Australian Standard®

Electrical equipment for explosive atmospheres—Encapsulated apparatus—Type of protection m

The following scientific, industrial and governmental organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

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

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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, and for use with the SAA Wiring Rules and relevant mining regulations. It prescribes requirements in respect of design, construction and marking of encapsulated apparatus and includes a section on testing.

Since there are at present no recommendations published by the International Electrotechnical Commission (IEC) for this subject, this standard has been based on requirements in other Australian standards and industry practice. Directly the IEC recommendations are published, this standard will be revised.

This standard may require reference to the following Australian standards:

AS 1194	Enamelled Round Copper Winding Wires
AS 1683	Methods of Test for Rubber 1683.15— Indentation Hardness of Rubber and Plastics by Means of a Durometer
AS 1767	Insulating Oil for Transformers and Switchgear
AS 1829	Intrinsically Safe Electrical Equipment for Explosiv At-mospheres— Apparatus Type of Protection i
AS 1874	Aluminium Ingots and Aluminium Alloys Ingots and Castings
AS 1896	Method of Test for Ignition Temperature of Gas and Vapours
AS 2341	Methods of Testing Bitumen and Related Roadmaking Products 2341.18— Determination of Softening Point of Tar (Ring and Ball Method)
AS 2380	Electrical Equipment for Explosive Gas Atmospheres — Explosion Protection Techniques Part 1— General Requirements
AS 2420	Fire Test Methods for Solid Insulating Materials and Nonmetallic Enclosures Used in Electrical Equipment
AS 2430	Classification of Hazardous Areas Part 1— Explosive Gas Atmospheres
AS 2480	Electrical Equipment for Explosive Atmospheres — Flameproof Enclosure— Type of Protection d
AS 3000	SAA Wiring Rules
AS C100	Approval and Test Specification for Definitions and General Requirements for Electrical Materials and Equipment
AS C329	Method for the Measurement of Voltage with Sphere-gaps (One Sphere Earthed)

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

ELECTRICAL EQUIPMENT FOR EXPLOSIVE ATMOSPHERES—ENCAPSULATED APPARATUS—TYPE OF PROTECTION m

FOREWORD

The purpose of this standard is to establish requirements for the encapsulation of electrical apparatus for use in flammable or explosive atmospheres in which gases or vapours may be present and as required by the SAA Wiring Rules or by the mining regulations for defined hazardous areas.

The classification of hazardous areas is dealt with in AS 2430, Parts 1 and 2. Part 1 applies to explosive gas atmospheres and recognizes the following zones:

Zone 0—an area in which an explosive gas atmosphere is present continuously, or is expected to be present for long periods or for short periods which occur with high frequency.

Zone 1—an area in which an explosive gas atmosphere can be expected to occur periodically or occasionally during normal operation.

Zone 2—an area in which an explosive gas atmosphere is not expected to occur in normal operation and if it occurs is likely to be present only infrequently and for short duration.

Apparatus complying with this standard will be suitable for installation in a Zone 1 or Zone 2 area.

It must be recognized that the safe use of electrical equipment in explosive atmospheres may depend on many factors besides the use of an appropriate type of protection. It is, therefore, essential to ensure that—

(a) with regard to rating, performance and other requirements, the encapsulated electrical apparatus complies with the appropriate Australian standard or with the requirements of the relevant Statutory Authority;

(b) the apparatus to which it applies will be properly installed and adequately maintained, and that it will be operated under such conditions that its rating will not be exceeded;

(c) the electrical circuit with which the apparatus is associated will include such automatic devices as may be necessary to ensure the encapsulated electrical apparatus will not cause ignition of the flammable ambient atmosphere; and

(d) the external electrical circuit connection of the apparatus will be protected in accordance with the requirements of AS 3000.

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies requirements for encapsulated electrical apparatus or parts of encapsulated electrical apparatus, and for those features of design and construction that are considered to be essential to the securing of reliability of the apparatus in service and for use in defined hazardous areas.

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

1.2.1 Encapsulation—protection of electrical components by enclosure in a resin in such a way that an explosive atmosphere cannot be ignited during operation by either sparking or overheating which may occur within the encapsulation.

1.2.2 Encapsulated apparatus—electrical apparatus which is protected by encapsulation.

1.2.3 Encapsulating material—an epoxy resin or other material with appropriate electrical insulation, mechanical and temperature stability, and chemical properties.

1.2.4 Encased apparatus—encapsulated equipment which is wholly or partly installed within a case.

NOTE: A casing may be provided for the purpose of additional mechanical protection to facilitate cable termination or for ease of manufacture.

1.2.5 Ignition temperature—the lowest temperature at which an explosive mixture ignites when tested in accordance with AS 1896.

1.2.6 Maximum surface temperature—the highest temperature attained under the most adverse conditions (but within the tolerances) by any part of any surface of an electrical apparatus, the exposure of which to an explosive atmosphere may not involve a risk of explosion of the atmosphere surrounding the electrical apparatus.

NOTE: The most adverse conditions include recognized overloads and any fault condition recognized in this standard.

1.2.7 Mould—the matrix or cavity, in which anything is shaped, and from which it takes its form; also the body or mass containing the cavity.

1.2.8 Moulding—act or process of shaping in or on a mould or of making moulds; moulder's art or occupation. Anything cast in a mould, or which appears to be so.

1.3 GROUPING. Apparatus shall be grouped in accordance with Clause 2.5 of AS 2380, Part 1.

NOTE: Apparatus complying with this standard can be made suitable for Group IIB or Group IIC or both.

1.4 TEMPERATURE CLASSIFICATION. Apparatus shall be classified in accordance with Clause 1.6 of AS 2380, Part 1.