(PREVIEW)

Indian Standard

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	Yes	Yes	Yes	Yes	Yes
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	Yes
6	Requirements for all electrical apparatus	Yes	Yes	Yes	Yes	Yes

6.1	General	Yes	Yes	Yes	Yes	Yes
6.2	Mechanical strength of apparatus	Yes	Yes	Yes	Yes	No
6.3	Opening times	No	No	Yes	Yes	No
6.4	Circulating currents	Yes	Yes	Yes	No	No
6.5	Gasket retention	Yes	Yes	Yes	Yes	No
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	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	No	No	No	No
18	Supplementary requirements for Switchgear	Yes	Yes	Yes	Yes	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 luminaries	No	No	No	No	No
22	Supplementary	Yes	Yes	Yes	Yes	No

	requirements for cap lights and handlights					
23	Apparatus incorporating cells and batteries	Yes	Yes	Yes	Yes	No
24	Documentation	Yes	Yes	Yes	Yes	Yes
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	No	Yes	No
26.5.3	Small component ignition test	Yes	Yes	Yes	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

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	Manufactures'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
a) An entry of "yes" in the table jndicates 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. b) Type of protection nC includes encapsulated devices, enclosed break devices, non-incendive components, sealed devices and hermetically sealed devices. c) clause 6.2 is a calling clause for the tests in 26.4 which are different for both portable and fixed apparatus.						

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*

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

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

IEC 60079-0:2004, *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements*

IEC 60079-1, *Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosures "d"*

IEC 60079-11:1999, *Electrical* apparatus *for explosive gas atmospheres - Part 11: Intrinsic safety "i"*

IEC 60079-17, *Electrical apparatus for explosive gas atmospheres* – Part 17: *Inspection and maintenance of electrical installations in hazardous areas {other than* mines)

IEC 60081, *Double-capped fluorescent lamps* - Performance *specifications* [1]

IEC 60112, *Method for the determination of the proof and the comparative* solid insulating *materials*

IEC 60155, *Glow-starters for* fluorescent lamps

IEC 60238:1998, *Edison screw lampholders* [1]

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 starterholders* [1]

IEC 60529:1989, *Degrees of protection* provided by *enclosures (IP Code)* [1]

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

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

IEC 60664- 1,. *Insulation coordination for equipment within low-voltage systems – Part 7: Principles,* requirements *and tests* [1]

IEC *60927:1996, Auxiliaries for lamps* – Starting devices *(other than glow starters) - Performance requirements* [1]

IEC 60998-2-4:1993, *Connecting devices for low-voltage circuits for household* and similar *purposes - Part 2-4: Particular requirements for twist-on connecting devices*

IEC 61048, *Auxiliaries for lamps - Capacitors for use in tubular fluorescent and other discharge lamp circuits – General and safety requirements* [1]

IEC 61184, *Bayonet lampholders*

IEC 61347-1, *Lamp controlgear - Part 1: Genera/ and safety requirements*

IEC 61347-2-1, *Lamp controlgear - Part 2-1: Particular requirements for starting devices (other than glow starters)*

IEC 61347-2-2, *Lamp controlgear - Part 2-2: Particular requirements for d. c. or a.c. supplied electronic step-down convertors for filament lamps*

IEC 61347-2-3, *Lamp controlgear – Part 2-3: Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps z*

IEC 61347-2-4, *Lamp controlgear – Part 2-4: Particular requirements for d.c. supplied electronic bailasts for general lighting*

IEC 61347-2-7, *Lamp- controlear – Part 2-7: Particular requirements for d.c. supplied electronic ballasts for emergency lighting*

IEC 61347-2-8, *Lamp controlgear – Part 2-8: Particular requirements for ballasts for fluorescent lamps*

IEC 61347-2-9, *Lamp controlgear - Part 2-9: Particular requirements for ballasts for discharge lamps (excluding fluorescents lamps*[2]

EN 50262, Metric *cable glands for electrical Installations*