



SLOVENSKI STANDARD
SIST EN 50015:2000

01-april-2000

Nadomešča:
SIST EN 50015:1995

Električne naprave za potencialno eksplozivne atmosfere - Potopitev v olje "o"

Electrical apparatus for potentially explosive atmospheres - Oil immersion o

Elektrische Betriebsmittel für explosionsgefährdete Bereiche - Ölkapselung o

Matériel électrique pour atmosphères explosibles - Immersion dans l'huile o
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Ta slovenski standard je istoveten z: ~~ST EN 50015:1995~~ EN 50015:1998

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ICS:

29.260.20	Električni aparati za eksplozivna ozračja	Electrical apparatus for explosive atmospheres
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EUROPEAN STANDARD

EN 50015

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 1998

ICS 29.260.20

Supersedes EN 50015:1994

Descriptors: Electrical apparatus, potentially explosive atmosphere, explosive atmosphere, explosion proofing, specific requirement, oil immersion "o"

English version

Electrical apparatus for potentially explosive atmospheres Oil immersion "o"

Matériel électrique pour atmosphères
explosibles - Immersion dans l'huile "o"

Elektrische Betriebsmittel für
explosionsgefährdete Bereiche
Ölkapselung "o"

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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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and 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

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 31, Electrical apparatus for explosive atmospheres - General Requirements.

It consists of the text of EN 50015:1994 and a draft amendment to this second edition which was submitted to the unique acceptance procedure and received a positive vote. The second edition and the amendment have been combined to form an "editorial" third edition which was approved by CENELEC on 1998-08-01.

This European Standard was prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and supports the essential health and safety requirements of EC Directive 94/9/EC.

This European Standard is to be read in conjunction with EN 50014:1997 Electrical apparatus for potentially explosive atmospheres - General requirements, and with the European Standards for the specific types of protection listed in the scope of EN 50014:1997. This European Standard should not be considered in conjunction with any editions of these standards and their amendments published before 1997.

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The following dates were fixed:

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- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 1999-06-01
- latest date by which the national standards
conflicting with the EN have to be withdrawn (dow) -

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1 Scope

1.1 This European Standard specifies the requirements for the construction and testing of oil-immersed electrical apparatus, oil-immersed parts of electrical apparatus and Ex components in the type of protection 'o', intended for use in potentially explosive atmospheres of gas, vapour and mist.

Potentially explosive atmospheres include the presence of combustible dusts.

This European Standard covers Category 2G and Category M2 only .

1.2 This European Standard supplements EN 50014, insofar that it applies to oil-immersed electrical apparatus.

1.3 This European Standard is applicable to electrical apparatus and parts of electrical apparatus which are not ignition capable in normal operation. Compliance of the electrical apparatus shall be assessed against IEC 60079-15 except for those parts designed to comply with EN 50020.

NOTE: This European Standard assumes that the electrical apparatus immersed in the protective liquid is fixed in its operating position in accordance with the installation instructions.

2 Normative references (standards.iteh.ai)

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 50014		Electrical apparatus for potentially explosive atmospheres General requirements
EN 50019		Electrical apparatus for potentially explosive atmospheres Increased safety 'e'
EN 50020		Electrical apparatus for potentially explosive atmospheres Intrinsic safety 'i'
EN 60156		Method for the determination of the electric strength of insulating oils (IEC 60156:1995)
EN 60529	1991	Degree of protection provided by enclosures (IP code) (IEC 60529:1989)
HD 565 S1	1993	Specifications for silicone liquids for electrical purposes (IEC 60836:1988)
IEC 60079-15	1987	Electrical apparatus for explosive gas atmospheres Part 15: Electrical apparatus with type of protection 'n'

IEC 60247	1978	Measurement of relative permittivity, dielectric dissipation factor and d.c. resistivity of insulating liquids
IEC 60296	1982	Specification for unused mineral insulating oils for transformers and switchgear
IEC 60588-2	1978	Askarels for transformers and capacitors Part 2: Test methods
ISO 2719	1988	Petroleum products and lubricants - Determination of Flash Point Pensky-Martens closed cup method
ISO 3016	1974	Petroleum Oils - Determination of pour point
ISO 3104	1976	Petroleum Products - Transparent and opaque liquids Determination of kinematic viscosity and calculation of dynamic viscosity

3 Definitions and symbols

The following definitions in EN 50014:1997 apply to this Standard: 3.27, 3.29, 3.31.

The following definitions specific to the type of protection oil immersion 'o' are applicable in this European Standard; they supplement the definitions which are given in EN 50014.

3.1 **oil immersion 'o'**: A type of protection in which the electrical apparatus or parts of the electrical apparatus are immersed in a protective liquid in such a way that an explosive atmosphere which may be above the liquid or outside the enclosure cannot be ignited.

3.2 **protective liquid**: Mineral oil conforming to IEC 60296 or an alternative liquid meeting the requirements of 4.1.

3.3 **sealed apparatus**: Apparatus designed and constructed in such a manner as to prevent ingress of an external atmosphere during the expansion and contraction of the internally contained liquid during normal operation.

3.4 **non-sealed apparatus**: Apparatus designed and constructed in such a manner as to allow the ingress and egress of an external atmosphere during the expansion and contraction of the internally contained fluid during normal operation.

3.5 **maximum permissible protective liquid level**: The maximum level the protective liquid can attain in normal service, taking into account the effects of expansion from the worst case filling condition specified by the manufacturer to the condition of full load at maximum ambient temperature for which the apparatus is designed.

3.6 **minimum permissible protective liquid level**: The minimum level the protective liquid can attain in normal service taking into account the effects of contraction from the worst case filling condition to the condition of de-energization at minimum ambient temperature.

4 Constructional requirements

4.1 Protective liquid other than mineral oil conforming to IEC 60296 shall comply with the following specific requirements:

- a) the protective liquid shall have a fire point of 300°C (minimum) as determined by the test method indicated in HD 565 S1 (IEC 60836).
- b) the protective liquid shall have a flash point (closed) of 200°C (minimum) determined in accordance with ISO 2719.
- c) the protective liquid shall have a kinematic viscosity of 100 cSt (maximum) at 25°C determined in accordance with ISO 3104.
- d) the protective liquid shall have an electrical breakdown strength of 27 kV (minimum) determined in accordance with EN 60156.

In the case of silicone liquids HD 565 S1 (IEC 60836) shall be used.

- e) the protective liquid shall have a volume resistivity at 25°C of 10^{14} ohm.cm (minimum) determined in accordance with IEC 60247.
- f) the pour point shall be -30°C (maximum) determined in accordance with ISO 3016.
- g) the acidity (neutralization value) shall be 0,03 mg KOH/g (maximum) determined in accordance with IEC 60588-2. [SIST EN 50015:2000](https://standards.iteh.ai/catalog/standards/sist/4bf675d3-4a25-473e-b925-5852f0e0e1f5/sist-en-50015-2000)
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NOTE: The reference to IEC 60588-2 identifies a test method only; it does not allow the use of substances prohibited by legislation.

- h) the protective liquid shall have no adverse effect on the properties of materials with which it is in contact.

The manufacturer shall provide data to confirm compliance with the above.

4.2 For Group I apparatus, mineral oils are not acceptable.

4.3 The apparatus shall be constructed so that deterioration of the protective liquid by dust or humidity from the exterior is prevented by the following means.

4.3.1 Apparatus which is sealed shall be provided with a pressure relief device. This device shall be set and sealed by the manufacturer of the liquid filled apparatus to operate at least at 1,1 times the pressure above the liquid level at the maximum permissible protective liquid level.

4.3.2 Apparatus which is not sealed shall be constructed so that gas or vapour which may evolve from the protective liquid in normal service can readily escape. A breathing device complete with suitable drying agent shall be provided. The manufacturer shall specify the maintenance requirements for the drying agent. The testing station is not required to verify the suitability of the drying agent nor its maintenance.

4.3.3 The apparatus shall have a degree of protection of at least IP66 as given in EN 60529 with no ingress of water.

The outlet of the breathing device for non-sealed apparatus and the outlet of the pressure relief device for sealed apparatus shall have a degree of protection of at least IP23 as given in EN 60529.

4.4 Means shall be provided to guard against accidental loosening of external and internal fasteners, as well as of devices to indicate the liquid level, plugs and other parts for filling or draining the liquid.

Examples of means to guard against accidental loosening are:

- cementing of threads;
- locking washers;
- wiring of bolt heads.

A warning label is not considered sufficient.

4.5 A protective liquid level indicating device (s) complying with the requirements of 4.5.1 to 4.5.3 shall be provided so that the liquid level of each separate liquid filled compartment can be easily checked in service.

4.5.1 The maximum and the minimum protective liquid levels permissible in normal service shall be clearly marked, taking into account the effects of expansion and contraction resulting from operational temperature changes over the full ambient temperature range specified by the manufacturer.

4.5.2 The protective liquid level indicating device shall be so marked to indicate the levels to which the electrical apparatus shall be filled under the filling temperature conditions specified by the manufacturer. Alternatively an adjacent label shall be provided which fully specifies the filling conditions.

4.5.3 The construction shall be such that, unless the manufacturer can demonstrate that in normal service leakage from the indicating device will not occur, the minimum possible filling level of the protective liquid cannot fall beneath the level necessary to comply with 4.7 taking into account the effects of expansion and contraction resulting from operational temperature changes over the full ambient temperature range specified by the manufacturer.

4.5.4 The manufacturer shall provide data to show that transparent parts will retain their mechanical and optical properties when in contact with the protective liquid.

4.5.5 For non-sealed apparatus, a dipstick may be used, provided that in normal operation the dipstick is secured in its measurement position and that the requirements of 4.3 with regard to ingress protection are maintained. An adjacent label shall be provided, requiring the dipstick to be replaced after use.

4.6 The lower of the two temperatures specified in 4.6.1 and 4.6.2 shall not be exceeded.

4.6.1 The temperature at the free surface of the protective liquid shall not exceed a value equal to 25 K less than the stated minimum flash point (closed) for the protective liquid used.

4.6.2 The temperature at the free surface of the protective liquid or at any point on the surface of the electrical apparatus to which a potentially explosive atmosphere has access shall not exceed the limit specified in EN 50014, for the specified temperature class.