Australian Standard®

Electrical equipment for explosive atmospheres—Explosion-protection techniques

Part 7: Intrinsic safety i

This Australian standard was prepared by Committee EL/14, Electrical Equipment in Hazardous Locations. It was approved on behalf of the Council of the Standards Association of Australia on 12 January 1987 and published on 2 March 1987.

The following interests are represented on Committee EL/14:

Australian Coal Association
Australian Electrical and Electronic Manufacturers Association
Australian Institute of Petroleum
Confederation of Australian Industry
Department of Defence
Department of Industrial Relations and Employment, N.S.W.
Department of Labour, Vic.
Department of Mines, Qld
Electrical Contractors Associations of Australia
Electricity Supply Association of Australia
Independent testing interests
Insurance Council of Australia
State electricity regulatory authorities

Representatives of the following interests also participated in the drafting of this standard:

Australian Gas Association
Institute of Instrumentation and Control Australia

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Part 7: INTRINSIC SAFETY i

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PREFACE

This standard was prepared by the Association's Committee on Electrical Equipment in Hazardous Areas, to supersede AS 2011—1977* and AS 1829—1981†. This standard is intended for the guidance of manufacturers, users, statutory authorities and associated interests. It is Part 7 of a standard dealing with the explosion-protection of electrical equipment intended for use in potentially explosive atmospheres.

In its terminology, definitions and general treatment of the subject, this standard is similar to the following standards and draft standards issued by the International Electrotechnical Commission and the European Committee for Electrotechnical Standardization:

IEC 79-11	Electrical apparatus for explosive gas atmospheres Construction and test of intrinsically-safe and associated apparatus
EN 50 020	Electrical apparatus for potentially explosive atmospheres Part 7: Intrinsic safety i
IEC 31G(Sect)24	Draft revision of IEC 79-11

Acknowledgement is made of the assistance received from these sources.

Acknowledgement is also made to the Safety in Mines Research Establishment, Ministry of Power, United Kingdom, for the graphs reproduced in Appendix A which have been extracted from SMRE Research Report No. 256.

Intrinsic safety is an explosion-protection technique for electrical circuits in hazardous areas, where ignition of explosive mixtures is prevented from occurring by limiting the energy of any potential spark occurring under fault conditions and by limiting surface temperatures.

This is generally achieved by a combination of electrical and mechanical measures, which also have to ensure that the protection is maintained in service.

Historically, intrinsic safety has been used as a protection technique for electrical equipment intended to be used in explosive gas atmospheres. Hence, the use of (gas) groups I and II throughout the standard. However, this technique has now been recognized in AS 3000 as suitable for combustible dust areas (Class II) under certain specified conditions.

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* AS 2011, Shunt Diode Safety Barriers for Explosive Atmospheres

† AS 1829, Electrical Equipment for Explosive Atmospheres—Intrinsically Safe Apparatus—Type of Protection i

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for

ELECTRICAL EQUIPMENT FOR EXPLOSIVE ATMOSPHERES—EXPLOSION-PROTECTION TECHNIQUES

PART 7—INTRINSIC SAFETY i

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies requirements for intrinsically safe electrical equipment and systems, type of protection i, intended for use in explosive atmospheres.

This standard supplements AS 2380, Part 1, except for the following requirements which do not apply:

(a) For intrinsically safe equipment and associated equipment:

Clause 2.1.4(b)	Access to uninsulated live parts
Clause 2.4.2	Special fasteners
Clause 2.5	Interlocking devices
Clause 2.6	Bushings and terminal studs
Clause 2.7	Materials used for cementing and sealing
Clause 2.8	Connections
Clause 2.12	Cable and conduit entries
Section 3	Supplementary requirements for certain electrical equipment
Clause 5.2.1	Impact test
Clause 5.2.3	Rubbing of moving parts
Clause 5.4	Torque test for bushings

(b) For associated electrical equipment:

Clause 2.2	Plastics enclosures
Clause 2.3	Light alloy enclosures
Clause 5.5	Temperature rise test
Clause 5.6	Thermal shock test
Clause 5.7	Insulation resistance test of parts of enclosures of plastics material

Where associated electrical equipment is protected by a type of explosion-protection other than intrinsic safety, the requirements of the applicable standard for that type of protection shall apply.

This standard applies also to electrical equipment or parts of electrical equipment located outside the explosive atmosphere or protected by another type of explosion protection, where the intrinsic safety of the electrical circuits in the explosive atmosphere may depend upon the design and construction of such electrical equipment or parts of such electrical equipment.

NOTE: The permitted methods of interconnection of intrinsically safe electrical equipment and associated electrical equipment are specified in AS 1076, Part 4.

1.2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1076	Electrical Equipment for Explosive Atmospheres—Selection, Installation and Maintenance Part 4—Intrinsic Safety i
AS 1939	Classification of Degrees of Protection Provided by Enclosures for Electrical Equipment
AS 2380	Electrical Equipment for Explosive Atmospheres—Explosion-Protection Techniques Part 1—General Requirements
AS 2420	Fire Test Methods for Solid Insulating Materials and Non-metallic Enclosures used in Electrical Equipment
AS 2430	Classification of Hazardous Areas Part 1—Explosive Gas Atmospheres Part 2—Combustible Dusts
AS 2480	Electrical Equipment for Explosive Atmospheres—Flameproof Enclosure—Type of Protection d
AS 2768	Electrical Insulating Materials—Evaluation and Classification Based on Thermal Endurance
AS 3000	SAA Wiring Rules
IEC 79-11	Electrical Apparatus for Explosive Gas Atmospheres—Construction and Test of Intrinsically-safe and Associated Apparatus
BS 50 000	Harmonized System of Quality Assessment for Electronic Components—General Specification: Discrete Semiconductor Devices.

1.3 DEFINITIONS. The following definitions specific to type of protection intrinsic safety 'i' are applicable in this standard and are supplementary to the definitions given in AS 2380, Part 1.

1.3.1 Associated electrical equipment—electrical equipment in which the circuits are not all intrinsically safe but which contains circuits that can affect the safety of intrinsically safe circuits connected to it.

NOTE: Associated electrical equipment may be either of the following:

(a) Electrical equipment which has an alternative type of explosion-protection for use in the explosive atmosphere.

Example: A safety barrier housed inside a flameproof enclosure.

(b) Electrical equipment not so protected and which is therefore not to be used within an explosive atmosphere, i.e. must be located in a safe area.

Example: A recorder which is located in a safe area where only the recorder input circuit is intrinsically safe.