SLOVENSKI STANDARD
SIST EN 61868:1999

01-december-1999

Mineral insulating oils. - Determination of kinematic viscosity at very low temperatures (IEC 61868:1998)

Mineral insulating oils - Determination of kinematic viscosity at very low temperatures

Isolieröle auf Mineralölbasis - Bestimmung der kinematischen Viskosität bei sehr niedrigen Temperaturen

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Huiles minérales isolantes - Détermination de la viscosité cinématique à très basse température

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Ta slovenski standard je istoveten z: **EN 61868:1999**

ICS:

29.040.10	Izolacijska olja	Insulating oils

SIST EN 61868:1999 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61868

January 1999

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Descriptors: Liquid electrical insulating materials, mineral oils, insulating oils, viscosity measurements, kinematic viscosity, low temperature tests, computation

English version

Mineral insulating oils
Determination of kinematic viscosity at very low temperatures
(IEC 61868:1998)

Huiles minérales isolantes
Détermination de la viscosité
cinématique à très basse température
(CEI 61868:1998)

Isolieröle auf Mineralölbasis
Bestimmung der kinematischen
Viskosität bei sehr niedrigen
Temperaturen
(IEC 61868:1998)

SIST EN 61868:1999

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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 10/443/FDIS, future edition 1 of IEC 61868, prepared by IEC TC 10, Fluids for electrotechnical applications, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61868 on 1999-01-01.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop) 1999-10-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow) 2001-10-01

Endorsement notice

The text of the International Standard IEC 61868:1998 was approved by CENELEC as a European Standard without any modification.

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International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland
Telefax: +41 22 919 0300 e-mail: inmail@iec.ch IEC web site http: //www.iec.ch

Commission Electrotechnique Internationale
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MINERAL INSULATING OILS – DETERMINATION OF KINEMATIC VISCOSITY AT VERY LOW TEMPERATURES

FOREWORD

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International Standard IEC 61868 has been prepared by IEC technical committee 10: Fluids for electrotechnical applications.

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

FDIS	Report on voting
10/443/FDIS	10/452/RVD

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

SIST EN 61868:1999

INTRODUCTION

Non-Newtonian behaviour and significant increases in viscosity at very low temperatures have been observed in some mineral insulating oils as a result of microcrystalline growth, with a potential risk of failure for electrical equipment re-energized under very cold weather conditions.

Microcrystalline formation is a slow process, which can take relatively long periods of low-temperature soaking to show its full effects, and which can also be destroyed by inducing movement in the oil, possibly as a result of heat producing friction or shear forces.

This standard presents the adaptations to be made to ISO 3104 to take into account these effects and to allow the measurement of kinematic viscosity at very low temperatures, without subjecting the oil sample to warming or undue movement during measurement, and with the application of a soaking period, in order to adequately simulate the flow of oil in electrical equipment, for example in the small cooling passages and timing mechanisms of transformers.

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MINERAL INSULATING OILS – DETERMINATION OF KINEMATIC VISCOSITY AT VERY LOW TEMPERATURES

1 Scope

This International Standard specifies a procedure for the determination of the kinematic viscosity of mineral insulating oils, both transparent and opaque, at very low temperatures, after a cold soaking period of at least 20 h, by measuring the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscometer.

It is applicable at all temperatures to both Newtonian and non-Newtonian liquids having viscosities of up to 20 000 $mm^2 \times s^{-1}$. It is particularly suitable for the measurement of the kinematic viscosity of liquids for use in cold climates, at very low temperatures (–40 °C) or at temperatures between the cloud and pour-point temperatures (typically –20 °C) where some liquids may develop unexpectedly high viscosities under cold soak conditions.

2 Normative references

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The following normative documents 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 normative documents 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 normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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ISO 3104:1994, *Petroleum products – Transparent and opaque liquids – Determination of kinematic viscosity and calculation of dynamic viscosity*

ISO 3105:1994, *Glass capillary kinematic viscometers – Specification and operating instructions*

3 Definitions

For the purpose of this International Standard, the following definitions apply:

3.1
kinematic viscosity
the ratio between the viscosity and the density of the liquid. It is a measure of the resistance to flow of a liquid under gravity

NOTE – In the SI, the unit of kinematic viscosity is the square metre per second ($m^2 \times s^{-1}$).

3.2
newtonian liquid
a liquid having a viscosity that is independent of the shear stress or shear rate. If the ratio of shear stress to shear rate is not constant, the liquid is non-Newtonian