SLOVENSKI STANDARD
oSIST prEN 50503:2007

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Tekočine za uporabo v elektrotehniki - Standard za materialno poslovanje, upravljanje, dekontaminacijo oziroma odlaganje električne opreme in izolacijskih tekočin, ki vsebujejo PCB

Fluids for electrotechnical applications - Standard for the inventory control, management, decontamination and/or disposal of electrical equipment and insulating liquids containing PCBs

Flüssigkeiten für elektrotechnische Anwendungen - Norm für Bestandsliste, Überwachung, Handhabung, Dekontaminierung und/oder Entsorgung von PCBs enthaltenden elektrischen Betriebsmitteln und Isolierflüssigkeiten

Fluides pour applications électrotechniques - Norme pour la vérification de l'inventaire, la gestion, la décontamination et/ou l'élimination de l'équipement électrique et des liquides isolants contenant du polychlorobiphényle (PCB)

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ICS

English version

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This draft European Standard is submitted to CENELEC members for CENELEC enquiry. Deadline for CENELEC: 2007-05-04.

It has been drawn up by CLC/BTTF 116-1.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

This draft European Standard has been prepared by CENELEC BTTF 116-1 'Fluids for electrotechnical applications'. It is submitted to CENELEC enquiry.

Contents

Introduction

Insulating liquids with PCBs bases (Askarels) or contaminated by PCBs that might be currently in use in electrical equipment in the generation, transmission, distribution and use of electric energy.

Polychlorinated biphenyls (PCBs) are a mixture of 209 possible congeners (as defined by EN 61619). Such compounds of a synthetic origin, have been produced and used in various commercial mixtures at an international level since 1930 (see Annex A). The chemical stability and relative non flammability features of PCBs created a decisive technological innovation to the point that a considerable use was generated by the electrotechnical industry.

The same functional features of these substances determined critical incidences of an environmental character: PCBs are, in fact, classified as hazardous and persistent substances in the environment, bio-accumulable along the food chain.

It is recognised that oil-filled electrical equipment may have been contaminated by PCBs either during manufacture or maintenance operations using oils which have been contaminated with PCBs.

Insulating liquids and equipment containing insulating liquids are classified, respectively, “PCBs” and “Equipment containing PCBs” when the total concentration of Polychlorinated biphenyls (209 possible congeners) and correlated compounds PCTs (Polychlorinated terphenyls-8 557 possible congeners) and PCBTs (Polychlorinated benzyltoluenes-thousands of possible congeners) present in the insulating liquids exceeds the limits prescribed by current legislation for the single matrices or destinations (equipment and insulating liquids in operation, waste, used oils, fuel oils, etc.).

During their life cycle, systems, equipment and insulating liquids in operation can degrade faster, if not properly managed and maintained, inducing failures that could cause, under limited circumstances, incidents having a significant environmental impact, that can be correlated to the specific conditions of the settlement and the site. Thus, during their service life, equipment containing PCBs should be subject to measures capable of preventing and/or mitigating degradation processes and the spillage of PCBs, in accordance with Directive 96/59/EC, to ensure the protection of workers, public health and the environment, as well as complying with the prescriptions of the Stockholm Convention entered into force on 2004-05-17.

Starting from the eighties, PCBs have been subject to prohibitions and limitations for the marketing and use: the recent Council Directives and Commission Decisions introduced new obligations for the inventory, control, management, decontamination and/or disposal of electrical equipment and insulating liquid containing PCBs, within 2010.

1 Scope

The scope of this European Standard is to provide operational procedures for the activities of inventory, control, management, decontamination and/or disposal of equipment and containers with insulating liquid containing PCBs, in compliance with the Council Directives (96/59/EC, 96/61/EC), Commission Decision (2001/68/EC), and/or with appropriate national or local legislation.

This European Standard is addressed, in particular, toward the management of insulating liquids and it has been developed in accordance with the following motivating principles:

a) reduction of risks for workers, public health and the environment, deriving from troubles or failures of the equipment that could originate fires or the spill of hazardous and persistent products;

b) implementation of the “Best Available Techniques” and methodologies available for safety, while taking into account the criteria of the surroundings, self-sufficiency and functional recovery;

c) technical feasibility of the activities recommended or imposed by current legislation, within the prescribed time schedules, taking into account the economic feasibility as well.

WARNING: For those CENELEC countries in which the European Directives do not apply, this European Standard has an informative purpose only.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 12766-1	Petroleum products and used oils – Determination of PCBs and related products – Part 1: Separation and determination of selected PCB congeners by gas chromatography (GC) using an electron capture detector (ECD)
EN 12766-2	Petroleum products and used oils – Determination of PCBs and related products – Part 2: Calculation of polychlorinated biphenyl (PCB) content
EN 12766-3	Petroleum products and used oils – Determination of PCBs and related products – Part 3: Determination and quantification of polychlorinated terphenyls (PCT) and polychlorinated benzyl toluenes (PCBT) content by gas chromatography (GC) using an electron capture detector (ECD)
EN 50195	Code of practice for the safe use of fully enclosed askarel-filled electrical equipment
EN 50225	Code of practice for the safe use of fully enclosed oil-filled electrical equipment which may be contaminated with PCBs
EN 60156	Insulating liquids - Determination of the breakdown voltage at power frequency - Test method (IEC 60156)
EN 60247	Insulating liquids - Measurement of relative permittivity, dielectric dissipation factor (tan d) and d.c. resistivity (IEC 60247)
EN 60567	Oil-filled electrical equipment - Sampling of gases and of oil for analysis of free and dissolved gases - Guidance (IEC 60567)

EN 60599		Mineral oil-impregnated electrical equipment in service - Guide to the interpretation of dissolved and free gases analysis (IEC 60599)
EN 60814		Insulating liquids - Oil-impregnated paper and pressboard - Determination of water by automatic coulometric Karl Fischer titration (IEC 60814)
EN 60970		Methods for counting and sizing particles in insulating liquids (IEC 60970)
EN 61125		Unused hydrocarbon-based insulating liquids - Test methods for evaluating the oxidation stability (IEC 61125)
EN 61198		Mineral insulating oils - Methods for the determination of 2-furfural and related compounds (IEC 61198)
EN 61619		Insulating liquids - Contamination by polychlorinated biphenyls (PCBs) - Method of determination by capillary column gas chromatography (IEC 61619)
EN 62021 series		Insulating liquids - Determination of acidity (IEC 62021 series)
EN ISO 9001	2000	Quality management systems – Requirements (ISO 9001:2000)
EN ISO/IEC 17025	2000	General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:1999)
IEC 60296		Fluids for electrotechnical applications - Unused mineral insulating oils for transformers and switchgear
IEC 60422		Mineral insulating oils in electrical equipment - Supervision and maintenance guidance
IEC 60588 series		Askarels for transformers and capacitors
IEC 60666		Detection and determination of specified anti-oxidant additives in insulating oils
IEC 60836		Specifications for unused silicon insulating liquids for electrotechnical purposes
IEC 60944		Guide for the maintenance of silicone transformer liquids
IEC 61099		Specifications for unused synthetic organic esters for electrical purposes
IEC 61203		Synthetic organic esters for electrical purposes - Guide for maintenance of transformer esters in equipment
DIN 51353		Testing of insulating oils; detection of corrosive sulfur; silber strip test
ISO 2049		Petroleum products - Determination of colour (ASTM scale)
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 5662		Petroleum products - Electrical insulating oils - Detection of corrosive sulfur
ISO 12185		Crude petroleum and petroleum products - Determination of density - Oscillating U-tube method
ASTM D 971		Standard test method for interfacial tension of oil against water by the ring method
ASTM D 4951	1996	Standard test method for determination of additive elements in lubricating oils by inductively coupled plasma atomic emission spectrometry
ASTM D 5185	1997	Standard test method for determination of additive elements, wear metals, and contaminants in used lubricating oils and determination of selected elements in base oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)

3 Definitions

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

3.1
askarel
synthetic, fireproof insulating liquid which, when decomposed by electrical arc, will evolve predominantly non combustible gaseous mixtures

[IEV 212-07-08]

NOTE Askarels usually consists of polychlorinated biphenyls with or without the addition of polychlorinated benzenes.

3.2
Best Available Techniques (BAT)
most effective and advanced stage in the development of activities and their operation methods which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole:

- *'techniques'* shall include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned;
- *'available techniques'* shall mean those techniques developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the member state in question, as long as they are reasonably accessible to the operator;
- *'best'* shall mean most effective in achieving a high general level of protection of the environment as a whole

[Council Directive 96/61/EC]

3.3
congener
all the chlorine derivatives of biphenyl, irrespective of the number of chlorine atoms, are termed congeners
[EN 61619]

3.4
contaminant
foreign substance or material in an insulating liquid, gas or solid, which usually has deleterious effect on one or more properties
[IEV 212-07-26]

3.5
critical incidence
in some cases, effect of the faulty performance of a component on the performances of a system

3.6
decontamination
procedure of reducing, eliminating and/or decomposing compounds and/or undesired elements on a specific matrix, to the prescribed concentration limit

3.7
decontamination (from PCBs)
all operations which enable equipment, objects, materials or fluids contaminated by PCBs to be reused, recycled or disposed of under safe conditions, and which may include replacement, meaning all operations in which PCBs are replaced by suitable fluids not containing PCBs
[Council Directive 96/59/EC Art. 2, e]

NOTE PCBs decontamination techniques may be applied during the service life of the electrical equipments or at the end of their life. In the latter case these techniques may be considered as waste treatment. When these techniques are applied during the service life then they should be considered as maintenance activities.

3.8
dehalogenation of PCBs
method of chemical decontamination dehalogenating PCBs down to the prescribed concentration limit

NOTE Halogenated compounds include PCTs, PCBTs, PCDFs, PCDDs, etc.

3.9
depolarisation
method of decontamination from polar compounds or oxidation products of dielectric fluids, capable of reinstating the functional features required.
This process includes selective chemical reaction applying the best available techniques

3.10
disposal
operations D8, D9, D10, D12 (only in safe, deep, underground storage in dry rock formations and only for equipment containing PCBs and used PCBs which cannot be decontaminated) and D15 provided for in Annex II A of Directive 75/442/EEC

[Council Directive 96/59/EC Art. 2, f]

3.11
equipment containing PCBs
any equipment containing PCBs or having contained PCBs (e.g. transformers, capacitors, receptacles containing residual stocks) which has not been decontaminated. Equipment of a type which may contain PCBs shall be treated as if it contains PCBs unless it is reasonable to assume the contrary

[Council Directive 96/59/EC Art. 2, b]

3.12
failure
end of the capability of a component or system to fulfil the function required

3.13
holder
natural or legal person who is in possession of PCBs, used PCBs and/or equipment containing PCBs

[Council Directive 96/59/EC Art. 2, d]

3.14
incineration
controlled combustion to degrade materials, in accordance with current regulations and the best available techniques

3.15
insulating liquid
liquid with negligibly low electrical conductivity, used to separate conducting parts at different electrical potentials

3.16
maintenance
combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function

3.17
reclaiming
elimination of soluble and insoluble contaminants from an insulating liquid by chemical absorption means, in order to restore properties as close as possible to the original value

NOTE The process may include the use of antioxidants.

3.18
risk
probabilistic value, entity of the damage for its probability to occur. It is a function of time, failure rate, asset value and correlated damages

3.19
PCBs

- polychlorinated biphenyls;
- polychlorinated terphenyls;
- monomethyl-tetrachlorodiphenyl methane, monomethyl-dichloro-diphenyl methane, monomethyl-dibromo-diphenyl methane;
- any mixture containing any of the above mentioned substances in a total of more than 0,005 % by weight

[Council Directive 96/59/EC Art. 2, a]

3.20
polychlorinated biphenyls
biphenyl substituted by one to 10 chlorine atoms

3.21
treatment
procedure using physical or chemical means with the purpose of reinstating the features of the fluid and/or matrix near the values desired

3.22
used PCBs
any PCBs which is considerable as a waste within the meaning of Directive 75/442/EEC

3.23
waste
any substance or object which the holder discards or intends or is required to discard

NOTE During their service life, electrical equipment and insulating liquids shall not be considered as waste.

4 Inventory and communication

Electrical equipments containing PCB contaminated insulating liquids are not considered waste whilst in service even if they are subject to the inventory.

The holders of equipment containing PCBs in volume exceeding 5 dm³ (5 l) are required to provide inventory and report to the authorities in charge, providing the information specified in 4.5.

NOTE 1 The limit of 5 dm³ is intended as referred to the volume of the insulating liquid (PCBs) contained by the equipment; if this is not known or can be presumed from the data of the plate or other documents of the manufacturer, it should be referred to the total volume of the equipment.

NOTE 2 Each capacitor in a bank battery should be considered as a single equipment to which the total volume of 5 dm³ applies.

4.1 PCBs for inventory purposes

With the term of PCBs is intended a family of substances including polychlorinated biphenyls and the products correlated to them listed in Table 1.