



# SLOVENSKI STANDARD

## SIST EN 50015:1995

01-avgust-1995

---

### Electrical apparatus for potentially explosive atmospheres - Oil immersion "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

**Ta slovenski standard je istoveten z: EN 50015:1994**

[SIST EN 50015:1995](https://standards.iteh.ai/catalog/standards/sist/5849f043-87b3-4706-a702-653d92f44864/sist-en-50015-1995)

<https://standards.iteh.ai/catalog/standards/sist/5849f043-87b3-4706-a702-653d92f44864/sist-en-50015-1995>

#### **ICS:**

|           |   |  |
|-----------|---|--|
| 29.260.20 | Električni aparati za eksplozivna ozračja | Electrical apparatus for explosive atmospheres |
|-----------|---|--|

**SIST EN 50015:1995**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 50015:1995](#)

<https://standards.iteh.ai/catalog/standards/sist/5849f043-87b3-4706-a702-653d92f44864/sist-en-50015-1995>

EUROPEAN STANDARD  
 NORME EUROPÉENNE  
 EUROPÄISCHE NORM

**EN 50015**

April 1994

UDC 621.31-78:614.833.4/5:001.4:620.1:62-777

Supersedes EN 50015:1977 + A1:1979  
 To be read in conjunction with EN 50014:1992

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"

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 50015:1995

<https://standards.iteh.ai/catalog/standards/sist/5849f043-87b3-4706-a702-653d92814864/sist-en-50015-1995>

This European Standard was approved by CENELEC on 6 July 1993. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, 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 has been prepared by a Working Group and the secretariat of CENELEC Technical Committee TC 31 in accordance with the decisions taken by that committee during its meetings held in Brussels 1991, Stockholm 1992 and Basle 1993.

The text of the draft was submitted to the formal vote in December 1992 and was approved by CENELEC as EN 50015 on 1993-07-06.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1994-08-01
- latest date of withdrawal of conflicting national standards (dow)

**STANDARD PREVIEW**  
**(standards.iteh.ai)**  
SIST EN 50015:1995  
<https://standards.iteh.ai/catalog/standards/sist/58494043-87b3-4706-a702-653d92f44864/sist-en-50015-1995>

This European Standard is to be read in conjunction with EN 50014:1992, Electrical apparatus for potentially explosive atmospheres - General requirements, and with the second editions of the European Standards for the specific types of protection listed in the scope of EN 50014:1992. This European Standard should not be considered in conjunction with any of the first edition standards and their amendments, published in 1977 or thereafter, listed in EN 50014.

## Contents

|  | PAGE |
|--|------|
| Foreword   | 2    |
| <br>   |      |
| <b>General</b>   |      |
| 1. Scope   | 4    |
| 2. Normative references  | 4    |
| 3. Definitions   | 5    |
| <br>   |      |
| 4. Constructional requirements   | 6    |
| <br>   |      |
| <b>Verifications and tests</b>   |      |
| <a href="https://standards.iteh.ai/catalog/standards/sist/5849f043-87b3-4706-a702-653d92f44864/sist-en-50015-1995">SIST EN 50015:1995<br/>https://standards.iteh.ai/catalog/standards/sist/5849f043-87b3-4706-a702-653d92f44864/sist-en-50015-1995</a> |      |
| 5. Type tests  | 8    |
| 6. Routine tests   | 9    |
| <br>   |      |
| <b>Marking</b>   |      |
| 7. Marking   | 9    |

## General

## 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.
- 1.2 This European Standard supplements EN 50014, the requirements of which apply 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 79-15 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

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.

## 2.1 European standards

|          |      |  |
|----------|------|--|
| EN 50014 | 1992 | Electrical apparatus for potentially explosive atmospheres - General Requirements                        |
| EN 50019 | 1994 | Electrical apparatus for potentially explosive atmospheres - Increased Safety 'e'                        |
| EN 50020 | 1994 | Electrical apparatus for potentially explosive atmospheres - Intrinsic Safety 'i'<br>(not yet published) |
| EN 60529 | 1991 | Degree of protection provided by enclosures (IP code)<br>(IEC 529:1989)                                  |

## 2.2 IEC Publications with reference to the relevant European publications

|           |      |   |
|-----------|------|---|
| IEC 79-15 | 1987 | Electrical apparatus for explosive gas atmospheres<br>Part 15: Electrical apparatus with type of protection 'n' |
| IEC 156   | 1963 | Method for the determination of the electric strength of insulating oils  |
| IEC 247   | 1978 | Measurement of relative permittivity, dielectric dissipation factor and d.c. resistivity of insulating liquids  |

|           |      |  |
|-----------|------|--|
| IEC 296   | 1982 | Specification for unused mineral insulating oils for transformers and switchgear |
| IEC 588-2 | 1978 | Askarels for transformers and capacitors<br>Part 2: Test methods                 |
| IEC 836   | 1988 | Specifications for silicone liquids for electrical purposes<br>(HD 565 51:1993)  |

### 2.3 ISO publications

|          |      |   |
|----------|------|---|
| 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 |

iTeh STANDARD PREVIEW

### 3 Definitions

(standards.iteh.ai)

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 50014:1994.

- <https://standards.iteh.ai/catalog/standards/sist/5849f043-87b3-4706-a702-653d92f44864/sist-en-50015-1995>
- 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 296 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 296 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 IEC 836.
- 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 IEC 156.

In the case of silicone liquids IEC 836 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 247.
- 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 588-2.

NOTE: The reference to IEC 588-2 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.