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Australian Standard®

SELECTION, INSTALLATION AND MAINTENANCE OF ELECTRICAL APPARATUS AND ASSOCIATED EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES
(Other than Mining Applications)

Part 7—APPARATUS WITH TYPE OF PROTECTION 'n'— NON–SPARKING APPARATUS

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

Associated Chambers of Manufactures of Australia

Australian Coal Association

Australian Electrical Manufacturers Association

Department of Defence

Department of Productivity

Department of Public Works, N.S.W.

Electrical Contractors Associations of Australia

Electricity Supply Association of Australia

Insurance Council of Australia

Oil Companies

State Departments of Explosives

State Departments of Labour and Industry

State Departments of Mines

Statutory Electricity Authorities

Sydney County Council (Testing Interest)

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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 and statutory authorities, and for use with the SAA Wiring Rules and relevant Mining Regulations.

This standard is one of a number of Parts of a code which deals with the classification of hazardous areas, and the selection,installation and maintenance of electrical apparatus for use in areas where combustible materials are generated, processed, handled or stored and which therefore are potentially hazardous. Each Part applies to the installation and maintenance requirements appropriate to one of the types of protection which may be used to achieve electrical safety, and outlines basic requirements and considerations which are fundamental to the use of electrical apparatus in hazardous areas and which therefore provide the basis for the other Parts of the standard.

The full list of Parts is as follows:

Part 1 Basic Requirements

Part 2 Classification of Hazardous Areas*

Part 3 Apparatus with Type of Protection 'd'— Flameproof Enclosure

Part 4 Apparatus with Type of Protection 'i'— Intrinsically Safe Apparatus and Systems*

Part 5 Apparatus with Type of Protection 'p'— Pressurization and Continuous Dilution

Part 6 Apparatus with Type of Protection 'e'— Increased Safety*

Part 7 Apparatus with Type of Protection 'n'— Non–sparking Apparatus*

Part 8 Apparatus with Type of Protection 's'— Special Protection

Part 9 Apparatus with Type of Protection 'o'— Oil–immersed Apparatus, and Apparatus with Type of Protection 'q'— Sand–filled Apparatus

Part 10 Apparatus for Use with Combustible Dusts

Part 11 Specific Industry Applications

Part 12 The Use of Gas Detectors

Part 13 Installation and Maintenance Requirements for Instrumentation.

*Published.

In its terminology, definitions and general treatment of the subject, this Part takes account of a similar draft standard code of practice issued by the British Standards Institution, viz Doc 75/20865 DC, Part 7—Installation and Maintenance Requirements for Electrical Apparatus with Type of Protection 'N', and acknowledgment is made of the assistance received therefrom.

In addition to Parts 1 and 2 of the standard, this Part requires reference to the following standards:

AS 1829	Intrinsically Safe Electrical Apparatus for Explosive Atmospheres
AS .....*	Non–sparking Electrical Apparatus for Explosive Atmospheres Part 1 — Apparatus with Type of Protection 'n' Part 2 — Type 'n' Three—phase Electric Motors Part 3 — Type 'n' Luminaires
AS C66	Part 1 — Rigid Metallic Conduits for Electrical Wiring.

* In course of preparation.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard Code of Practice for the SELECTION, INSTALLATION AND MAINTENANCE OF ELECTRICAL APPARATUS AND ASSOCIATED EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES (Other than Mining Applications)

PART 7 APPARATUS WITH TYPE OF PROTECTION 'n'

FOREWORD

This Part of the code should be read in conjunction with the other Parts, particularly Parts 1 and 2 which taken together describe the fundamental considerations which affect the selection, installation and maintenance of all electrical apparatus used in hazardous areas.

The code is based on the concept, which is accepted internationally, of dealing with the risk of fire and explosion by area classification. This concept recognizes the differing degrees of probability with which explosive (flammable) concentrations of combustible material may arise in installations in terms of both the frequency of occurrence and the probable duration of existence on each occasion.

The detailed considerations which must be taken into account are described in Part 2 of the code. For completeness and for the convenience of readers, the definitions appropriate to area classification are repeated here. It should be noted that whereas classified areas were formerly known as 'divisions', they are now called 'zones'. Three sets of conditions are recognized, viz:

Zone 0—in which an explosive gas/air mixture is continuously present or present for long periods.

Zone 1—in which an explosive gas/air mixture is likely to occur in normal operation.

Zone 2—which an explosive gas/air mixture is not likely to occur in normal operation, and if it occurs it will only exist for a short time.

It should be noted that this concept of area classification deals only with risks due to combustible gas and vapours, and by implication mists. It does not deal with combustible dusts, which may lie quiescent for long periods of time until disturbed into suspension by a suitable mechanism.

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By implication, an area which is not classified as Zone 0, 1 or 2 is deemed to be a non-hazardous or safe area. If doubt exists as to the classification of an area which is judged to be hazardous or potentially hazardous, guidance should be sought at an early stage from the authority having jurisdiction in the industry or area concerned (see Parts 1 and 2).

Electrical apparatus used in each of the classified zones must be suitably protected by design and manufacture, and must also be installed and maintained so as to ensure its safe use. The code offers guidance in the selection, installation and maintenance of suitably protected apparatus and should be applied to all new installations. It should also be applied to change to existing installations, though it is recognized that minor changes only to certain existing installations may need to be made.

Notwithstanding application of the installation recommendations of this code to existing installations, the recommendations for maintenance should be applied to all electrical apparatus and installations, irrespective of age and date of installation. It should also be noted that the installation and maintenance recommendations described in the code are supplementary and not alternative to AS 3000, Part 1, SAA Wiring Rules.

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SECTION 1. GENERAL

1.1 SCOPE. This Part of the code offers guidance in the selection, installation and maintenance in Class 1 Zone 2 hazardous areas of electrical apparatus which is certified or assessed in accordance with the requirements of Type of Protection 'n': Non-sparking Apparatus. (For relevant specifications, see Rule 1.4.)

For the purposes of this Part of the code, explosion risks due only to the presence of combustible gases and vapours are considered.

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

1.2.1 Type of Protection 'n' — a type of protection applied for electrical apparatus such that, in normal operation, it is not capable of igniting a surrounding explosive atmosphere and a fault capable of causing ignition is not likely to occur.

1.2.2 Enclosure — the external casing protecting the electrical and mechanical parts of the apparatus. The term excludes cables.

1.2.3 Restricted-breathing enclosure — an enclosure which is not hermetically sealed, but which is designed to prevent or restrict the entry of gases.

1.2.4 Enclosed-break device — a device incorporating an electrical contact that is made and broken, the enclosure of which will withstand an internal explosion of the combustible gas or vapour which may enter it without suffering damage and without communicating the internal explosion to the external explosive gas/air mixture, the net volume of the enclosure being not greater than 20 cm^3.

NOTE: It should be noted that an enclosed-break device does not need to comply with the requirements of Type of Protection 'd': Flameproof Enclosure.

1.2.5 Hermetically sealed device — a device in which an electrical contact is made and broken, which is so constructed that the external atmosphere cannot gain access to the contacts and in which the sealing does not depend on the use of O-rings or elastomeric materials.

1.2.6 Clearance — the shortest distance through air between two conducting parts.

1.2.7 Creepage distance — the shortest distance between two conducting parts along the surface of the insulating parts.

1.3 DESCRIPTION OF TECHNIQUE. Electrical apparatus which is certified, or assessed in accordance with the requirements of Type of Protection 'n' is so designed and constructed that it is not capable under normal operating conditions of igniting a surrounding explosive atmosphere, and any fault capable of causing ignition is not likely to occur.

It is therefore implicit in the design of apparatus complying with Type of Protection 'n' that the apparatus shall not in normal operation —

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