

# INTERNATIONAL STANDARD



Explosive atmospheres –  
Part 15: Equipment protection by type of protection "n"

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IEC 60079-15

Edition 5.0 2017-12  
REDLINE VERSION

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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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ICS 29.260.20

ISBN 978-2-8322-5162-1

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## CONTENTS

FOREWORD .....	5
1 Scope .....	10
2 Normative references .....	20
3 Terms and definitions .....	22
4 General .....	24
4.1 Equipment grouping and temperature classification .....	24
4.2 Potential ignition sources .....	24
4.3 Equipment requirements .....	24
5 Maximum surface temperatures .....	25
<del>5.1 Maximum surface temperature .....</del>	<del>25</del>
<del>5.2 Small components .....</del>	<del>25</del>
6 Requirements for electrical equipment .....	25
6.1 General .....	25
<del>6.2 Opening times .....</del>	<del>25</del>
<del>6.3 Minimum degree of protection .....</del>	<del>25</del>
<del>6.4 Clearances, creepage distances and separations .....</del>	<del>25</del>
6.2 Electric strength insulation from earth or frame .....	33
<del>7 Connection facilities and terminal compartments .....</del>	<del>25</del>
<del>8 Supplementary requirements for non-sparking electrical machines .....</del>	<del>25</del>
<del>9 Supplementary requirements for non-sparking fuses and fuse assemblies .....</del>	<del>25</del>
<del>10 Supplementary requirements for non-sparking plugs and sockets .....</del>	<del>25</del>
<del>11 Supplementary requirements for non-sparking luminaires .....</del>	<del>25</del>
<del>12 Supplementary requirements for equipment incorporating non-sparking cells and batteries .....</del>	<del>25</del>
<del>13 Supplementary requirements for non-sparking low power equipment .....</del>	<del>25</del>
<del>14 Supplementary requirements for non-sparking current transformers .....</del>	<del>25</del>
<del>15 Other non-sparking electrical equipment .....</del>	<del>25</del>
<del>16 General supplementary requirements for equipment producing arcs, sparks or hot surfaces .....</del>	<del>25</del>
<del>17 Supplementary requirements for enclosed break devices and non-incendive components producing arcs, sparks or hot surfaces .....</del>	<del>25</del>
7 Requirements for non-incendive components .....	58
7.1 Type testing .....	58
7.2 Circuit limitations .....	58
8 <del>Supplementary</del> Requirements for hermetically sealed devices producing arcs, sparks or hot surfaces .....	58
9 <del>Supplementary</del> Requirements for sealed devices producing arcs, sparks or hot surfaces .....	58
9.1 Non-metallic materials .....	58
9.2 Opening .....	59
9.3 Internal spaces .....	59
9.4 Handling .....	59
9.5 Gasket and seals .....	59
9.6 Type tests .....	59

10	<del>Supplementary Requirements for restricted-breathing enclosures protecting equipment producing arcs, sparks or hot surfaces</del>	59
10.1	General	59
10.2	Constructional requirements	60
10.2.1	Type of equipment	60
10.2.2	Cells and batteries	61
10.2.3	Cable glands and conduit entries	61
10.2.4	Operating rods, spindles and shafts	61
10.2.5	Windows	61
10.2.6	Gasket and seal requirements	62
10.2.7	Non-resilient seals	62
10.2.8	Test port	62
10.2.9	Internal fans	63
10.3	Temperature limitation	64
10.4	Additional requirements for restricted-breathing luminaires	64
10.4.1	Mounting arrangement	64
10.4.2	Reflectors	64
10.4.3	Surface temperatures of restricted-breathing luminaires	64
11	Type tests	65
11.1	Tests for non incensive components	65
11.1.1	Preparation of non-incensive component samples	66
11.1.2	Test conditions for non-incensive components	66
11.2	Tests for sealed devices	67
11.2.1	Conditioning	67
11.2.2	Voltage test	67
11.3	Type test requirements for restricted-breathing enclosures	69
11.3.1	General	69
11.3.3	Alternative type test for equipment where the volume of the enclosure changes due to pressure	69
12	Routine verifications and tests	74
12.1	Electric strength test	74
12.2	Routine test requirements for restricted-breathing enclosures	75
12.2.1	General	75
12.2.2	Test procedure	75
12.3	Routine temperature rise test	76
12.4	Temperature calculation	76
13	Marking	77
13.1	General	77
13.2	Examples of marking	78
13.3	Warning markings	79
14	Documentation	79
15	Instructions	79
	<del>21—General information on verification and tests</del>	
	<del>Annex A (informative) Application, installation, and testing considerations for Ex “nA” asynchronous machines</del>	
	Bibliography	83

Table 1 – Relationship of <del>this part</del> IEC 60079-15 to IEC 60079-0 .....	10
<del>Table 2 – Minimum creepage distances, clearances and separations .....</del>	
<del>Table 3 – Tracking resistance of insulating materials .....</del>	
<del>Table 4 – Separation in compound-filled cable sealing boxes .....</del>	
<del>Table 5 – Assumed voltage of neutral points .....</del>	
<del>Table 6 – Potential air gap sparking risk assessment for cage rotor ignition risk factors .....</del>	
<del>Table 7 – Minimum distance between lamp and protective cover .....</del>	
<del>Table 8 – Creepage distances and clearances at peak values of pulse voltages greater than 1,5 kV .....</del>	
<del>Table 9 – Types and use of cells and batteries .....</del>	
<del>Table 10 – Minimum creepage distances, clearances and separations for low power equipment .....</del>	
<del>Table 11 – Insertion torque .....</del>	
<del>Table 12 – Minimum removal torque .....</del>	
<del>Table 13 – Explosion test mixtures .....</del>	
Table 2 – Text of warning markings .....	79

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<https://standards.iteh.ai/catalog/standards/iec/a96293d8-1416-46c3-8134-47ffc54204b8/iec-60079-15-2017>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## EXPLOSIVE ATMOSPHERES –

## Part 15: Equipment protection by type of protection "n"

## FOREWORD

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

This fifth edition cancels and replaces the fourth edition, published in 2010, and constitutes a technical revision.

This edition includes the following significant changes with respect to the previous edition:

The text of this International Standard is based on the following documents:

FDIS	Report on voting
31/1339/FDIS	31/1355/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

This International Standard is to be read in conjunction with IEC 60079-0.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

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Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Requirements for enclosed break devices have been removed	-			C1
Requirements for type of protection "nA" has been removed	-			C2
Scope has been updated to allow equipment with internal working voltages over 15 kV such as starters for HID luminaires	1		X	
Definition for cable sealing box removed	3	X		
Definitions for creepage distance and clearance removed as they are now in 60079-0	3	X		
Definition of non-sparking device "nA" removed, as the concept has been transferred to 60079-7	3			C2
Definition of duty cycle removed	3	X		
Definition of enclosed break device moved as the concept has been transferred to 60079-1	3			C1
Definition of hermetically sealed device revised	3	A1		
Definition for normally sparking device added	3.2	X		
Small component temperature clause removed, part of moving type of protection "nA" to 60079-7	5			C2
Minimum degree of protection requirements; clearance, creepage and separation requirements; determination of working voltage; conformal coating; CTI requirement; Insulation between conductive parts and measurement of creepage and clearance requirements have been removed.	6			C2
Connection facilities and terminal compartment requirements have been removed	-			C2
Supplementary requirements for non-sparking electrical rotating machines have been removed	-			C2
Supplementary requirements for non-sparking fuses and fuse assemblies have been removed	-			C2
Supplementary requirements for non-sparking plugs and sockets have been removed	-			C2
Supplementary requirements for non-sparking luminaires have been removed	-			C2
Supplementary requirements for equipment incorporating non-sparking cells and batteries have been removed	-			C2
Supplementary requirements for non-sparking low power equipment have been removed	-			C2
Supplementary requirements for non-sparking current transformers have been removed	-			C2
Requirements for other non-sparking electrical equipment have been removed	-			C2
General supplementary requirements for equipment producing arcs, sparks or hot surfaces have been removed	-			C2
Requirements for enclosed break devices have been removed	-			C1
Voltage and current limitations added for non-incendive components.	7.2			C6

Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
The requirements for sealed devices have been extended to require more documentation,	9.1		X	
The +20K requirement for luminaire materials has been removed	9.5			C2
Notes 1-3 have been removed, as this information is covered elsewhere	10.1	X		
Entry device requirements added	10.1		X	
Industrial standard compliance and battery requirements added	10.2.1.2		X	
The exemption for manually operated sparking devices moved to here, creepage and clearance requirements in industrial standards added for switching devices, and cell and battery requirements added	10.2.1.2		X	
Requirements for cable glands and conduit entries have been clarified	10.2.3	X		
Requirements for gasketed windows expanded to allow a removable window mounted in a frame.	10.2.5.2		X	
Requirement to include documentation on the thermal stability of gaskets or seals added	10.2.6			C4
Requirements reworded for clarity	10.2.7	X		
Requirements for "nR" enclosures fitted with fans added.	10.2.9			C5
Type test requirements for enclosed break "nC" and "nA" equipment removed	-			C1, C2
The dielectric test after the leakage test for sealed devices has been eliminated unless the results of the leakage test are uncertain.	11.2.2		X	
Tests for sealed devices, screw lampholders, starters, lamps, ignitors, and ignitor pulses for luminaires have been removed				C2
All testing for batteries has been removed.	-			C2
All testing for electrical machines removed	-			C2
Routine test requirements re-written for sealed components, non-incendive components and restricted breathing equipment to take out the testing for enclosed break and nA equipment	12			C1, C2
Preparation of non-incendive component samples	11.1.1			C3
Marking requirements modified to remove labelling requirements for enclosed break components, nA equipment, and batteries.	-			C1, C2
Documentation requirements modified to remove to remove labelling requirements for enclosed break components, nA equipment, and batteries.	14			C1, C2
The instruction section has been expanded to include new requirements	15		X	
Annex A has been removed.	-			C2

NOTE The technical changes referred to include the significance of technical changes in the revised IEC Standard, but they do not form an exhaustive list of all modifications from the previous version.

**Explanation of the types of changes:**

## A) Definitions

1) **Minor and editorial changes:**

- Clarification
- Decrease of technical requirements
- Minor technical change
- Editorial corrections

These are changes which modify requirements in an editorial or a minor technical way. They include changes of the wording to clarify technical requirements without any technical change, or a reduction in level of existing requirement.

2) **Extension:** Addition of technical options

These are changes which add new or modify existing technical requirements, in a way that new options are given, but without increasing requirements for equipment that was fully compliant with the previous standard. Therefore, these will not have to be considered for products in conformity with the preceding edition.

3) **Major technical changes:**

- addition of technical requirements
- increase of technical requirements

These are changes to technical requirements (addition, increase of the level or removal) made in a way that a product in conformity with the preceding edition will not always be able to fulfil the requirements given in the later edition. These changes have to be considered for products in conformity with the preceding edition. For these changes additional information is provided in Clause B below.

NOTE These changes represent current technological knowledge. However, these changes should not normally have an influence on equipment already placed on the market.

## B) Information about the background of changes

- A1 – It was determined that this was already covered by the sealed device definition.
- C1 – Enclosed break devices “nC” are now designated as “dc” and the requirements are located in IEC 60079-1:2014.
- C2 – Type of protection “nA” is now designated as type of protection “ec” and the requirements for “ec” equipment are located in IEC 60079-7:2015.
- C3 – Test time for the preparation of non-incendive component samples has been specified.
- C4 – Additional documentation requirements for seals and gaskets.
- C5 – As the pressure inside an enclosure fitted with fans can be affected by the operation of the fan, it is now specified that the restricted breathing test is conducted with fans operating and stationary.
- C6 – The limitations from IEC 60079-15 Ed 3 were added.

## EXPLOSIVE ATMOSPHERES –

### Part 15: Equipment protection by type of protection "n"

#### 1 Scope

This part of IEC 60079 specifies requirements for the construction, testing and marking for Group II electrical equipment with type of protection "n" which includes; sealed devices "nC", hermetically sealed devices "nC", non-incendive components "nC" and restricted breathing enclosures "nR" intended for use in explosive gas atmospheres. This part of IEC 60079 applies to electrical equipment where the rated input voltage does not exceed 15 kV r.m.s. AC or DC including where the internal working voltages of the Ex product exceeds 15 kV, for example starters for HID luminaires.

~~This part of IEC 60079 is applicable to non-sparking electrical equipment and also to electrical equipment 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 of IEC 60079 supplements and modifies the general requirements of IEC 60079-0, except as indicated in Table 1. Where a requirement of this part of IEC 60079 conflicts with a requirement of IEC 60079-0, the requirement of this part of IEC 60079 takes precedence.

**Table 1 – Relationship of this part IEC 60079-15 to IEC 60079-0**

Clause of IEC 60079-0			IEC 60079-0 clause application to IEC 60079-15		
Ed. 5.0 (2007) (informative)	Ed. 6.0 <sup>1</sup> (future edition) (informative)	Clause / Subclause title (normative)	Protected sparking nC	Non sparking nA	Restricted breathing nR
4	4	Equipment grouping	Applies	Applies	Applies
4.1	4.1	Group I	Excluded	Excluded	Excluded
4.2	4.2	Group II	Applies	Applies	Applies
4.3	4.3	Group III	Excluded	Excluded	Excluded
4.4	4.4	Equipment for a particular explosive atmosphere	Applies	Applies	Applies
5.1	5.1	Environmental influences	Applies	Applies	Applies
5.1.1	5.1.1	Ambient temperature	Applies	Applies	Applies
5.1.2	5.1.2	External source of heating or cooling	Applies	Applies	Applies
5.2	5.2	Service temperature	Applies	Applies	Applies
5.3.1	5.3.1	Determination of maximum surface temperature	Applies	Applies	Applies

<sup>1</sup> Under consideration.

Clause of IEC 60079-0			IEC 60079-0 clause application to IEC 60079-15		
Ed. 5.0 (2007) (informative)	Ed. 6.01 (future edition) (informative)	Clause / Subclause title (normative)	Protected sparking nC	Non sparking nA	Restricted breathing nR
5.3.2.1	5.3.2.1	Group I electrical equipment	Excluded	Excluded	Excluded
5.3.2.2	5.3.2.2	Group II electrical equipment	Applies	Applies	Applies
5.3.2.3	5.3.2.3	Group III electrical equipment	Excluded	Excluded	Excluded
5.3.3	5.3.3	Small component temperature for Group I and Group II electrical equipment	Applies	Applies	Excluded
6.1	6.1	General	Applies	Applies	Applies
6.2	6.2	Mechanical strength	Applies	Applies	Applies
6.3	6.3	Opening times	Excluded	Excluded	Applies
6.4	6.4	Circulating currents	Applies	Applies	Applies
6.5	6.5	Gasket retention	Applies	Applies	Applies
6.6	6.6	Electromagnetic and ultrasonic radiating equipment	Applies	Applies	Applies
7.1.1	7.1.1	Applicability	Applies	Applies	Applies
7.1.2	7.1.2	Specification of materials	Applies	Applies	Applies
7.1.3	7.1.2.2	Plastic materials	Applies	Applies	Applies
7.1.4	7.1.2.3	Elastomeric materials	Applies	Applies	Applies
7.2	7.2	Thermal endurance	Applies	Applies	Applies
7.3	7.3	Resistance to light	Applies	Applies	Applies
7.4	7.4	Electrostatic charges on external non-metallic materials	Applies	Applies	Applies
7.5	9.1	Threaded holes	Applies	Applies	Applies
8.1.1	8.2	Group I	Excluded	Excluded	Excluded
8.1.2	8.3	Group II	Applies	Applies	Applies
8.1.3	8.4	Group III	Excluded	Excluded	Excluded
8.2	9.1	Threaded holes	Applies	Applies	Applies
9.1	9.1	General	Applies	Applies	Applies
9.2	9.2	Special fasteners	Excluded	Excluded	Excluded
9.3	9.3	Holes for special fasteners	Excluded	Excluded	Excluded
10	10	Interlocking devices	Excluded	Excluded	Excluded
11	11	Bushings	Applies	Applies	Applies
12	12	Materials used for cementing	Modified	Modified	Modified
13	13	Ex-components	Applies	Applies	Applies
14	14	Connection facilities and termination compartments	Modified	Modified	Modified

Clause of IEC 60079-0			IEC 60079-0 clause application to IEC 60079-15		
Ed. 5.0 (2007) (informative)	Ed. 6.01 (future edition) (informative)	Clause / Subclause title (normative)	Protected sparking nC	Non sparking nA	Restricted breathing nR
15	15	Connection facilities for earthing and bonding conductors	Applies	Applies	Applies
16	16	Entries into enclosures	Applies	Applies	Applies
17	17	Supplementary requirements for rotating electrical machines	Excluded	Modified	Excluded
18	18	Supplementary requirements for switchgear	Applies	Applies	Applies
19	19	Supplementary requirements for fuses	Modified	Modified	Modified
20	20	Supplementary requirements for plugs and sockets	Modified	Modified	Modified
21	21	Supplementary requirements for luminaires	Modified	Modified	Modified
22	22	Supplementary requirements for caplights and handlights	Applies	Applies	Applies
23	23	Equipment incorporating cells and batteries	Modified	Modified	Modified
24	24	Documentation	Applies	Applies	Applies
25	25	Compliance of prototype or sample with documents	Applies	Applies	Applies
26.1	26.1	General	Applies	Applies	Applies
26.2	26.2	Test configuration	Applies	Applies	Applies
26.3	26.3	Tests in explosive test mixtures	Applies	Applies	Applies
26.4	26.4	Tests of enclosures	Applies	Applies	Applies
26.4.1.1	26.4.1.1	Metallic enclosures, metallic parts of enclosures and glass parts of enclosures	Applies	Applies	Applies
26.4.1.2.1	26.4.1.2.1	Group I electrical equipment	Excluded	Excluded	Excluded
26.4.1.2.2	26.4.1.2.2	Group II and Group III electrical equipment	Applies	Applies	Applies
26.4.2	26.4.2	Resistance to impact	Applies	Applies	Applies
26.4.3	26.4.3	Drop test	Applies	Applies	Applies
26.4.4	26.4.4	Acceptance criteria	Applies	Applies	Applies
26.4.5	26.4.5	Degree of protection by enclosure	Applies	Applies	Applies
26.5	26.5	Thermal tests	Applies	Applies	Applies
26.6	26.6	Torque test for bushings	Applies	Applies	Applies
26.7	26.7	Non-metallic enclosures or non-metallic parts of enclosures	Modified	Modified	Modified