and synthetic fluids*

ISO 6619, *Petroleum products and lubricants — Neutralization number — Potentiometric titration method*

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ISO 9120, *Petroleum and related products — Determination of air-release properties of steam turbine and other oils — Impinger method*

ISO 12185, *Crude petroleum, petroleum products and related products — Determination of density — Laboratory density meter with an oscillating U-tube sensor*

ISO 12937, *Petroleum products — Determination of water — Coulometric Karl Fischer titration method*

ISO 13226, *Rubber — Standard reference elastomers (SREs) for characterizing the effect of liquids on vulcanized rubbers*

ISO 14935, *Petroleum and related products — Determination of wick flame persistence of fire-resistant fluids*

ISO 15597, *Petroleum and related products — Determination of chlorine and bromine content — Wavelength-dispersive X-ray fluorescence spectrometry*

ISO 20823, *Petroleum and related products — Determination of the flammability characteristics of fluids in contact with hot surfaces — Manifold ignition test*

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

EN 14832, *Petroleum and related products — Determination of the oxidation stability and corrosivity of fire-resistant phosphate ester fluids*

EN 14833, *Petroleum and related products — Determination of the hydrolytic stability of fire-resistant phosphate ester fluids*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Composition

4.1 In general, phosphate esters are a class of organophosphorus compounds with the following chemical structure:

$$O = P\ (OR)_3$$

where R is an alkyl, aryl or aryl substituted group. In control systems applications, only triaryl phosphate fluids are used. R, in that case, is a substituted or an unsubstituted phenyl group.

4.2 When approved for use as governor fluids, substituents on the aromatic group are currently either methyl (- CH_3) or tertiary butyl (- $C(CH_3)_3$) groups.

4.3 If the substituents are methyl groups, the product is known as trixylyl phosphate (TXP). This material is a substance of very high concern (SVHC) and its use is subject to authorization as it is included in Annex XIV of the regulation for registration, evaluation, authorization and restriction of chemicals (REACH).[9] Outside the European Union, the fluid is widely used.

4.4 Additives can be incorporated to enhance oxidation stability, corrosion and rust protection, and to reduce foaming. Use of viscosity modifiers is not allowed.

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