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Australian Standard 2380, Part 1–1980

ELECTRICAL EQUIPMENT FOR EXPLOSIVE GAS ATMOSPHERES—EXPLOSION PROTECTION ECHNIQUES

Part 1—
GENERAL REQUIREMENTS

STANDARDS ASSOCIATION OF AUSTRALIA
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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANISATIONS AND departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Coal Association

Australian Electrical and Electronics Manufacturers Association

Confederation of Australian Industry

Department of Productivity

Departments of Explosives

Departments of Industrial Relations

Departments of Mines

Electrical Contractors Association of Australia

Independent Testing Interests

Insurance Council of Australia

Oil Companies

Statutory Electricity Authorities

This standard, prepared by Committee EL/14, Electrical Equipment in Hazardous Locations, was approved on behalf of the Council of the Standards Association of Australia on 13 June 1980, and was published on 1 September 1980.

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Amendment No 1
July 1981

STANDARDS ASSOCIATION OF AUSTRALIA

Incorporated by Royal Charter

AMENDMENT No 1
to
AS 2380, Part 1—1980
ELECTRICAL EQUIPMENT FOR EXPLOSIVE GAS ATMOSPHERES—EXPLOSION PROTECTION TECHNIQUES
PART 1—GENERAL REQUIREMENTS

SUMMARY: This amendment covers the following section of the standard: Section 5.
Published on 15 July 1981.

AUSTRALIAN STANDARD

ELECTRICAL EQUIPMENT FOR EXPLOSIVE GAS ATMOSPHERES—EXPLOSION PROTECTION TECHNIQUES

Part 1

GENERAL REQUIREMENTS

AS 2380, Part 1–1980

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PREFACE

This standard was prepared by the Association's Committee on Electrical Equipment in Hazardous Locations for the guidance of manufacturers, users, statutory authorities and associated interests.

In its terminology, definitions and general treatment of the subject this standard is similar to corresponding recommendations issued by the International Electrotechnical Commission (IEC) under document reference IEC Draft 31 (Secretariat) 108, and amendments agreed to at the Budapest meeting, November 1978. Acknowledgement is made of the assistance received from this source.

This standard is one of seven parts of an omnibus standard dealing with the explosion protection of electrical apparatus intended for use in potentially explosive atmospheres. It will be supplemented by the following Parts concerning the specific types of protection:

Part 2 — Oil Immersion 'o'
Part 3 — Pressurized Apparatus 'p'
Part 4 — Sand Filled 'q'
Part 5 — Flameproof Enclosure 'd'
Part 6 — Increased Safety 'e'
Part 7 — Intrinsic Safety 'i'

It is anticipated that apparatus certified in compliance with existing Australian standards will continue to be acceptable for some considerable time after the new standards are issued.

All parts are being based on IEC/TC 31 recommendations and when published as Australian standards will interface with CENELEC standards EN50 014 to EN50 020 and also provide a step towards international harmonization.

This standard requires reference to the following Australian standards:

AS 1076	Code of Practice for Selection, Installation and Maintenance of Electrical Apparatus and Associated Equipment for Use in Explosive Atmospheres (Other than Mining Applications) Part 1 — Basic Requirements Part 2 — Classification of Hazardous Areas
AS 1110	ISO Metric Hexagon Precision Bolts and Screws
AS 1112	ISO Metric Hexagon Nuts, Including Thin Nuts, Slotted Nuts and Castle Nuts
AS 1202	A.C. Motor Starters (Up to and Including 1000 V) Part 1 — Direct-on-line (Full Voltage) Starters
AS 1593	Increased Safety of Electrical Equipment for Explosive Atmospheres
AS 1654	Limits and Fits for Engineering
AS 1721	General Purpose Metric Screw Threads
AS 1825	Pressurized Enclosure of Electrical Equipment for Explosive Atmospheres
AS 1826	Special Protection of Electrical Equipment for Explosive Atmospheres
AS 1829	Intrinsically Safe Electrical Apparatus for Explosive Atmospheres
AS 1896	Method of Test for Ignition Temperature of Gases and Vapours
AS 1939	Classification of Degrees of Protection Provided by Enclosures for Electrical Equipment
AS C98	Flameproof Enclosure of Electrical Equipment for Explosive Atmospheres
AS 2380	Electrical Equipment for Explosive Gas Atmospheres — Explosion Protection Techniques Part 2 — Oil Immersion 'o'* Part 3 — Pressurized Apparatus 'p'* Part 4 — Sand Filled 'q'* Part 5 — Flameproof Enclosure 'd'* Part 6 — Increased Safety 'e'* Part 7 — Intrinsic Safety 'i'*

* In course of preparation.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

ELECTRICAL EQUIPMENT FOR EXPLOSIVE GAS ATMOSPHERES — EXPLOSION PROTECTION TECHNIQUES

PART 1 — GENERAL REQUIREMENTS

FOREWORD

In coal mines and some other industrial situations, electrical apparatus may have to operate in an explosive atmosphere. The precautions to be taken against explosion are prescribed by Australian State Authorities responsible for safety. These authorities require that all categories of apparatus for use in explosive atmospheres must be approved and/or certified. Where explosive atmospheres exist, apparatus and installations must comply with the mining or wiring regulations of the State or Territory in which the installation is located. The regulations of States and Territories are very similar and are generally based on national standards and codes of practice. The requirements of published Australian standards for explosion-protected electrical apparatus are solely concerned with the design and construction of electrical apparatus for use in explosive atmospheres to ensure that the apparatus will not cause an explosion in the surrounding atmosphere. They are relevant where the risk arises from the possible presence of an explosive atmosphere, but not from ignitable dusts. (The possibilities of standardization in respect of ignitable dusts are being examined.)

Several different types of explosion protection techniques for the construction of electrical apparatus for explosive atmospheres are covered by the standards listed in Clause 1.1 of this standard. These techniques provide the required level of safety when the electrical apparatus is operated within the limits indicated by its nameplate marking and is adequately protected against overcurrents, internal short-circuits and other electrical faults. In particular, it is essential that the severity and duration of an internal or external fault be limited by internal or external means to values that can be sustained by the electrical apparatus without damage.

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SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies general requirements for the construction of electrical apparatus for explosive gas atmospheres and is supplemented or modified by the following standards* according to the specific type of protection:

AS 2380, Part 2 — Oil Immersion 'o'

AS 2380, Part 3 — Pressurized Apparatus 'p'

AS 2380, Part 4 — Sand Filled 'q'

AS 2380, Part 5 — Flameproof Enclosure 'd'

AS 2380, Part 6 — Increased Safety 'e'

AS 2380, Part 7 — Intrinsic Safety 'i'

NOTE: Pending the publication of these standards the relevant types of explosion protection as specified in the existing Australian standard should be used in the selection, examination and testing of electrical apparatus. Existing standards are AS 1076, Parts 1 and 2, AS 1593, AS 1825, AS 1829, AS 1896, AS C98.

1.2 STANDARD ATMOSPHERIC CONDITIONS. The atmospheric conditions applicable to electrical apparatus for explosive atmospheres are considered to include pressures within the range 80 kPa to 110 kPa and temperatures within the range −20°C to +60°C.

1.3 CERTIFICATION EXEMPTIONS. Devices which never exceed any of the values 1.2 V, 0.1 A, 20 μJ or 25 mW need not be certified nor marked. They will be subjected, however, to requirements of the Australian series of standards on explosion protection if they are connected to a device which contains a source or a storage element of electrical energy which could cause the circuit to exceed these parameters.

NOTE: Apparatus which is not constructed in accordance with the requirements of the type of explosion protection used and which cannot comply with a recognized type of protection is to comply with AS 1826.

1.4 DEFINITIONS. For the purpose of this standard, the following definitions apply:

1.4.1 Cable entry — a means of introducing an electric cable into an electrical apparatus.

1.4.2 Conduit entry — a means of introducing a conduit into an electrical apparatus.

1.4.3 Degree of protection of enclosures — the measures applied to the enclosures of electrical apparatus to provide for—

(a) the protection of persons against contact with live or moving parts inside the enclosure and protection of the apparatus against ingress of solid foreign bodies; and

(b) the protection of the apparatus against ingress of liquids.

1.4.4 Electrical apparatus — all items applied as a whole or in part for the utilization of electrical energy. These include items for the generation, transmission, distribution, storage, measurement, regulation, conversion, and consumption of electrical energy and items for telecommunications.

1.4.5 Electrical apparatus for explosive atmospheres — electrical apparatus for use in hazardous areas and complying with any of the standards listed in Clause 1.1.

NOTE: This applies to explosion-protected electrical apparatus and hazardous location electrical equipment.

1.4.6 Enclosure — all the walls which surround the live parts of electrical apparatus including doors, covers, cable entries, rods, spindles and shafts, ensuring the protection of the electrical apparatus.

1.4.7 Explosive atmosphere — a mixture with air, under atmospheric conditions, of gas, vapour, mist, in which, after ignition, combustion spreads throughout the unconsumed mixture.

1.4.8 Explosive test mixture — a specific explosive mixture used for testing electrical apparatus for explosive atmospheres.

1.4.9 Hazardous area — an area in which explosive gas/air mixtures are or may be expected to be present in quantities such as to require special precautions for the construction and use of electrical apparatus.

1.4.10 Ignition temperature of an explosive atmosphere — the lowest temperature of a combustible gas or vapour at which ignition occurs under test conditions specified in AS 1896.

1.4.11 Maximum surface temperature — the highest temperature which is attained in service under the most adverse conditions (but within the tolerances) by any part or surface of an electrical apparatus, which would be able to produce an ignition of the surrounding atmosphere.

NOTE: The most adverse conditions include overloads and fault condition recognized in the specific standard for the type of protection concerned.

1.4.12 Potentially explosive atmosphere — an atmosphere which could be explosive.

1.4.13 Type of protection — the specific measures applied to electrical apparatus to prevent ignition of a surrounding explosive atmosphere.

1.5 GROUPING AND CLASSIFICATION OF ELECTRICAL APPARATUS.

1.5.1 Group Designation. Electrical apparatus for explosive atmospheres is grouped as follows:

(a) Group I — electrical apparatus for mines susceptible to methane.

(b) Group II — electrical apparatus for all places with an explosive atmosphere, other than mines susceptible to methane.

For mines where gases other than firedamp may normally and naturally occur, the electrical apparatus shall be constructed in accordance with the requirements for Group I, but shall also be submitted to the tests prescribed for the appropriate Group II explosive mixture and marked accordingly.

*The standards are in the course of preparation — see Preface.

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