

Australian Standard[®]

Electrical equipment for explosive atmospheres—Explosion-protection techniques

Part 4: Pressurized rooms or pressurized enclosures

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 29 June 1994 and published on 19 September 1994.

The following interests are represented on Committee EL/14:

Auckland Regional Chamber of Commerce New Zealand
Australian Chamber of Commerce and Industry
Australian Coal Association
Australian Electrical and Electronics Manufacturers Association
Australian Gas Association
Australian Institute of Petroleum
Coal-mining interests
Confederation of Australian Industry
Department of Mineral Resources, N.S.W.
Department of Minerals and Energy, Qld
Electricity Supply Association of Australia
Institute of Instrumentation and Control Australia
Insurance Council of Australia
Metal Trades Industry Association of Australia
Ministry of Commerce New Zealand
National Electrical Contractors Association of Australia
Regulatory Authorities (Electrical)
WorkCover Authority of N.S.W.

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This Standard was issued in draft form for comment as DR 89196.

Australian Standard®

Electrical equipment for explosive atmospheres—Explosion-protection techniques

Part 4: Pressurized rooms or pressurized enclosures

First published in part as AS C377—1969.
AS 1021 first published 1971.
AS C377—1969 revised and redesignated
AS 1825—1976.
Second edition AS 1021—1980.
Second edition AS 1825—1982.
AS 1021—1980 and AS 1825—1982 revised,
amalgamated and redesignated AS 2380.4—1994.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 9149 8

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee on Electrical Equipment in Hazardous Areas, to supersede AS 1021—1980, *Protection by purging of electrical equipment for explosive atmospheres* and AS 1825—1982, *Electrical equipment for explosive atmospheres—Pressurized enclosures—Type of protection p*. Under the terms of the Active Cooperation Agreement, this Standard is the result of a consensus among Australian and New Zealand representatives on the Joint Committee to produce this document as an Australian Standard.

The scope of the Standard has also been expanded to include pressurized rooms and enclosures for use in Class II (dust) areas.

This Standard is intended for the guidance of manufacturers, designers, installers, users, statutory authorities and associated interests. It is part of a series of Standards dealing with the explosion-protection of electrical equipment intended for use in potentially explosive atmospheres.

In its terminology, definitions and general treatment of the subject, this Standard is similar to IEC 79, *Electrical apparatus for explosive gas atmospheres, Part 2: Electrical apparatus—Type of protection “p”* and Part 13: *Construction and use of rooms or buildings protected by pressurization*.

Acknowledgment is made of the assistance received from the resources.

Some of the more significant changes to AS 1021 and AS 1825 included in this Standard are:

- (a) The inclusion of requirements for pressurized rooms and enclosures suitable for use in Class II combustible dust areas.
- (b) Definitions and terminology have been revised to align with other Australian and IEC Standards.
- (c) Reference to IEC 79-16 for analysis houses has been included.
- (d) Requirements for shutdown of electrical supply have been clarified.
- (e) The inclusion of a clause detailing the pressurization principle.

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

CONTENTS

| | <i>Page</i> |
|--|-------------|
| SECTION 1 SCOPE AND GENERAL | |
| 1.1 SCOPE | 5 |
| 1.2 REFERENCED DOCUMENTS | 5 |
| 1.3 DEFINITIONS | 6 |
| 1.4 TEMPERATURE LIMITS | 7 |
| 1.5 GROUPING OF EQUIPMENT | 7 |
| 1.6 PRESSURIZATION PRINCIPLE | 7 |
| SECTION 2 GENERAL CONSTRUCTIONAL REQUIREMENTS | |
| 2.1 SCOPE OF SECTION | 9 |
| 2.2 ELECTRICAL PERFORMANCE OF EQUIPMENT | 9 |
| 2.3 CONSTRUCTION MATERIALS | 9 |
| 2.4 PROTECTION AGAINST ENVIRONMENT | 9 |
| 2.5 PRESSURIZATION | 9 |
| 2.6 INLET AND OUTLET APERTURES | 9 |
| 2.7 ALTERNATIVE SOURCES OF PROTECTIVE GAS | 9 |
| 2.8 INTAKE DUCTING | 10 |
| 2.9 ELECTRICAL CONNECTIONS TO ENCLOSURES | 10 |
| 2.10 ENTRY OF ELECTRICAL AND OTHER SERVICES TO ROOMS | 10 |
| 2.11 DOORS AND COVERS | 10 |
| 2.12 POSSIBLE SOURCES OF IGNITION | 10 |
| 2.13 ENCLOSED COMPONENTS | 10 |
| 2.14 PRESSURE OR FLOW ACTIVATED DEVICES | 10 |
| 2.15 SUPPLY OF PROTECTIVE GAS | 11 |
| 2.16 ROTATING MACHINES | 11 |
| 2.17 PROTECTION REQUIREMENTS | 11 |
| 2.18 INSPECTION DOORS | 12 |
| SECTION 3 ENCLOSURES HAVING NO INTERNAL SOURCE OF FLAMMABLE MATERIAL | |
| 3.1 GENERAL | 13 |
| 3.2 LEVEL OF OVERPRESSURE | 13 |
| 3.3 PROTECTION REQUIREMENT | 13 |
| SECTION 4 ROOMS HAVING NO INTERNAL SOURCE OF FLAMMABLE MATERIAL | |
| 4.1 GENERAL | 14 |
| 4.2 LEVEL OF OVERPRESSURE | 14 |
| 4.3 PROTECTIVE GAS FLOW | 14 |
| 4.4 PROTECTION REQUIREMENT | 14 |
| SECTION 5 ENCLOSURES HAVING AN INTERNAL SOURCE OF FLAMMABLE GAS OR VAPOUR | |
| 5.1 GENERAL | 16 |
| 5.2 DESCRIPTION OF TECHNIQUES | 16 |
| 5.3 LEVEL OF OVERPRESSURE | 16 |
| 5.4 OUTLET APERTURES | 16 |

| | <i>Page</i> |
|---|-------------|
| 5.5 ASSESSMENT OF THE INTERNAL RELEASE | 16 |
| 5.6 PROTECTION REQUIREMENTS | 17 |
| 5.7 SUPPLY OF PROTECTIVE GAS | 18 |
| SECTION 6 ASSESSMENT AND TESTS | |
| 6.1 GENERAL | 20 |
| 6.2 TYPE VERIFICATION AND TESTS | 20 |
| 6.3 PRESSURIZATION TEST | 20 |
| 6.4 MINIMUM OVERPRESSURE TEST | 20 |
| 6.5 IMPACT TEST | 20 |
| SECTION 7 MARKING | 21 |
| APPENDICES | |
| A DUCTS FOR PROTECTIVE GAS SUPPLY | 22 |
| B GUIDELINES FOR ASSESSING THE TYPE OF RELEASE WITHIN ENCLOSURES | 25 |
| C DISCUSSION OF PROTECTION REQUIREMENTS FOR CONTINUOUS DILUTION | 27 |

STANDARDS AUSTRALIA

Australian Standard

**Electrical equipment for explosive atmospheres—
Explosion-protection techniques****Part 4: Pressurized rooms or pressurized enclosures**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard specifies requirements for the design, construction and testing of pressurized rooms or pressurized enclosures, type of protection 'p', intended for use in Class I, Zone 1 and Zone 2 or Class II explosive atmospheres. While this standard covers enclosures with an internal release of flammable gas or vapour, it does not cover rooms with such a release, e.g. analyser houses nor rooms or enclosures with an internal release of combustible dust.

The requirements contained in this Standard are supplementary to those in AS 2380.1.

NOTES:

- 1 The classification of explosive atmospheres, termed hazardous areas, is dealt with in AS 2430. Further guidance may be obtained from Handbook HAA HB13.
- 2 Equipment with large areas which are subjected to pressures in excess of 1 kPa (e.g. sheet metal switchboard enclosures) may require approval from the relevant authority responsible for pressure vessel legislation in the State or Territory in which the enclosure is to be installed.
- 3 Rooms in which there is an internal release of flammable gas or vapour e.g. analyser houses are covered by IEC 79-16.
- 4 Areas not covered by this standard may be treated by protection by ventilation in accordance with AS 1482.
- 5 To minimise the risk of failure of an enclosure due to rupturing arc faults safeguarding against potential fault currents of an installation, especially where levels exceed 6 KA, should be provided.

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

AS

- | | |
|---------|--|
| 1939 | Degrees of protection provided by enclosures for electrical equipment (IP Code) |
| 2380 | Electrical equipment for explosive atmospheres—Explosion-protection techniques |
| 2380.1 | Part 1: General requirements |
| 2381 | Electrical equipment for explosive atmospheres—Selection, installation and maintenance |
| 2381.1 | Part 1: General requirements |
| 2430 | Classification of hazardous areas |
| HB13 | Electrical equipment for hazardous areas |
| IEC | |
| 79-16 | Electrical apparatus for explosive gas atmospheres, Part 16: Artificial ventilation for the protection of analyzer(s) houses |