

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electrical apparatus for explosive gas atmospheres –
Part 15: Construction, test and marking of type of protection "n" electrical
apparatus**

**Matériel électrique pour atmosphères explosives gazeuses –
Partie 15: Construction, essais et marquage des matériels électriques
du mode de protection «n»**

WUJIAOJIAN



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES –**Part 15: Construction, test and marking of type of protection,
"n" electrical apparatus**

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International Standard IEC 60079-15 has been prepared by IEC technical committee 31: Electrical apparatus for explosive atmospheres.

This third edition cancels and replaces the second edition, published in 2001, and constitutes a technical revision.

The significant technical changes with respect to the previous edition are as follows:

- Linking the standard to IEC 60079-0 and adding Table 1 to show the connections
- References to third party testing stations removed

- Adding the definition of associated energy limiting apparatus [nL] and [Ex nL]
- Definitions eliminated that also appear in IEC 60079-0
- Elimination of n-pressurization, all pressurization requirements now covered by IEC 60079-2
- Air gap spark test requirement added for motors over 100 kW
- Added risk assessment tables for motors over 1 kV and over 100 kW
- Requirements changed for motors operating with frequency converters
- References to other IEC standards updated for luminaires
- Caplights and handlights addressed by reference to IEC 60079-0
- Creepage and clearance requirements for low powered apparatus between 60 V a.c. up to 250 V a.c. added in Table 10
- Requirement for plugs and sockets to maintain the degree of protection expanded
- Cable clamping test eliminated
- Insertion and removal torque values for E40/E39 lamp caps adjusted downward
- High-voltage impulse test for ballasts eliminated
- Changes made to test and acceptance criteria in luminaire starter and ignitor tests
- Ignition tests for large or high-voltage machines added
- Marking and documentation sections changed to reflect changes elsewhere in the standard
- Manufacturer's responsibility section dropped and replaced with instructions section

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

FDIS	Report on voting
31/558/FDIS	31/569/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 International standard is to be read in conjunction with IEC 60079-0.

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

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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

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

ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES –

Part 15: Construction, test and marking of type of protection "n" electrical apparatus

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 part 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. This standard describes several different methods by which this can be achieved which may be combined with other methods described in IEC 60079-0.

This part supplements the general requirements in IEC 60079-0. The relationship of IEC 60079-0 to this part is as indicated in Table 1.

Table 1 – Relationship of this part to IEC 60079-0

Clause of IEC 60079-0		IEC 60079-0 clause application to IEC 60079-15				
		Type of protection nC	Non sparking apparatus nA and nA nL	Restricted breathing apparatus nR	Energy limited apparatus nL	Associated energy limited apparatus [nL] and [Ex nL]
4	Apparatus grouping and temperature classification	Yes	Yes	Yes	Yes	Yes
5	Temperatures					
5.1	Environmental influences	Yes	Yes	Yes	Yes	Yes
5.2	Service temperature	Yes	Yes	Yes	Yes	Yes
5.3	Maximum surface temperature	Yes	Yes	Yes	Yes	No
5.4	Surface temperature and ignition temperature	No	No	No	No	No
5.5	Small components	Yes	Yes	Yes	Yes	No
6	Requirements for all electrical apparatus					
6.1	General	Yes	Yes	Yes	Yes	Yes
6.2	Mechanical strength of apparatus	Yes	Yes	Yes	Yes ^{c)}	No
6.3	Opening times	No	No	Yes	No	No
6.4	Circulating currents	Yes	Yes	Yes	No	No
6.5	Gasket retention	Yes	Yes	Yes	Yes	No

Clause of IEC 60079-0		IEC 60079-0 clause application to IEC 60079-15				
		Type of protection nC	Non sparking apparatus nA and nA nL	Restricted breathing apparatus nR	Energy limited apparatus nL	Associated energy limited apparatus [nL] and [Ex nL]
7	Non-metallic enclosures and non-metallic parts of enclosures					
7.1	General	Yes	Yes	Yes	Yes	No
7.2	Thermal endurance	Yes	Yes	Yes	Yes	No
7.3	Electrostatic charges on external non-metallic materials of enclosures	Yes	Yes	Yes	Yes	No
7.4	Threaded holes	Yes	Yes	Yes	Yes	No
8	Enclosures containing light metals					
8.1	Material composition	Yes	Yes	Yes	Yes	No
8.2	Threaded holes	Yes	Yes	Yes	Yes	No
9	Fasteners					
9.1	General	Yes	Yes	Yes	Yes	No
9.2	Special fasteners	No	No	No	No	No
9.3	Holes for special fasteners	No	No	No	No	No
10	Interlocking devices	No	No	No	No	No
11	Bushings	Yes	Yes	Yes	Yes	No
12	Materials used for cementing	No	No	No	No	No
13	Ex components	No	No	No	No	No
14	Connection facilities and terminal compartments	No	No	No	No	No
15	Connection facilities for earthing or bonding conductors	Yes	Yes	Yes	Yes	No
16	Entries into enclosures	Yes	Yes	Yes	Yes	No
17	Supplementary requirements for rotating electrical machines	No	Yes	No	No	No
18	Supplementary requirements for switchgear	Yes	Yes	Yes	No	No
19	Supplementary requirements for fuses	No	No	No	No	No
20	Supplementary requirements for plugs and sockets	No	No	No	No	No
21	Supplementary requirements for luminaires	No	No	No	No	No
22	Supplementary requirements for cap lights and handlights	Yes	Yes	Yes	No	No
23	Apparatus incorporating cells and batteries	Yes	Yes	Yes	Yes	No
24	Documentation	Yes	Yes	Yes	Yes	Yes

Clause of IEC 60079-0		IEC 60079-0 clause application to IEC 60079-15				
		Type of protection nC	Non sparking apparatus nA and nA nL	Restricted breathing apparatus nR	Energy limited apparatus nL	Associated energy limited apparatus [nL] and [Ex nL]
25	Compliance of prototype or sample with documents	Yes	Yes	Yes	Yes	Yes
26	Type tests					
26.1	General	Yes	Yes	Yes	Yes	Yes
26.2	Test configuration	Yes	Yes	Yes	Yes	Yes
26.3	Tests in explosive test mixtures	Yes	Yes	Yes	Yes	Yes
26.4	Tests of enclosures					
26.4.1	Order of tests	No	No	No	No	No
26.4.2	Resistance to impact	Yes	Yes	Yes	Yes	No
26.4.3	Drop test	Yes	Yes	Yes	Yes	No
26.4.4	Acceptance criteria for test for resistance to impact and drop test	Yes	Yes	Yes	Yes	No
26.4.5	Degree of protection IP by enclosures	No	No	No	No	No
26.5	Thermal tests					
26.5.1	Temperature measurement	Yes	Yes	Yes	Yes	No
26.5.2	Thermal shock test	Yes	Yes	Yes	Yes	No
26.5.3	Small component ignition test	Yes	Yes	No	Yes	No
26.6	Torque test for bushings	Yes	Yes	Yes	Yes	Yes
26.6.1	Procedure	Yes	Yes	Yes	Yes	Yes
26.6.2	Acceptance criteria	Yes	Yes	Yes	Yes	Yes
26.7	Non-metallic enclosures or of non-metallic parts of enclosures					
26.7.1	General	Yes	Yes	Yes	Yes	No
26.7.2	Temperatures during tests	Yes	Yes	Yes	Yes	No
26.8	Thermal endurance to heat	Yes	Yes	Yes	Yes	No
26.9	Thermal endurance to cold	Yes	Yes	Yes	Yes	No
26.10	Resistance to light	Yes	Yes	Yes	Yes	No
26.11	Resistance to chemical agents for Group I electrical apparatus	No	No	No	No	No
26.12	Earth continuity	Yes	Yes	Yes	Yes	No
26.13	Surface resistance test of parts of enclosures of non-metallic materials	Yes	Yes	Yes	Yes	No
26.14	Charging tests to verify the inability to store a dangerous charge	Yes	Yes	Yes	Yes	No

Clause of IEC 60079-0		IEC 60079-0 clause application to IEC 60079-15				
		Type of protection nC	Non sparking apparatus nA and nL	Restricted breathing apparatus nR	Energy limited apparatus nL	Associated energy limited apparatus [nL] and [Ex nL]
26.15	Measurement of capacitance to verify the inability to store a dangerous charge	Yes	Yes	Yes	Yes	Yes
26.15.1	Procedure	Yes	Yes	Yes	Yes	No
26.15.2	Acceptance criteria	Yes	Yes	Yes	Yes	No
27	Routine verifications and tests	Yes	Yes	Yes	Yes	Yes
28	Manufacturer's responsibility	Yes	Yes	Yes	Yes	Yes
28.1	Certificate	Yes	Yes	Yes	Yes	Yes
28.2	Responsibility for marking	Yes	Yes	Yes	Yes	Yes
29	Marking	Yes	Yes	Yes	Yes	Yes
30	Instructions	Yes	Yes	Yes	Yes	Yes
<p>^{a)} An entry of "Yes" in the table indicates the requirements of the referenced section of IEC 60079-0 apply. An entry of "No" indicates the requirements either do not apply or have been modified by IEC 60079-15.</p> <p>^{b)} Type of protection nC includes encapsulated devices, enclosed break devices, non-incendive components, sealed devices and hermetically sealed devices.</p> <p>^{c)} Clause 6.2 is a calling clause for the tests in 26.4 which are different for both portable and fixed apparatus.</p>						

NOTE 1 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.

NOTE 2 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.

NOTE 3 This part supplements, and may enhance, the requirements for apparatus for normal industrial applications. Where compliance with other IEC standards is indicated, such as IEC 60034 for motors and IEC 60598-2 for luminaires, proving compliance to those standards is normally the responsibility of the manufacturer.

2 Normative references

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

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

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

IEC 60034-5, *Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP Code) – Classification*

IEC 60034-7, *Rotating electrical machines – Part 7: Classification of type of construction, mounting arrangements and terminal box position (IM Code)*

IEC 60034-25, *Rotating electrical machines – Part 25: Guide for the design and performance of cage induction motors specifically designed for converter supply*