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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 13: Installation and maintenance requirements for instrumentation

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

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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Selection, installation and maintenance of electrical apparatus and associated equipment for use in explosive atmospheres (other than mining applications)

Part 13: Installation and maintenance requirements for instrumentation

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PREFACE

This standard was prepared by the Association's Committee on Electrical Equipment for 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, other than Parts 1 and 2, deals with the installation and maintenance requirements appropriate to one of the types of protection which may be used to achieve electrical safety, or with 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 Code.

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 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.*

In its terminology, definitions and general treatment of the subject, this Part takes into account a similar code of practice issued by The Institute of Petroleum, viz Chapter 3 of Part 1 of the IP Model Code of Safe Practice in the Petroleum Industry.

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* Published.

This Part of the standard may require reference to Parts 1, 2 and 4 of this standard and to the following Australian standards:

AS 1593 Increased Safety 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 Gas and Vapours
AS 3000, Part 1 SAA Wiring Rules
AS C98 Flameproof Enclosure of Electrical Equipment for Explosive Atmospheres
AS . . . . Encapsulated Electrical Equipment for Explosive Atmospheres*

In addition, attention is drawn to the list of related publications given in Appendix A.

* In course of preparation.

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard Code of Practice

for

SELECTION, INSTALLATION AND MAINTENANCE OF ELECTRICAL APPARATUS AND ASSOCIATED EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES

(Other than Mining Applications)

PART 13—INSTALLATION AND MAINTENANCE REQUIREMENTS FOR INSTRUMENTATION

FOREWORD

This Part of the code applies to the installation and maintenance requirements for instrumentation and sets out the special precautions needed to safeguard against fires or explosions which might otherwise arise from the use of electricity near flammable substances. In this it supplements but does not set out the whole field of general electrical safe practice. Familiarity and compliance with good general electrical practice and also with any national regulations legally applying in any particular cases are therefore assumed.

It is particularly emphasized that the onus for determining, where necessary by test, the classification of the hazardous area as defined in the code, rests with the occupier of the premises concerned or his duly appointed representative. In any event it is the user's responsibility to comply with the relevant statutory regulations and the requirements of the SAA Wiring Rules.*

* AS 3000, Part 1-SAA Wiring Rules.

CODE

1 SCOPE. This Part of the code gives recommendations for the selection, installation and use of instruments and instrument systems utilizing electrical energy in hazardous areas or in the proximity of flammable substances.

It also takes into account that for certain instruments the release of flammable substances may be internal as well as external to the enclosure. Consequently, this results in combinations of area classification, types of release and types of protection not previously covered.

This Part deals exclusively with protection against hazards arising from explosive mixtures, resulting from release of flammable substances. It does not deal with hazards arising from dust fibres and flyings, increased hazards arising from oxygen-enriched atmospheres, or highly specialized hazards such as those arising from radio-induced sparks.

Outlines of area classification, types of release and types of protection are principally based upon the recommendations published in AS 1076, Parts 1 and 2,* to which reference should be made for detailed information.

2 DEFINITIONS. For the purpose of this Part of the code the following definitions apply, irrespective of any other meaning the words have in other connections:

2.1 Analyzer—an instrument for the measurement of the composition or inherent physical property of a substance.

2.2 Area classification—the classification of an area according to the probability of an explosive mixture being present.

2.3 Electrical apparatus—an apparatus in which electrical conductors are used or of which they form a part.

2.4 Enclosure—a robust shell containing one or more pieces of electrical apparatus.

2.5 Enclosure group - the classification of enclosures according to the dimensions of the gaps between their joint surfaces, taking into consideration the flame-quenching properties for flammable gases or vapours.

2.6 Explosive gas/air mixture - a mixture of a flammable substance with air, in which, after ignition, combustion spreads throughout the unconsumed portion of the mixture, with explosive force.

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* AS 1076, 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 1—Basic Requirements
Part 2—Classification of Hazardous Areas

2.7 Fallible component—a component which is liable to become defective in service or in storage.

2.8 Flammable—easily ignitable. Synonymous with the deprecated word 'inflammable'.

2.9 Flammable substance—a liquid, vapour or gas which, when in contact with air, can be easily ignited.

2.10 Flexible member—a physical barrier separating two substances and which is subject to some intentional elastic deformation during operation. Examples are a diaphragm, a bourdon tube, a bellows or a torque tube.

2.11 Grouping of gases and vapours—the classification of the ignition properties of gases or vapours with respect to the maximum effective safe gap of a flameproof enclosure or minimum igniting current.

2.12 Ignition temperature—the lowest temperature of a combustible gas or vapour at which ignition occurs under test conditions specified in AS 1896.*

2.13 Instrument—an electrical apparatus for the measurement, control and/or computation of physical or chemical quantities.

2.14 Instrument system—an installed instrument complete with its ancillary apparatus, the cables and the fittings required to enable it to fulfil its intended function.

2.15 Means of ignition—an electrical arc or spark of sufficient energy, or an electrically engendered thermal effect with a temperature sufficiently high, to ignite an explosive mixture.

2.16 Protective gas—a suitable gas (such as fresh air or inert gas) derived from a non-hazardous source and applied to prevent ignition of a flammable substance.

2.17 Purge—the operation of passing a quantity of protective gas through an enclosure before the application of electricity supply to the apparatus, such that the original atmosphere is expelled and any explosive mixture no longer exists in the enclosure.

2.18 Source of release—a point from which a flammable substance may be or is being released into the atmosphere.

2.19 Temperature class—classification of electrical apparatus based upon the maximum temperature permitted for surfaces of the apparatus or parts thereof that can be exposed to an explosive mixture. The assumed maximum ambient temperature is 40°C.

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* AS 1896, Method of Test for Ignition Temperature of Gases and Vapours.