

# Australian/New Zealand Standard™

## Explosive atmospheres

### Part 11: Equipment protection by intrinsic safety 'i'



## **AS/NZS 60079.11:2006**

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 10 November 2006 and on behalf of the Council of Standards New Zealand on 8 December 2006. This Standard was published on 27 December 2006.

---

The following are represented on Committee EL-014:

Association of Consulting Engineers Australia  
Auckland Regional Chamber of Commerce  
Australian Chamber of Commerce and Industry  
Australian Coal Association  
Australian Electrical and Electronic Manufacturers Association  
Australian Industry Group  
Australian Institute of Petroleum Ltd  
Australian Institute of Refrigeration Air Conditioning and Heating (Inc)  
Australian Petroleum Production and Exploration Association  
Certification Interests (Australia)  
Committee EL-023  
Department of Natural Resources and Mines (Qld)  
Department of Primary Industries, Mine Safety (NSW)  
Electrical Regulatory Authorities Council  
Energy Networks Association  
Engineers Australia  
Institute of Electrical Inspectors  
Institute of Instrumentation, Control and Automation Australia  
Mining Electrical and Mining Mechanical Engineering Society  
Ministry of Economic Development (New Zealand)  
National Electrical and Communications Association  
New Zealand Association of Marine, Aviation and Power Engineers  
New Zealand Employers and Manufacturers Association  
New Zealand Hazardous Areas Electrical Coordinating Committee  
WorkCover New South Wales

---

### **Keeping Standards up-to-date**

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at [www.standards.com.au](http://www.standards.com.au) or Standards New Zealand web site at [www.standards.co.nz](http://www.standards.co.nz) and looking up the relevant Standard in the on-line catalogue.

Alternatively, both organizations publish an annual printed Catalogue with full details of all current Standards. For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

---

*This Standard was issued in draft form for comment as DR 06551.*

---

AS/NZS 60079.11:2006

# Australian/New Zealand Standard™

## Explosive atmospheres

### Part 11: Equipment protection by intrinsic safety 'i'

Originated as AS/NZS 60079.11:2000.  
Second edition 2006.

#### **COPYRIGHT**

© Standards Australia/Standards New Zealand

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.

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 7942 5

## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-014, Equipment for Explosive Atmospheres, to supersede AS/NZS 60079.11:2000.

The objective of this Standard is to specify the construction and testing of intrinsically safe apparatus intended for use in an explosive gas atmosphere and for associated apparatus, which is intended for connection to intrinsically safe circuits which enter such atmospheres.

This Standard is identical to and has been reproduced from IEC 60079-11, Ed. 5.0 (2006), *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i”*.

Footnotes have been added to clarify typographical errors in the original IEC Standard.

The significant changes with respect to the previous edition are listed below:

- (a) introduction of level of protection “ic” (this level of protection has been introduced to allow removal of the ‘energy limitation’ concept from IEC 60079-15);
- (b) introduction of Annex F that allows reduction in segregation distance requirements when the pollution degree has been reduced by installation or enclosure;
- (c) introduction of alternative spark test apparatus construction when used with high current circuits;
- (d) introduction of Annex E that provides a method for transient energy test;
- (e) changes in the table of ‘Temperature classification of tracks on PCBs’ to allow correlation with IPC-2152;
- (f) allowing alternative methods of rating resistors when used to limit the discharge from capacitance;
- (g) introduction of methods to deal with the spark ignition energy consideration when high current low voltage cells and batteries are used;
- (h) introduction of tests to measure the maximum pressure in sealed battery containers;
- (i) introduction of methods to deal with fault application on voltage enhancement ICs;
- (j) introduction of infallible connection methods for SMDs (surface mount devices);
- (k) introduction of alternative methods to deal with the spark ignition energy in circuits with both inductance and capacitance;
- (l) introduction of alternative high voltage test for transformers;
- (m) introduction of methods to assess the reduction of effective capacitance when protected by series resistances;
- (n) introduction of Group I data for permitted short circuit current and permitted capacitance in the tables of Annex A.

As this Standard is reproduced from an International Standard, the following applies:

- (i) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (ii) In the source text ‘IEC 60079-11’ should read ‘AS/NZS 60079.11’.
- (iii) A full point should be substituted for a comma when referring to a decimal marker.

The terms ‘normative’ and ‘informative’ are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

## CONTENTS

	<i>Page</i>
1 Scope .....	1
2 Normative references .....	2
3 Terms and definitions .....	4
3.1 General .....	4
4 Grouping and classification of intrinsically safe apparatus and associated apparatus .....	8
5 Levels of protection and ignition compliance requirements of electrical apparatus .....	8
5.1 General .....	8
5.2 Level of protection "ia" .....	9
5.3 Level of protection "ib" .....	9
5.4 Level of protection "ic" .....	10
5.5 Spark ignition compliance .....	10
5.6 Thermal ignition compliance .....	10
5.7 Simple apparatus .....	13
6 Apparatus construction .....	14
6.1 Enclosures .....	14
6.2 Facilities for connection of external circuits .....	15
6.3 Separation distances .....	19
6.4 Protection against polarity reversal .....	30
6.5 Earth conductors, connections and terminals .....	30
6.6 Encapsulation .....	31
7 Components on which intrinsic safety depends .....	32
7.1 Rating of components .....	32
7.2 Connectors for internal connections, plug-in cards and components .....	33
7.3 Fuses .....	33
7.4 Primary and secondary cells and batteries .....	34
7.5 Semiconductors .....	37
7.6 Failure of components, connections and separations .....	38
7.7 Piezo-electric devices .....	39
7.8 Electrochemical cells for the detection of gases .....	39
8 Infallible components, infallible assemblies of components and infallible connections on which intrinsic safety depends .....	39
8.1 Mains transformers .....	39
8.2 Transformers other than mains transformers .....	41
8.3 Infallible windings .....	42
8.4 Current-limiting resistors .....	42
8.5 Blocking capacitors .....	43
8.6 Shunt safety assemblies .....	43
8.7 Wiring, printed circuit board tracks, and connections .....	45
8.8 Galvanically separating components .....	46
9 Diode safety barriers .....	47
9.1 General .....	47
9.2 Construction .....	48

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-