BRITISH STANDARD

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EN 50015
(Reprinted, incorporating Amendment Nos. 1 and 2)

Electrical apparatus for potentially explosive atmospheres —

Part 2: Oil immersion "o"

This European Standard EN 50015 was given as from 30 December 1977 the status of a British Standard

UDC 621.31 – 213.34 – 78:614.833.4/.5:001.4:620.1:62 – 777

Cooperating organizations

The European Committee for Electrotechnical Standardization (CENELEC), under whose supervision this European Standard was prepared, comprises the National Committees of the following countries.

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This British Standard, having been prepared under the direction of the General Electrotechnical Engineering Standards Committee, was published under the authority of the Executive Board on 30 December 1977

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Contents

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 6, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

EUROPEAN STANDARD

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EUROPÄISCHE NORM

EN 50015

Edition 1
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Key words: 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"

This European Standard was accepted by CENELEC on 1 March 1977. The CENELEC members are bound to adhere to the CENELEC Internal Regulations which specify under which conditions this European Standard has to be given, without any alteration, the status of a national standard.

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

This European Standard is established by CENELEC in three official versions (English, French, German). A translation made by another member under its own responsibility, in its own language, and notified to CENELEC has the same status.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, 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

IEC Publications referred to in European Standard EN 50015

IEC 56-4 (1972) (3rd edition)	*High-voltage alternating-current circuit-breakers* Part 4 *Type tests and routine tests*
IEC 157-1 (1973) (2nd edition)	*Low-voltage switchgear and controlgear* Part 1 *Circuit-breakers*
IEC 158-1 (1970) (2nd edition)	*Low-voltage controlgear* Part 1 *Contactors*
IEC 292-1 (1969) (1st edition)	*Low-voltage motor starters* Part 1 *Direct-on-line (full voltage) a.c. starters* [with following supplements: 292-1A (1971) & 292-1B (1973)]
IEC 296 (1969) (1st edition)	*Specification for new insulating oils for transformers and switchgear*

European Standard referred to in European Standard EN 50015

EN 50014 (1977) (1st edition)	*Electrical apparatus for potentially explosive atmospheres — General requirements*

This European Standard has been prepared by the CENELEC Technical Committee 31.

Contents

Section 1. General

1 Scope

1.1 This European Standard contains the specific requirements for the construction and testing of oil-immersed electrical apparatus, type of protection "o", intended for use in potentially explosive atmospheres.

1.2 This European Standard supplements European Standard EN 50014 "*General requirements*", the requirements of which apply to oil-immersed electrical apparatus.

1.3 For electrical apparatus of Group I this European Standard applies only to switching and isolating devices whose construction is permitted by **17.1** of European Standard EN 50014 "*General requirements*".

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

2 Definitions

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 European Standard EN 50014 "*General requirements*".

2.1
oil immersion "o"

a type of protection in which the electrical apparatus or parts of the electrical apparatus are immersed in oil in such a way that an explosive atmosphere which may be above the oil or outside the enclosure cannot be ignited

2.2
oil

mineral oil conforming to IEC 296

Section 2. Specific constructional requirements

3 Requirements for the construction of all electrical apparatus

3.1 The electrical apparatus shall be constructed so that deterioration of the oil by dust or humidity coming from the exterior is effectively prevented but so that gas or vapours from the oil can readily escape.

3.2 Devices shall be provided to ensure that accidental loosening of bolts, screws and nuts of electrical and mechanical connections, as well as of plugs and other parts or devices for filling or draining the oil, cannot occur.

3.3 Tanks which have to be lowered for filling purposes shall have a mark on the inside indicating the prescribed oil level in the lowered position.

3.4 Devices shall be provided so that the oil level can be easily checked when the electrical apparatus is in service.

NOTE The use of a dipstick is permissible provided that safety is not affected, that the dipstick cannot be taken completely away from the electrical apparatus, but that it can be cleaned, if necessary.

3.5 Devices indicating the oil level shall comply with the requirements **3.5.1** to **3.5.4**.

3.5.1 The highest and the lowest levels permissible in normal service shall be clearly marked, taking into account the effects of temperature.

3.5.2 The construction shall be such that, in case of leakage due to any damage to the indicating device, the oil cannot fall beneath the level at which full safety of the electrical apparatus remains assured.

3.5.3 Transparent parts shall retain their mechanical and optical properties when in contact with the oil.

3.5.4 Inspection windows shall be replaceable and oil-tight.

3.6 The following temperature limits shall not be exceeded.

3.6.1 The temperature of the oil shall not exceed 115 °C if the oil is class I or 105 °C if the oil is class II, according to IEC 296.

NOTE The limits are fixed in order to prevent the oil from altering too rapidly.

3.6.2 The temperature at the surface of the oil 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 European Standard EN 50014 "*General requirements*", for the temperature class concerned.

Special attention shall be given to apparatus which may have to withstand for short times currents in excess of the rated value (for example, short circuit currents) which are able to influence the surface temperature. In any case the permissible temperature shall not be exceeded.

3.7 All parts capable of producing arcs or sparks in normal service shall in all circumstances be immersed in oil at a depth sufficient to prevent the ignition of an explosive atmosphere which may occur above the oil.

This depth shall be at least equal to the value established by tests as described in clause **5**, but in no case shall be less than 25 mm.

3.8 All energized parts which do not produce arcs or sparks in normal service shall either be immersed in oil as specified in **3.7**, or be protected by one of the types of protection listed in European Standard EN 50014 "*General requirements*".

The conductors entering the free surface of the oil in electrical apparatus for a nominal voltage above 1 kV shall be insulated, except for designs where each pole is arranged in a separate enclosure.

The insulation of these conductors shall be sufficiently above the maximum permitted oil level and below the minimum permitted oil level and be effected and arranged in a manner to prevent any discharge along the surface of the oil. In addition any possibility of the oil being lost by capillary or siphon action shall be prevented.

3.9 Draining devices and devices to indicate the oil level shall be provided with special fasteners in accordance with European Standard EN 50014 "*General requirements*".

3.10 Enclosures containing bare energized parts shall be able to be opened only by the use of a tool. Special fasteners in accordance with European Standard EN 50014 "*General requirements*" shall be used for electrical apparatus of Group I.

3.11 Plugs for draining holes shall have at least five full threads of engagement even when they are equipped with a seal. They shall assure complete sealing of the oil.

4 Supplementary requirements for certain electrical apparatus

4.1 Switchgear and controlgear

4.1.1 The rated breaking and making capacities of switchgear and controlgear, such as circuit breakers, switches, motor starters, shall be not more than 75 % of the maximum values at which no ignition of the explosive mixture as prescribed in clause **5** has occurred above the oil surface during the tests.

4.1.2 Motor starters, motor controllers and other controlgear that contain resistors or main current windings under oil shall be provided with protective devices for automatically disconnecting the supply current to the electrical apparatus when the temperature of the oil exceeds by 10 K the permissible temperature specified in **3.6.1**, where the surface temperature of the oil does not exceed the temperature class according to **3.6.2**. These devices shall also interrupt the supply current when the temperature of the surface of the oil exceeds the limit specified in **3.6.2**.

4.2 Transformers

Non-hermetically sealed oil-immersed transformers shall be provided with an oil expansion vessel and be equipped with protective devices which automatically interrupt the supply current to the transformer if

a) there is an internal fault in the transformer;

b) the temperature of the oil exceeds the permitted value.

Section 3. Verifications and tests

5 Type tests

In order to satisfy the requirements of **4.1.1** the tests for making and breaking shall be carried out in accordance with the type test in the appropriate IEC Publications for the apparatus concerned[1)].

The tests shall be carried out with the highest oil level and the lowest level corresponding to a fault in the level gauge, and with a mixture of air and hydrogen of 22 % to 25 % of hydrogen by volume above the oil within the enclosure.

Section 4. Marking

6 Additional marking

In addition to the marking prescribed in European Standard EN 50014 "*General requirements*", the electrical apparatus shall also carry, when appropriate, additional information as follows.

6.1 The making and breaking capacity as determined according to **4.1.1**.

6.2 The time and value of the current defined in **3.6.2**.

[1)] For the relevant tests see, for example, IEC 56-4, IEC 157-1, IEC 158-1 and IEC 292-1.

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National appendix A

The United Kingdom participation in the preparation of this European Standard came under the direction of the General Electrotechnical Engineering Standards Committee of BSI. This committee consists of representatives from the following Government departments and scientific and industrial organizations:

Associated Offices Technical Committee
British Approvals Service for Electric Cables Ltd
British Electrical and Allied Manufacturers' Association (BEAMA)*
British Radio Equipment Manufacturers' Association
British Steel Corporation
Department of Energy — Electricity
Electric Cable Makers' Confederation
Electrical Contractors' Association
Electrical Contractors' Association of Scotland
Electrical Research Association
Electricity Supply Industry in England and Wales
Electronic Components Industry Federation
Electronic Engineering Association
Engineering Equipment Users' Association*
Health and Safety Executive*
Home Office
Institution of Electrical Engineers
Ministry of Defence
National Coal Board*
Oil Companies' Materials Association*
Post Office
Telecommunication Engineering and Manufacturing Association (TEMA)

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee involved with the work on this standard:

British Industrial Measuring and Control Apparatus Manufacturers' Association
British Industrial Truck Association
CBMPE
Council for Electrical Equipment for Flammable Atmospheres (BEAMA)
Department of Energy — Petroleum (Oil)
Department of the Environment — Building Research Establishment (Fire Research Station)
Department of the Environment — Joint Fire Research Organisation of the Department of the Environment and Fire Offices Committee
Department of Trade (Marine Division)
Lighting Industry Federation Ltd
Miner's Lamp Manufacturers' Association
Rotating Electrical Machines Association (BEAMA)
Scientific Instrument Manufacturers' Association

National appendix B

The British Standards corresponding to the IEC Publications and European Standards listed on page 3 of EN 50015 are as follows:

IEC Publications	**British Standards**
IEC 157-1:1973	BS 4752 *Specification for switchgear and controlgear for voltages up to and including 1 000 V a.c. and 1 200 V d.c.*
	Part 1:1977 *Circuit-breakers* (Identical)
IEC 158-1:1970	BS 5424 *Specification for controlgear for voltages up to and including 1 000 V a.c. and 1 200 V d.c.*
	Part 1:1977 *Contactors* (Identical)
IEC 292-1:1969	BS 4941 *Motor starters for voltages up to and including 1 000 V a.c. and 1 200 V d.c.*
IEC 292-1A:1971	Part 1:1979 *Direct-on-line (full voltage) a.c. starters*
IEC 292-1B:1973	(Identical)
IEC 296:1969	BS 148:1972 *Insulating oil for transformers and switchgear* (Technically equivalent)

NOTE BS 5311-4:1976 is a related standard to IEC 56-4:1972 and, as the requirements are additional to those in IEC 56-4, may be considered as technically equivalent for the purposes of this standard.

European Standard	**British Standard** (title and content identical)
EN 50014:1977	BS 5501-1:1977

Product certification. Users of this British Standard are advised to consider the desirablility of third party certification of product conformity with this British Standard. Enquiries as to the availability of the third party certification schemes will be forwarded by BSI to the Association of Certification Bodies.

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