SLOVENSKI STANDARD
SIST EN 60970:2007

01-december-2007

Izolacijske tekočine – Metode za štetje in ugotavljanje velikosti delcev (IEC 60970:2007)

Insulating liquids - Methods for counting and sizing particles

Isolierflüssigkeiten - Verfahren zur Bestimmung der Anzahl und Größen von Teilchen

Isolants liquides - Méthodes de détermination du nombre et de la taille des particules

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: EN 60970:2007

SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab94f6b/sist-en-60970-2007

ICS:

17.220.99	Drugi standardi v zvezi z elektriko in magnetizmom	Other standards related to electricity and magnetism
29.040.01	Izolacijski fluidi na splošno	Insulating fluids in general

SIST EN 60970:2007 **en,fr,de**

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

SIST EN 60970:2007

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab94f6b/sist-en-60970-2007

SIST EN 60970:2007

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60970

August 2007

ICS 17.220.99. 29.040.10

English version

Insulating liquids - Methods for counting and sizing particles
(IEC 60970:2007)

Isolants liquides -
Méthodes de détermination du nombre et de la taille des particules
(CEI 60970:2007)

Isolierflüssigkeiten -
Verfahren zur Bestimmung der Anzahl und Größen von Teilchen
(IEC 60970:2007)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2007-08-01. 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.

SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab94f5b/sist-en-60970-2007

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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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

© 2007 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Ref. No. EN 60970:2007 E

SIST EN 60970:2007

Foreword

The text of document 10/695/FDIS, future edition 2 of IEC 60970, prepared by IEC TC 10, Fluids for electrotechnical applications, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60970 on 2007-08-01.

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)	2008-05-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2010-08-01

Annex ZA has been added by CENELEC.

_____

Endorsement notice

The text of the International Standard IEC 60970:2007 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 60422	NOTE	Harmonized as EN 60422:2006 (not modified).
ISO 4402	NOTE	Harmonized as EN ISO 14402:1999 (not modified).

SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab94f6b/sist-en-60970-2007

SIST EN 60970:2007

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

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

Publication	Year	Title	EN/HD	Year
-	-	Insulating oil - Determination of fibre contamination by the counting method using a microscope	EN 50353	- [1)]
IEC 60475	- [1)]	Method of sampling liquid dielectrics	-	-
ISO 4406	- [1)]	Hydraulic fluid power - Fluids - Method for coding the level of contamination by solid particles	-	-
ISO 4407	- [1)]	Hydraulic fluid power - Fluid contamination - Determination of particulate contamination by the counting method using an optical microscope	-	-
ISO 5884	- [1)]	Aerospace - Fluid systems and components - Methods for system sampling and measuring the solid particle contamination of hydraulic fluids	-	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab54fbb/sist-en-60970-2007

[1)] Undated reference.

SIST EN 60970:2007

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab94f6b/sist-en-60970-2007

SIST EN 60970:2007

INTERNATIONAL STANDARD

NORME INTERNATIONALE

IEC
CEI
60970

Second edition
Deuxième édition
2007-07

Insulating liquids – Methods for counting and sizing particles

Isolants liquides – Méthodes de détermination du nombre et de la taille des particules

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab94f6b/sist-en-60970-2007

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE
CODE PRIX R

For price, see current catalogue
Pour prix, voir catalogue en vigueur

SIST EN 60970:2007

CONTENTS

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab94f6b/sist-en-60970-2007

SIST EN 60970:2007

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INSULATING LIQUIDS – METHODS FOR COUNTING AND SIZING PARTICLES

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002a1-8518-4d1b-89f9-85b26ab94f5b/sist-en-60970-2007

International Standard IEC 60970 has been prepared by IEC technical committee 10: Fluids for electrotechnical applications.

This second edition cancels and replaces the first edition published in 1989. This edition constitutes a technical revision.

The significant technical changes with respect to the previous edition are as follows:

– new calibration procedures for automated laser particle;
– three figures contamination code;
– new procedure of sample pre-treatment when automated laser counter method are used.

SIST EN 60970:2007

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

FDIS	Report on voting
10/695/FDIS	10/714/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab94f6b/sist-en-60970-2007

SIST EN 60970:2007

INTRODUCTION

The first edition of this standard was published in 1989, and confirmed in 1996. The present edition has been found necessary for consistency with the new ISO 4406:1999, in which calibration procedures for automated particles counters have been changed from ACFTD standard to ISO-MTD standard. Specific procedures for sample preparation are described in more detail when automated particle counters are used. Results and ISO Code reporting are consistent with ISO 4406:1999 standard. Repeatability and reproducibility data are reported.

It has been demonstrated that particle contamination of insulating liquids used in electrical equipment have been responsible for major faults [1][1]. Particle analysis is recommended (as complementary test) by IEC 60422[3] for power transformers with nominal voltage above 170 kV[2].

Particle counting and sizing is usually carried out using automated counters; the calibration standard for these counters was changed in 1999. The ISO reporting code has also been changed from a two-figure to a three-figure code. This code gives information on three classes of cumulative counting: particles/ml with ∅ > 4 µm, particles/ml with ∅ > 6 µm, particles/ml with ∅ > 14 µm. Particle analysis with automated particle counters has been thoroughly investigated to verify factors influencing the results and to optimize the analysis procedure. Reference figures for repeatability and Reproducibility are reported, for particle counting and for ISO Class.

Annex A provides information about sampling with syringes. Annex B reports a reference for ISO MTD calibration procedure.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 60970:2007
https://standards.iteh.ai/catalog/standards/sist/48c002ad-8518-4d1b-89f9-85b26ab94f6b/sist-en-60970-2007

[1] Figures in square brackets refer to the bibliography.