Australian Standard®

Electrical equipment for explosive atmospheres — Explosion-protection techniques

Part 1: General requirements

This Australian Standard was prepared by Committee EL/14, Electrical Equipment in Hazardous Areas. It was approved on behalf of the Council of Standards Australia on 3 August 1989 and published on 13 November 1989.

The following interest 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 Minerals and Energy, N.S.W.

Department of Mines, Qld

Electrical Contractors Associations of Australia

Institute of Instrumentation and Control

Insurance Council of Australia

Regulatory authorities (electrical)

Testing interests

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PREFACE

This Standard was prepared by the Standards Australia Committee on Electrical Equipment in Hazardous Areas to supersede AS 2380.1—1985. It is intended for the guidance of manufacturers, users, regulatory authorities and associated interests, and for use with the *SAA Wiring Rules* (AS 3000) and relevant mining regulations.

In its terminology, definitions and general treatment of the subject, this Standard is similar to corresponding requirements contained in IEC 79-0, *Electrical apparatus for explosive gas atmospheres*, Part 0: *General requirements*. Acknowledgment is made of the assistance received from this source.

This Standard is the first of a series of Standards dealing with the explosion-protection of electrical equipment intended for use in explosive atmospheres. It is supplemented by other parts covering specific types of protection.

The major change in this edition is the deletion of requirements for clearances, separations and creepage distances. These are now included in the appropriate parts covering specific types of protection.

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FOREWORD

In coal mines, and many other industrial situations, electrical equipment 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 generally require that all categories of equipment for use in explosive atmospheres must be approved or certified. Where explosive atmospheres exist or can exist, equipment 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 equipment are solely concerned with the design and construction of electrical equipment for use in explosive atmospheres to ensure that the equipment will not cause an explosion in the surrounding atmosphere. They are relevant where the risk arises from the possible presence of an explosive atmosphere.

Several different types of explosion-protection techniques for the construction of electrical equipment for explosive atmospheres are covered by the various parts of this Standard. These techniques provide the required level of safety when the electrical equipment 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 equipment without damage.

The classification of hazardous areas is dealt with in AS 2430.

STANDARDS AUSTRALIA

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SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard specifies general requirements for the construction of electrical equipment for explosive atmospheres and is supplemented or modified by the particular Standards for the specific types of explosion-protection.

The requirements contained in this Standard are supplementary to the requirements for electrical equipment specified in AS 3000, SAA Wiring Rules, and the relevant Australian Standard Approval and Test Specifications called-up therein. This Standard covers safety of the equipment with regard to explosion hazards only.

1.2 APPLICATION. This Standard is intended for application by designers and manufacturers of explosion-protected electrical equipment. It is also intended for application by certifying authorities in assessing compliance on the basis of type tests.

This Standard does not contain requirements for ensuring that, in production, the equipment continues to comply. However, it is the manufacturer's responsibility to make the routine verifications and tests necessary to ensure that production models continue to comply with the Standard and are not inferior to the prototype or sample submitted for testing.

Likewise this Standard does not include requirements for ensuring that maintenance work is carried out to ensure that equipment, originally manufactured in accordance with this Standard, continues to comply with the Standard. It is the owner's responsibility to ensure that appropriate maintenance is undertaken on a regular basis.

1.3 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

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)
1076.1 Part 1: Basic requirements
1202 A.C. motor starters (up to and including 1000 V)
1202.1 Part 1: Direct-on-line (full voltage) starters
1939 Classification of degrees of protection provided by enclosures for electrical equipment
2032 Metallic conduits and fittings
2380 Electrical equipment for explosive atmospheres — Explosion-protection techniques
2380.6 Part 6: Increased safety
2420 Fire test methods for solid insulating materials and non-metallic enclosures used in electrical equipment
2430 Classification of hazardous areas
3000 SAA Wiring Rules
3100 Approval and test specification for definitions and general requirements for electrical materials and equipment

SAA
MP 42 Explosion-protected electrical equipment — Conditions and procedures for SAA certification

NFPA
325M Fire hazard properties of flammable liquids, gases and volatile solid

1.4 DEFINITIONS. For the purpose of this Standard, the definitions below apply.

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

1.4.2 Certifying authority — body responsible for issuing certificates of compliance.

1.4.3 Clearance — shortest distance in air between two conductive parts.

1.4.4 Conduit entry — a means of introducing a conduit into an electrical equipment.

1.4.5 Creepage distance — shortest distance along the surface of electrical insulating material between two conductive parts.

1.4.6 Connection facilities — terminals, screws and other parts, used for the electrical connection of conductors of external circuits.

1.4.7 Degree of protection of enclosures — measure applied to the enclosures of electrical equipment to provide for —

(a) the protection of persons against contact with, or approach to, live parts and against contact with moving parts (other than smooth rotating shafts and the like) inside the enclosure and protection of the equipment against ingress of solid foreign bodies; and

(b) the protection of the equipment inside the enclosure against harmful ingress of water.

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

1.4.9 Electrical equipment for explosive gas atmospheres — electrical equipment for use in hazardous areas and complying with an appropriate Australian Standard.

NOTE: Such equipment may also be referred to as 'explosion-protected electrical equipment'.