

INTERNATIONAL STANDARD

IEC 60079-15

Second edition
2001-02

Electrical apparatus for explosive gas atmospheres –

Part 15: Type of protection "n"

Matériel électrique pour atmosphères explosives gazeuses –

*Partie 15:
Mode de protection «n»*

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International Electrotechnical Commission
Telefax: +41 22 919 0300

3, rue de Varembeé Geneva, Switzerland
e-mail: inmail@iec.ch

IEC web site <http://www.iec.ch>



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES –**Part 15: Type of protection "n"**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60079-15 has been prepared by IEC technical committee 31: Electrical apparatus for explosive atmospheres.

This second edition cancels and replaces the first edition which was issued as a technical report in 1987. It constitutes a technical revision and now has the status of an International Standard.

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

FDIS	Report on voting
31/346/FDIS	31/353/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 3.

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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- withdrawn;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

A bilingual version of this publication may be issued at a later date.

ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES –

Part 15: Type of protection "n"

1 Scope

This part of IEC 60079 specifies requirements for the construction, testing and marking for Group II electrical apparatus with type of protection "n" intended for use in explosive gas atmospheres.

This standard is applicable to non-sparking electrical apparatus and also to electrical apparatus with parts or circuits producing arcs or sparks or having hot surfaces which, if not protected in one of the ways specified in this standard, could be capable of igniting a surrounding explosive gas atmosphere.

A non-incendive component is limited in use to the particular circuit for which it has been shown to be non-ignition capable and, therefore, cannot be separately assessed as complying with this standard.

Compliance with this standard does not imply any removal of, or lowering of, the requirements of any other standard with which the electrical apparatus complies.

This standard supplements, and may enhance, the requirements for apparatus for normal industrial applications.

NOTE This standard makes several specific references to IEC 60079-0. It is not intended that apparatus with type of protection "n" should comply with IEC 60079-0 in its entirety, or that the level of protection achieved by compliance with this standard should be equal to the level of protection achieved by compliance with IEC 60079-0 and any of the types of protection listed therein.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60079. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60079 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid standards.

IEC 60034 (all parts), *Rotating electrical machines*

IEC 60034-1:1996, *Rotating electrical machines – Part 1: Rating and performance*¹

IEC 60034-5, *Rotating electrical machines – Part 5: Classification of degrees of protection provided by enclosures of rotating electrical machines (IP code)*

IEC 60050-411, *International Electrotechnical Vocabulary – Chapter 411: Rotating machinery*

¹ A consolidated edition 10.2 exists (1999) that includes IEC 60034-1 (1996), its amendment 1 (1997) and its amendment 2 (1999).

IEC 60050(426), *International Electrotechnical Vocabulary – Chapter 426: Electrical apparatus for explosive atmospheres*

IEC 60050(486), *International Electrotechnical Vocabulary – Chapter 486: Secondary cells and batteries*

IEC 60060 (all parts), *High-voltage test techniques*

IEC 60061 (all parts), *Lamp caps and holders together with gauges for the control of interchangeability and safety*

IEC 60068-2-27:1987, *Environmental testing – Part 2: Tests – Test Ea and guidance: Shock*

IEC 60079-0:1998, *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements*²

IEC 60079-2, *Electrical apparatus for explosive gas atmospheres – Part 2: Electrical apparatus, type of protection "p"*³

IEC 60079-11, *Electrical apparatus for explosive gas atmospheres – Part 11: Intrinsic safety "i"*

IEC 60081, *Double-capped fluorescent lamps – Performance specifications*

IEC 60112, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions*

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60216-1:1990, *Guide for the determination of thermal endurance properties of electrical insulating materials – Part 1: General guidelines for ageing procedures and evaluation of test results*⁴

IEC 60216-2, *Guide for the determination of thermal endurance properties of electrical insulating materials – Part 2: Choice of test criteria*

IEC 60238:1998, *Edison screw lampholders*⁵

IEC 60269-3, *Low-voltage fuses – Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications)*

IEC 60400, *Lampholders for tubular fluorescent lamps and starter holders*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60598-1:1996, *Luminaires – Part 1: General requirements and tests*

IEC 60598-2 (all parts), *Luminaires – Part 2: Particular requirements*

IEC 60662:1992, *High-pressure sodium vapour lamps*

² A consolidated edition 3.1 exists (2000) that includes IEC 60079-0 (1998) and its amendment 1 (2000).

³ Fourth edition in preparation.

⁴ Fifth edition in preparation.

⁵ A consolidated edition 7.1 exists (2000) that includes IEC 60238 (1998) and its amendment 1 (1999).

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests* ⁶

IEC 60920, *Ballasts for tubular fluorescent lamps – General and safety requirements*

IEC 60922, *Auxiliaries for lamps – Ballasts for discharge lamps (excluding tubular fluorescent lamps) – General and safety requirements*

IEC 60924, *D.C. supplied electronic ballasts for tubular fluorescent lamps – General and safety requirements*

IEC 60926, 1995, *Auxiliaries for lamps – Starting devices (other than glow starters) – General and safety requirements* ⁷

IEC 60927, 1996, *Auxiliaries for lamps – Starting devices (other than glow starters) – Performance requirements* ⁸

IEC 60928: 1995, *Auxiliaries for lamps – A.C. supplied electronic ballasts for tubular fluorescent lamps – General and safety requirements* ⁹

IEC 60998-2-4, 1991, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-4: Particular requirements for twist-on connecting devices*

IEC 61048, *Capacitors for use in tubular fluorescent and other discharge lamp circuits – General and safety requirements* ¹⁰

IEC 61049, *Capacitors for use in tubular fluorescent and other discharge lamp circuits – Performance requirements*

IEC 61184, *Bayonet lampholders*

3 Definitions

For the purpose of this part of IEC 60079, the definitions given in IEC 60079-0 as well as the following definitions apply.

NOTE Definitions marked ¹⁾ differ from the equivalent definitions in IEC 60079-0. It is proposed that the definitions in IEC 60079-0 be modified to accommodate the slight differences needed for use with this standard, at which time definitions in this standard will be deleted.

3.1

cable sealing box

auxiliary enclosure provided specifically for the purpose of sealing the insulation of a cable (for example, oil insulated cable) where it is connected to an apparatus. The enclosure may also provide for the connection of separate cable tails to the cable

⁶ A consolidated edition 1.1 exists (2000) that includes IEC 60664 (1992) and its amendment 1 (2000).

⁷ A consolidated edition 2.1 exists (2000) that includes IEC 60926 (1995) and its amendment 1 (1999).

⁸ A consolidated edition 2.1 exists (2000) that includes IEC 60927 (1996) and its amendment 1 (1999).

⁹ A consolidated edition 2.1 exists (1999) that includes IEC 60928 (1995) and its amendment 1 (1999).

¹⁰ A consolidated edition 1.2 exists (1999) that includes IEC 61048 (1991), its amendment 1 (1995) and its amendment 2 (1999).

3.2

(electrochemical) cell or battery

electrochemical system capable of storing in chemical form the electric energy received and which can give it back by reconversion

[IEV 486-01-01]

3.2.1

secondary cell

assembly of electrodes and electrolyte which constitutes the basic unit of a secondary battery

[IEV 486-01-02]

NOTE 1 A cell consists substantially of positive and negative plates and separators, of the items needed for assembling and connecting (plate lugs, group bars, terminal posts), of the cell container, and the electrolyte.

NOTE 2 A sketch illustrating various parts of a cell is given in figure 1. This sketch is included for descriptive purposes only and is not intended to imply any requirements or preference for a particular form of construction.

3.2.2

secondary battery

two or more secondary cells connected together and used as a source of electric energy

[IEV 486-01-03]

3.2.3

container (of a cell)

container for the plate pack and electrolyte of a cell made of a material impervious to attack by the electrolyte

[IEV 486-02-20]

3.2.4

(battery) container

enclosure to contain the battery

NOTE The cover is a part of the battery container.

3.2.5

battery capacity

quantity of electricity or electric charge, which a fully charged battery can deliver under specified conditions

NOTE The SI unit for electrical charge is the coulomb (1 C = 1 As) but in practice, battery capacity is usually expressed in ampere-hours (Ah).

[IEV 486-03-01]

3.2.6

plate pack

assembly of the positive and negative plate groups with separators

[IEV 486-02-15]

3.2.7

intercell connector

conductor of electricity used for carrying current between cells

[IEV 486-02-31]

3.3

clearance

shortest distance in air between two conductive parts

(IEC 60664-1)

3.4

continuous operating temperature (COT)

maximum temperature which ensures the stability and integrity of the material for the expected life of the apparatus, or part, in its intended application

3.5

creepage distance

shortest distance along the surface of an electrically insulating material between two conductive parts

3.6

duty cycle

repetitive variation of load in which the cycle time is too short for thermal equilibrium to be attained in the first cycle

[IEV 411-51-07]

3.7

encapsulated device

device, which may or may not contain voids, which is so constructed that it is totally immersed in an encapsulating compound so that it is sealed to prevent entry of an external atmosphere

NOTE For the purpose of this standard an encapsulated device is considered to be a particular form of sealed device. It does not provide equivalent protection to encapsulated apparatus constructed in accordance with IEC 60079-18.

3.8

enclosed-break device

device incorporating electrical contacts that are made and broken and that will withstand an internal explosion of the flammable gas or vapour which may enter it without suffering damage and without communicating the internal explosion to the external flammable gas or vapour

3.9

energy limitation

concept applicable to circuits in which no spark or any thermal effect produced in the test conditions prescribed in this standard is capable of causing ignition of a given flammable gas or vapour

3.9.1

energy-limited apparatus

electrical apparatus in which the circuits and components are constructed according to the concept of energy limitation

3.9.2

associated energy-limited apparatus

electrical apparatus which contains both energy-limited and non-energy-limited circuits and is constructed so that the non-energy-limited circuits cannot adversely affect the energy-limited circuits. Associated energy-limited apparatus may be either:

- a) electrical apparatus which has an alternative method of protection included in this standard for use in the appropriate explosive gas atmosphere;
- b) electrical apparatus which has an alternative type of protection listed in IEC 60079-0 for use in the appropriate explosive gas atmosphere;
- c) electrical apparatus not so protected and which therefore shall not be used within an explosive gas atmosphere, for example, a recorder which is not of itself in an explosive gas atmosphere but is connected to a thermocouple situated within an explosive gas atmosphere where only the recorder input circuit is energy-limited