

AS/NZS IEC 60079.15:2020
IEC 60079-15:2017
(Incorporating Amendment No. 1)



Australian/New Zealand Standard™

Explosive atmospheres

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



AS/NZS IEC 60079.15:2020

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee EL-014, Equipment for Explosive Atmospheres. It was approved on behalf of the Council of Standards Australia on 12 November 2019 and by the New Zealand Standards Approval Board on 18 December 2019.

This Standard was published on 24 January 2020.

The following are represented on Committee EL-014:

- Auckland Business Chamber
- Australian Chamber of Commerce and Industry
- Australian Industry Group
- Australian Institute of Petroleum
- Australian Petroleum Production and Exploration Association
- Australian Pipelines and Gas Association
- Aviation & Marine Engineers Association
- Bureau of Steel Manufacturers of Australia
- Business New Zealand
- Communications, Electrical and Plumbing Union — Electrical Trades Division
- Queensland Department of Natural Resources, Mines and Energy
- Electrical Compliance Testing Association (Australia)
- Electrical Regulatory Authorities Council (Australia)
- Electrical Safety New Zealand
- Engineering New Zealand
- Engineers Australia
- Institute of Electrical Inspectors (Australia)
- Institute of Instrumentation, Control and Automation Australia
- Master Electricians (New Zealand)
- Mining Electrical and Mining Mechanical Engineering Society
- NSW Department of Planning, Industry and Environment
- SafeWork NSW
- University of Newcastle
- WorkSafe New Zealand

This Standard was issued in draft form for comment as DR AS/NZS 60079.15:2019.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

www.standards.govt.nz

ISBN 978 1 76072 714 7

Australian/New Zealand Standard™

Explosive atmospheres

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

Originated as AS/NZS 60079.15:2006.

Previous edition 2011.

Third edition 2020.

Reissued incorporating Amendment No 1 (November 2021).



© IEC 2020 — All rights reserved

© Standards Australia Limited/the Crown in right of New Zealand, administered by the New Zealand Standards Executive 2020

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth) or the Copyright Act 1994 (New Zealand).

Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-014, Equipment for Explosive Atmospheres to supersede AS/NZS 60079.15:2011 *Explosive atmospheres, Part 15: Equipment protection by type of protection 'n'*.

A1 This Standard incorporates Amendment No. 1 (November 2021). The start and end of changes introduced by the Amendment are indicated in the text by tags including the amendment number 1. **A1**

A1 AS/NZS 60079.15:2020 was initially published with modifications to refer to a modified adoption of AS/NZS 60079.0:2019 rather than IEC 60079-0. The modifications to AS/NZS 60079.0 do not affect compliance with IEC 60079-15, and the use of either AS/NZS 60079.0 or IEC 60079-0 is acceptable for AS/NZS 60079.15. Accordingly, AS/NZS 60079.15:2020 has been corrected to an identical adoption of IEC 60079-15:2017. **A1**

The objective of this Standard is to specify 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 Standard 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 Standard supplements and modifies the general requirements of AS/NZS 60079.0, except as indicated in [Table 1](#). Where a requirement of this Standard conflicts with a requirement of AS/NZS 60079.0, the requirement of this Standard takes precedence.

Table 1 — Relationship of AS/NZS 60079.15 to AS/NZS 60079.0

Clause of AS/NZS 60079.0			AS/NZS 60079.0 clause application to AS/NZS 60079.15	
Ed. 6.0 (2011) (informative)	Ed. 7.0 (future edition) (informative)	Clause/Subclause title (normative)	Protected sparking “nC”	Restricted breathing “nR”
3	3	Definitions	Applies	Applies
4	4	Equipment grouping		
4.1	4.1	Group I	Excluded	Excluded
4.2	4.2	Group II	Applies	Applies
4.3	4.3	Group III	Excluded	Excluded
4.4	4.4	Equipment for a particular explosive atmosphere	Applies	Applies
5	5	Temperatures		
5.1	5.1	Environmental influences	Applies	Applies
5.2	5.2	Service temperature	Applies	Applies
5.3	5.3	Maximum surface temperature		
5.3.1	5.3.1	Determination of maximum surface temperature	Applies	Applies
5.3.2	5.3.2	Limitation of maximum surface temperature		
5.3.2.1	5.3.2.1	Group I equipment	Excluded	Excluded

Table 1 (continued)

Clause of AS/NZS 60079.0			AS/NZS 60079.0 clause application to AS/NZS 60079.15	
Ed. 6.0 (2011) (informative)	Ed. 7.0 (future edition) (informative)	Clause/Subclause title (normative)	Protected sparking "nC"	Restricted breathing "nR"
5.3.2.2	5.3.2.2	Group II equipment	Applies	Applies
5.3.2.3	5.3.2.3	Group III equipment	Excluded	Excluded
5.3.3	5.3.3	Small component temperature for Group I and Group II equipment	Applies	Excluded
-	5.3.4	Component temperature of smooth surfaces for Group I or Group II equipment (Applies for smaller than 10 000 mm ² only)	Applies	Excluded
6	6	Requirements for all electrical apparatus		
6.1	6.1	General	Applies	Applies
6.2	6.2	Mechanical strength	Applies	Applies
6.3	6.3	Opening times	Excluded	Applies
6.4	6.4	Circulating currents	Applies	Applies
6.5	6.5	Gasket retention	Applies	Applies
6.6	6.6	Electromagnetic and ultrasonic radiating equipment	Applies	Applies
7	7	Non-metallic enclosures and non-metallic parts of enclosures		
7.1	7.1	General		
7.1.1	7.1.1	Applicability	Applies	Applies
7.1.2	7.1.2	Specification of materials	Applies	Applies
7.2	7.2	Thermal endurance		
7.2.1	7.2.1	Tests for thermal resistance	Applies	Applies
7.2.2	-	Material selection	Modified	Modified
-	7.2.2	Material selection	Applies	Applies
7.2.3	7.2.3	Alternative qualification for elastomeric sealing O-rings	Applies	Applies
7.3	7.3	Resistance to ultraviolet light	Applies	Applies
7.4	7.4	Electrostatic charges on external non-metallic materials		
7.4.1	7.4.1	Applicability	Applies	Applies

Table 1 (continued)

Clause of AS/NZS 60079.0			AS/NZS 60079.0 clause application to AS/NZS 60079.15	
Ed. 6.0 (2011) (informative)	Ed. 7.0 (future edition) (informative)	Clause/Subclause title (normative)	Protected sparking "nC"	Restricted breathing "nR"
7.4.2	7.4.2	Avoidance of build-up of electrostatic charge on Group I or Group II electrical equipment	Applies	Applies
7.4.3	7.4.3	Avoidance of build-up of electrostatic charge on equipment for Group III	Excluded	Excluded
7.5	7.5	External conductive parts	Applies	Applies
8	8	Metallic enclosures and metallic parts of enclosures		
8.1	8.1	Material composition	Applies	Applies
8.2	8.2	Group I	Excluded	Excluded
8.3	8.3	Group II	Applies	Applies
8.4	8.4	Group III	Excluded	Excluded
NR	8.5	Copper alloys	Applies	Applies
9	9	Fasteners		
9.1	9.1	General	Applies	Applies
9.2	9.2	Special fasteners	Excluded	Excluded
9.3	9.3	Holes for special fasteners	Excluded	Excluded
9.3.3	-	Hexagon socket set screws	Excluded	Excluded
-	9.4	Hexagon socket set screws	Excluded	Excluded
10	10	Interlocking devices	Excluded	Excluded
11	11	Bushings	Applies	Applies
12	-	Materials used for cementing	Modified	Modified
-	12	Reserved for future use.	Excluded	Excluded
13	13	Ex components	Applies	Applies
14	14	Connection facilities	Applies	Applies
15	15	Connection facilities for earthing and bonding conductors	Applies	Applies
16	16	Entries into enclosures	Applies	Applies
17	17	Supplementary requirements for electric machines	Excluded	Excluded
18	18	Supplementary requirements for switchgear	Excluded	

Table 1 (continued)

Clause of AS/NZS 60079.0			AS/NZS 60079.0 clause application to AS/NZS 60079.15	
Ed. 6.0 (2011) (informative)	Ed. 7.0 (future edition) (informative)	Clause/Subclause title (normative)	Protected sparking “nC”	Restricted breathing “nR”
18.1	18.1	Flammable dielectric	Excluded	Applies
18.2	18.2	Disconnectors	Excluded	Applies
18.3	18.3	Group I – Provisions for locking	Excluded	Excluded
18.4	18.4	Doors and covers	Excluded	Applies
19	-	Supplementary requirements for fuses	Excluded	Excluded
-	19	Reserved for future use.	Excluded	Excluded
20	20	Supplementary requirements for plugs and sockets		
20.1	20.1	General	Applies	Applies
20.2	20.2	Explosive gas atmospheres	Excluded	Excluded
20.3	20.3	Explosive dust atmospheres	Excluded	Excluded
20.4	20.4	Energized plugs	Applies	Applies
21	21	Supplementary requirements for luminaires		
21.1	21.1	General	Applies	Applies
21.2	21.2	Covers for luminaires of EPL Mb, EPL Gb or EPL Db	Excluded	Excluded
21.3	21.3	Covers for luminaires of EPL Gc or EPL Dc	Applies	Applies
21.4	21.4	Sodium lamps	Applies	Applies
22	22	Supplementary requirements for caplights and handlights		
22.1	22.1	Group I caplights	Excluded	Excluded
22.2	22.2	Group II and Group III caplights and handlights	Excluded	Applies
23	23	Equipment incorporating cells and batteries	Applies	Applies
23.12	23.12	Replacement battery pack	Applies	Applies
24	24	Documentation	Modified	Modified
25	25	Compliance of prototype or sample with documents	Applies	Applies
26	26	Type tests	Applies	Applies

Table 1 (continued)

Clause of AS/NZS 60079.0			AS/NZS 60079.0 clause application to AS/NZS 60079.15	
Ed. 6.0 (2011) (informative)	Ed. 7.0 (future edition) (informative)	Clause/Subclause title (normative)	Protected sparking "nC"	Restricted breathing "nR"
26.4	26.4	Tests of enclosures		
26.4.1	26.4.1	Order of tests		
26.4.1.1	26.4.1.1	Metallic enclosures, metallic parts of enclosures and glass or ceramic parts of enclosures	Applies	Applies
26.4.1.2	26.4.1.2	Non-metallic enclosures or non-metallic parts of enclosures		
26.4.1.2.1	26.4.1.2.1	General	Applies	Applies
26.4.1.2.2	26.4.1.2.2	Group I electrical equipment	Excluded	Excluded
26.4.1.2.3	-	Group II and Group III electrical equipment	Modified	Modified
-	26.4.1.2.3	Group II and Group III electrical equipment	Applies	Applies
26.4.2	26.4.2	Resistance to impact	Applies	Applies
26.4.3	26.4.3	Drop test	Applies	Applies
26.4.4	26.4.4	Acceptance criteria	Applies	Applies
26.4.5	26.4.5	Degree of protection by enclosure	Applies	Applies
26.5	26.5	Thermal tests		
26.5.1	26.5.1	Temperature measurement	Applies	Applies
26.5.1.1	26.5.1.1	General	Applies	Applies
26.5.1.2	26.5.1.2	Service Temperature	Applies	Applies
26.5.2	26.5.2	Thermal shock test	Applies	Applies
26.5.3	26.5.3	Small component ignition test (Group I and Group II)	Applies	Excluded
26.6	26.6	Torque test for bushings	Applies	Applies
26.7	26.7	Non-metallic enclosures or non-metallic parts of enclosures		
26.7.1	26.7.1	General	Applies	Applies
26.7.2	-	Test temperatures	Modified	Modified
-	26.7.2	Test temperatures	Applies	Applies
26.8	-	Thermal endurance to heat	Modified	Modified
-	26.8	Thermal endurance to heat	Applies	Applies

Table 1 (continued)

Clause of AS/NZS 60079.0			AS/NZS 60079.0 clause application to AS/NZS 60079.15	
Ed. 6.0 (2011) (informative)	Ed. 7.0 (future edition) (informative)	Clause/Subclause title (normative)	Protected sparking "nC"	Restricted breathing "nR"
26.9	26.9	Thermal endurance to cold	Applies	Applies
26.10	26.10	Resistance to light		
26.10.1	26.10.1	General	Applies	Applies
26.10.2	26.10.2	Light exposure	Applies	Applies
26.10.3	26.10.3	Acceptance criteria	Applies	Applies
26.11	26.11	Resistance to chemical agents for Group I electrical equipment	Excluded	Excluded
26.12	26.12	Earth continuity	Applies	Applies
26.13	26.13	Surface resistance test of parts of enclosures of non-metallic materials	Applies	Applies
26.14	26.14	Measurement of capacitance		
26.14.1	26.14.1	General	Applies	Applies
26.14.2	26.14.2	Test procedure	Applies	Applies
26.15	26.15	Verification of ratings of ventilating fans	Excluded	Excluded
26.16	26.16	Alternative qualification of elastomeric sealing O-rings	Applies	Applies
-	26.17	Transferred charge test	Applies	Applies
27	27	Routine tests	Applies	Applies
28	28	Manufacturers responsibility	Applies	Applies
29	29	Marking		
29.1	29.1	Applicability	Applies	Applies
29.2	29.2	Location	Applies	Applies
29.3	29.3	General	Applies	Applies
29.4	29.4	Ex marking for explosive gas atmospheres	Applies	Applies
29.5	29.5	Ex marking for explosive dust atmospheres	Excluded	Excluded
29.6	29.6	Combined types (or levels) of protection	Applies	Applies
29.7	29.7	Multiple types of protection	Applies	Applies
29.8	29.8	Ga equipment using two independent Gb types (or levels) of protection	Excluded	Excluded

Table 1 (continued)

Clause of AS/NZS 60079.0			AS/NZS 60079.0 clause application to AS/NZS 60079.15	
Ed. 6.0 (2011) (informative)	Ed. 7.0 (future edition) (informative)	Clause/Subclause title (normative)	Protected sparking “nC”	Restricted breathing “nR”
-	29.9	Boundary wall	Excluded	Excluded
29.9	29.10	Ex Components	Applies	Applies
29.10	29.11	Small Ex Equipment and small Ex Components	Applies	Applies
29.11	29.12	Extremely small equipment and extremely small Ex Components	Applies	Applies
29.12	29.13	Warning markings	Applies	Applies
29.13	-	Alternate marking of equipment protection levels (EPLs)	Applies	Applies
29.13.1	-	Alternate marking of type of protection for explosive gas atmospheres	Applies	Applies
29.13.2	-	Alternate marking of type of protection for explosive dust atmospheres	Excluded	Excluded
29.14	29.14	Cells and batteries	Applies	Applies
29.15	29.15	Electrical machines operated with a converter	Applies	Applies
29.16	29.16	Examples of marking	Examples only	Examples only
30	30	Instructions		
30.1	30.1	General	Applies	Applies
30.2	30.2	Cells and batteries	Applies	Applies
30.3	30.3	Electric machines	Excluded	Excluded
30.4	30.4	Ventilating fans	Excluded	Excluded
-	30.5	Cable glands	Applies	Applies
Annex A	Annex A	Supplementary requirements for Ex cable glands	Applies	Applies
Annex B	Annex B	Requirements for Ex components	Applies	Applies
Annex C	Annex C	Example of rig for resistance to impact test	Informative Annex	Informative Annex
Annex D	Annex D	Motors supplied by converters	Informative Annex	Informative Annex
Annex E	Annex E	Temperature evaluation of electric machines	Informative Annex	Informative Annex

Table 1 (continued)

Clause of AS/NZS 60079.0			AS/NZS 60079.0 clause application to AS/NZS 60079.15	
Ed. 6.0 (2011) (informative)	Ed. 7.0 (future edition) (informative)	Clause/Subclause title (normative)	Protected sparking “nC”	Restricted breathing “nR”
Annex F	Annex F	Guideline flowchart for tests of non-metallic enclosures or non-metallic parts of enclosures (26.4)	Informative Annex	Informative Annex
-	Annex G	Guidance flowchart for tests of cable glands	Informative Annex	Informative Annex
-	Annex H	Shaft voltages resulting in motor bearing or shaft brush sparking. Discharge energy calculation	Informative Annex	Informative Annex
Applies – This requirement of AS/NZS 60079.0 is applied without change.				
Excluded – This requirement of AS/NZS 60079.0 does not apply.				
Modified – This requirement of AS/NZS 60079.0 is modified as detailed in this standard.				
NOTE 1 The clause number in the above table is shown for information only. The applicable requirements of AS/NZS 60079.0 are identified by the clause title which is normative. This document was written against the specific requirements of IEC 60079-0 (ed. 7.0). The clause numbers for the previous edition are shown for information only. This is to enable the general requirements of AS/NZS 60079.0 to be used where necessary with this Standard. Where there is a conflict between requirements, the later edition requirements take precedence.				
NOTE 2 In cases where the applicability is the same for all of the sub-clauses the ‘Applies’ or ‘Excluded’ is listed in the heading row and the sub-clauses are not expanded. Where the application of the individual sub-clauses may be different, these are expanded in the above table and the applicability for each is listed.				
NOTE 3 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.				

A1 This Standard is identical with, and has been reproduced from, IEC 60079-15:2017, *Explosive atmospheres — Part 15: Equipment protection by type of protection “n”*. **A1**

A1 [Text deleted.] **A1**

As this document has been reproduced from an International Standard, the following applies:

- (a) In the source text “this part of IEC 60079” should read “this Australian/New Zealand Standard”.
- (b) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

CONTENTS

FOREWORD	4
1 Scope	9
2 Normative references	15
3 Terms and definitions	16
4 General	17
4.1 Equipment grouping and temperature classification	17
4.2 Potential ignition sources	17
4.3 Equipment requirements	17
5 Maximum surface temperatures	17
6 Requirements for electrical equipment	18
6.1 General	18
6.2 Electric strength insulation from earth or frame	18
7 Requirements for non-incendive components	18
7.1 Type testing	18
7.2 Circuit limitations	18
8 Requirements for hermetically sealed devices	18
9 Requirements for sealed devices	19
9.1 Non-metallic materials	19
9.2 Opening	19
9.3 Internal spaces	19
9.4 Handling	19
9.5 Gasket and seals	19
9.6 Type tests	19
10 Requirements for restricted-breathing enclosures	19
10.1 General	19
10.2 Constructional requirements	20
10.2.1 Type of equipment	20
10.2.2 Cells and batteries	20
10.2.3 Cable glands and conduit entries	20
10.2.4 Operating rods, spindles and shafts	21
10.2.5 Windows	21
10.2.6 Gasket and seal requirements	21
10.2.7 Non-resilient seals	21
10.2.8 Test port	22
10.2.9 Internal fans	23
10.3 Temperature limitation	23
10.4 Additional requirements for restricted-breathing luminaires	23
10.4.1 Mounting arrangement	23
10.4.2 Reflectors	23
10.4.3 Surface temperatures of restricted-breathing luminaires	23
11 Type Tests	24
11.1 Tests for non incendive components	24
11.1.1 Preparation of non-incendive component samples	24
11.1.2 Test conditions for non-incendive components	24
11.2 Tests for sealed devices	24

11.2.1	Conditioning	25
11.2.2	Voltage test	25
11.2.3	Leakage tests on sealed devices	25
11.3	Type test requirements for restricted-breathing enclosures	26
11.3.1	General	26
11.3.2	Equipment where the volume of the enclosure will be unchanged due to pressure	26
11.3.3	Alternative type test for equipment where the volume of the enclosure changes due to pressure	26
12	Routine verifications and tests	27
12.1	Electric strength test	27
12.2	Routine test requirements for restricted-breathing enclosures	27
12.2.1	General	27
12.2.2	Test procedure	27
12.3	Routine temperature rise test	28
12.4	Temperature calculation	28
13	Marking	29
13.1	General	29
13.2	Examples of marking	29
13.3	Warning markings	29
14	Documentation	29
15	Instructions	30
	Bibliography	31
	Table 1 – Relationship of IEC 60079-15 to IEC 60079-0	9
	Table 2 – Text of warning markings	29

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

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

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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.