

CONSOLIDATED VERSION

VERSION CONSOLIDÉE



**Explosive atmospheres –
Part 6: Equipment protection by liquid immersion "o"**

**Atmosphères explosives –
Partie 6: Protection du matériel par immersion dans le liquide "o"**



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VERSION REDLINE



**Explosive atmospheres –
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**Atmosphères explosives –
Partie 6: Protection du matériel par immersion dans le liquide "o"**

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EXPLOSIVE ATMOSPHERES –

Part 6: Equipment protection by liquid immersion "o"

FOREWORD

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This Consolidated version of IEC 60079-6 bears the edition number 4.1. It consists of the fourth edition (2015-02) [documents 31/1157/FDIS and 31/1172/RVD] and its amendment 1 (2020-02) [documents 31/1517/FDIS and 31/1526/RVD]. The technical content is identical to the base edition and its amendment.

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60079-6 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This fourth edition constitutes a technical revision.

The significant changes with respect to the previous edition are listed below:

- Edition 4 represents a major technical revision of the requirements for oil immersion “o” and should be considered as introducing all new requirements. The normal “Table of Significant Changes” has not been included for this reason. In particular:
 - The requirements for oil immersion “o” have been redefined into liquid immersion , levels of protection “ob” and “oc” as recommended by the responses to 31/715/DC
 - The ability to protect sparking contacts has been added to both “ob” and “oc”
- Additional requirements have been introduced for the protective liquid.

This part of IEC 60079 is to be used in conjunction with IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*.

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

A list of all parts in the IEC 60079 series, under the general title *Explosive atmospheres*, can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability 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,
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EXPLOSIVE ATMOSPHERES –

Part 6: Equipment protection by liquid immersion "o"

1 Scope

This part of IEC 60079 specifies the requirements for the design, construction, testing and marking of Ex Equipment and Ex Components with type of protection liquid immersion "o" intended for use in explosive gas atmospheres.

Ex Equipment and Ex Components of type of protection liquid immersion "o" are either:

- Level of Protection "ob" (EPL "Mb" or "Gb")
- Level of Protection "oc" (EPL "Gc")

For Level of Protection "ob", this standard applies where the rated voltage does not exceed 11 kV r.m.s. a.c. or d.c.

For Level of Protection "oc", this standard applies where the rated voltage does not exceed 15 kV r.m.s. a.c. or d.c.

Additionally, for Level of Protection "oc", Annex D applies where the rated voltage exceeds 15 kV AC RMS or DC and up to 245 kV AC RMS or DC.

Annex D applies specifically to liquid immersed transformers and reactors, and other liquid immersed equipment such as swivels for off-shore platforms, power regulators, tap changers and earthing/switching resistors.

~~NOTE—Requirements for higher voltages are under consideration.~~

This standard supplements and modifies the general requirements of IEC 60079-0. Where a requirement of this standard conflicts with a requirement of IEC 60079-0, the requirement of this standard takes precedence.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60071 (all parts), *Insulation co-ordination*

IEC 60076-3, *Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air*

IEC 60079-0, *Explosive Atmospheres – Part 0: Equipment – General requirements*

IEC 60079-1, *Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d"*

IEC 60079-2, *Explosive atmospheres – Part 2: Equipment protection by pressurized enclosure "p"*

IEC 60079-33, *Explosive atmospheres – Part 33: Equipment protection by special protection 's'*

IEC 60137, *Insulated bushings for alternating voltages above 1000 V*

IEC 60156, *Insulating liquids – Determination of the breakdown voltage at power frequency – Test method*

IEC 60247, *Insulating liquids – Measurement of relative permittivity, dielectric dissipation factor ($\tan \delta$) and d.c. resistivity*

IEC 60296, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60814, *Insulating liquids – Oil impregnated paper and pressboard – Determination of water by automatic coulometric Karl Fischer titration*

IEC 60836, *Specifications for unused silicone insulating liquids for electrotechnical purposes*

IEC 61099, *Insulating liquids – Specifications for unused synthetic organic esters for electrical purposes*

IEC 61125, *Unused hydrocarbon based insulating liquids – Test methods for evaluating the oxidation stability*

IEC 62021-1, *Insulating liquids – Determination of acidity – Part 1: Automatic potentiometric titration*

IEC 62535, *Insulating liquids – Test method for detection of potentially corrosive sulphur in used and unused insulating oil*

IEC 62770, *Fluids for electrotechnical applications – Unused natural esters for transformers and similar electrical equipment*

ISO 2592, *Determination of flash and fire points – Cleveland open cup method*

ISO 2719, *Determination of flash point – Pensky-Martens closed cup method*

ISO 3016, *Petroleum oils – Determination of pour point*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60079-0 and the following apply.

3.1

liquid immersion "o"

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