SLOVENSKI STANDARD
SIST EN 61125:1997

01-avgust-1997

Nerabljene izolacijske tekočine na osnovi ogljikovodikov - Preskusne metode za ocenjevanje oksidacijske stabilnosti

Unused hydrocarbon-based insulating liquids - Test methods for evaluating the oxidation stability

Neue Isolierflüssigkeiten auf Mineralölbasis - Prüfverfahren zur Beurteilung der Oxidationsbeständigkeit

Isolants liquides neufs à base d'hydrocarbures - Méthodes d'essai pour évaluer la stabilité à l'oxydation

Ta slovenski standard je istoveten z: **EN 61125:1993**

ICS:

29.040.10	Izolacijska olja	Insulating oils

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EUROPEAN STANDARD EN 61125

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ENGLISH VERSION

Unused hydrocarbon-based insulating liquids Test methods for evaluating the oxidation stability (IEC 1125:1992 + corrigendum 1992)

Isolants liquides neufs à base d'hydrocarbures - Méthodes d'essai pour évaluer la stabilité à l'oxydation (CEI 1125:1992 + corrigendum 1992)

Prüfverfahren zur Beurteilung der Oxidationsbeständigkeit von Isolierflüssigkeiten auf Mineralölbasis (IEC 1125:1992 + Corrigendum 1992)

This European Standard was approved by CENELEC on 1993-03-09. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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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

The text of document 10(CO)263, as prepared by IEC technical committee N° 10: Fluids for electrotechnical applications, was submitted to the IEC-CENELEC parallel vote in November 1991.

The reference document was approved by CENELEC as EN 61125 on 9 March 1993.

This European Standard supersedes HD 486 S1:1987.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1994-03-01
- latest date of withdrawal of conflicting national standards	(dow)	1994-03-01

Annexes designated "normative" are part of the body of the standard. In this standard, annexes A, B and ZA are normative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 1125:1992 and its corrigendum of September 1992 was approved by CENELEC as a European Standard without any modification.

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC Publication	Date	Title	EN/HD	Date
247	1978	Measurement of relative permittivity, dielectric dissipation factor and d.c. resistivity of insulating liquids	-	-

Other publications

ISO 383:1976 - Laboratory glassware - Interchangeable conical ground joints

ISO 4793:1980 - Laboratory sintered (fritted) filters - Porosity grading, classification and designation

ISO/DIS 6344-1 - Coated abrasives - Grain size analysis - Part 1: Definitions, designation and principles

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Isolants liquides neufs à base d'hydrocarbures – Méthodes d'essai pour évaluer la stabilité à l'oxydation

Unused hydrocarbon-based insulating liquids – Test methods for evaluating the oxidation stability

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

UNUSED HYDROCARBON-BASED INSULATING LIQUIDS – TEST METHODS FOR EVALUATING THE OXIDATION STABILITY

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

This standard has been prepared by IEC Technical Committee No. 10: Fluids for electrotechnical applications.

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

DIS	Report on Voting
10(CO)263	10(CO)272

Full information on the voting for the approval of this standard can be found in the Voting Report indicated in the above table.

Annexes A and B form an integral part of IEC 1125.

UNUSED HYDROCARBON-BASED INSULATING LIQUIDS – TEST METHODS FOR EVALUATING THE OXIDATION STABILITY

Section 1: General

1.1 Scope

This International Standard describes three test methods using the same apparatus for evaluating the oxidation stability of mineral insulating oils and of hydrocarbon-based insulating liquids. It comprises four sections as follows:

Section 1 describes the following items common to the three methods:

– the equipment and reagents;
– the cleaning of the glassware;
– the preparation of the catalyst and of the insulating liquid sample to be tested;
– the determinations on the oxidized insulating liquid.

Section 2 – Method A describes a method for evaluating the oxidation stability of unused uninhibited mineral insulating oils under accelerated conditions.

Section 3 – Method B describes a method for evaluating the oxidation stability of unused inhibited mineral insulating oils under accelerated conditions.

Section 4 – Method C describes a method for evaluating the oxidation stability of unused uninhibited and inhibited hydrocarbon insulating liquids under accelerated conditions.

1.2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 247: (1978), *Measurement of relative permittivity, dielectric dissipation factor and d.c. resistivity of insulating liquids.*

ISO 383: (1976), *Laboratory glassware – Interchangeable conical ground joints.*

ISO 4793: (1980), *Laboratory sintered (fritted) filters – Porosity grading, classification and designation.*

ISO/DIS 6344-1: *Coated abrasives – Grain size analysis – Part 1: Definitions, designation and principles.*

1.3 General principle of the methods

The liquid sample to be tested, through which a stream of oxygen or air is bubbled, is maintained for a given period at a given temperature, 100 °C or 120 °C, in the presence of solid copper. The resistance to oxidation is evaluated from the amount of total sludge and total acidity formed or from the time to develop a given amount of volatile acidity (induction period).

1.4 Equipment

1.4.1 *Heating arangement*

A thermostatically-controlled aluminium alloy block heater or oil bath may be used to maintain the insulating liquid in the desired number of oxidation tubes at the required temperature 100 °C ± 0,5 °C or 120 °C ± 0,5 °C (as examples see figures 1 and 3, pages 44 and 45). This temperature shall be read on a thermometer (see annex B) inserted in an oxidation tube to within 5 mm from the bottom; this oxidation tube shall be filled with oil up to the immersion line of the thermometer and placed in the heating bath.

The temperature of the upper surface of the thermal insulation top shall be maintained at 50 °C ± 5 °C (Method A) or 60 °C ± 5 °C (Methods B and C). Measure this temperature by the use of a thermometer in a drilled aluminium block (see figure 2, page 45). The surfaces of this block, other than that against the upper surface of the heating device, are protected by suitable thermal insulation of nominal 4 mm thickness. The thermal characteristics of this insulation shall be such as to permit the specified temperatures to be achieved. This block should be placed as near to the holes as practicable and within the area of the upper surface covering the heating device.

When using an aluminium heating block, the oxidation tubes are inserted into the holes to an overall depth of 150 mm. The depth of the holes in the heating part of the block shall be at least 125 mm and short aluminium alloy collars, passing through the insulating cover and surrounding each oxidation tube, will ensure heating over the 150 mm length of the tube.

In the case of oil baths, the oxidation tubes shall be immersed to a depth of 137 mm in the oil and to an overall depth of 150 mm in the bath (see figure 3, page 45).

For both types of heating device, the height of the oxidation tubes above the upper surface shall be 60 mm and the diameter of the holes shall be just sufficient to allow insertion of the specified tube. In the case of slackness a 25 mm internal diameter O-ring may be placed around the tube and pressed against the thermal insulation top or inserted into the annular space between the tube and the thermal insulated top. The heating bath should be equipped with supports to hold the absorption tubes.

When in use the heater shall be shielded from direct sunlight and air draughts.

NOTE - When oil baths are used, for safety reasons, it may be advisable to place them in a fume hood.

1.4.2 *Test vessels*

Test tubes of borosilicate or neutral glass provided with a 24/29 ground joint (see ISO 383), of the following dimensions:

	mm
– overall length	210 ± 2
– external diameter	26 ± 0,5
– wall thickness	1,4 ± 0,2
– height of the head	28 ± 2
– air inlet tube:	
external diameter	5,0 ± 0,4
wall thickness	0,8 ± 0,1

The test tube is fitted with a Drechsel head to which is attached the inlet tube which extends to within 2,5 mm ± 0,5 mm from the bottom and has its end ground at an angle of 60° to the horizontal axis (see figure 4, page 46).

1.4.3 *Absorption tubes* (only required for methods B and C)

These are identical to the test vessels and the distance between the axes of the two tubes shall be 150 mm ± 50 mm (see figures 4 and 4 bis, page 46). Connections between the test and absorption tubes should be as short as possible, of glass tubing butt-jointed to the vessels by means of short flexible sleeves (silicone rubber sleeving has been found suitable for this purpose). These tubes are mounted outside the heating device.

1.4.4 *Filtering crucibles*

Gooch-type crucibles with fused-in fritted glass disk according to ISO 4793 - grade P 10 porosity (pore size index > 4 µm and ≤ 10 µm) of, for example, 35 ml capacity.

NOTES

1 Maximum diameter of the pores can be determined in accordance with the method described in annex A.

2 Alternatively polymeric membrane filters may be used, provided they are compatible with oil and solvents.

Suitable membranes consist of mixture of cellulose esters (cellulose nitrate + cellulose acetate) with the following characteristics:

pore size: 8 µm

thickness: 150 µm

operating temperature: 120 °C in sterilizer;
75 °C under continuous filtration.

The filtration is improved by impregnating the membrane with a suitable wetting agent (e.g.: octyl ethoxylate).