

Australian Standard[®]

**Electrical equipment for
explosive atmospheres —
Explosion-protection techniques**

Part 6: Increased safety

This Australian Standard was prepared by Committee EL/14, Electrical Equipment in Hazardous Areas. It was approved on behalf of the Council of the Standards Association of Australia on 11 August 1988 and published on 3 October 1988.

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 (Commonwealth)
Department of Industrial Relations and Employment, N.S.W.
Department of Labour, Vic.
Department of Mineral Resources, N.S.W.
Department of Mines, Qld
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Explosion-protection techniques**

Part 6: Increased safety

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Second edition 1982.
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PREFACE

This Standard was prepared by the Association's Committee on Electrical Equipment in Hazardous Areas, to supersede AS 1593-1982, *Electrical equipment for explosive atmospheres — Increased safety apparatus — Type of protection e*. This Standard is intended for the guidance of manufacturers, users, statutory authorities and associated interests. It is Part 6 of a series of Standards dealing with the explosion-protection of electrical equipment intended for use in hazardous areas.

Increased safety is an explosion-protection technique for electrical equipment in hazardous areas, which can be applied to several different forms of electrical equipment, including cage induction motors, luminaires, handlamps, and instrument transformers.

Equipment complying with this Standard will be suitable for use in a Class I Zone 1 or Zone 2 area.

In its terminology, definitions and general treatment of the subject, this Standard is similar to the following Standards and draft Standards issued by the International Electrotechnical Commission and the European Committee for Electrotechnical Standardization:

IEC 79	Electrical apparatus for explosive gas atmospheres Part 7: Increased safety e
EN 50 019	Electrical apparatus for potentially explosive atmospheres Part 6: Increased safety e
IEC 31C(C.O.)8	Draft revision of IEC publication 79-7

Acknowledgement is made of the assistance received from these sources.

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CONTENTS

	<i>Page</i>
SECTION 1. SCOPE AND DEFINITIONS	
1.1 SCOPE	4
1.2 REFERENCED DOCUMENTS	4
1.3 DEFINITIONS	4
SECTION 2. REQUIREMENTS FOR THE CONSTRUCTION OF ALL ELECTRICAL EQUIPMENT	
2.1 SCOPE OF SECTION	6
2.2 TERMINALS FOR EXTERNAL CONNECTIONS	6
2.3 INTERNAL CONNECTIONS	6
2.4 CLEARANCES	6
2.5 CREEPAGE DISTANCES	6
2.6 SURFACE PROFILES	7
2.7 SOLID ELECTRICAL INSULATING MATERIALS	7
2.8 WINDINGS	7
2.9 LIMITING TEMPERATURE	9
2.10 OVER-TEMPERATURE PROTECTION	9
2.11 INTERNAL WIRING	9
2.12 DEGREES OF PROTECTION FOR ENCLOSURES	10
SECTION 3. SUPPLEMENTARY REQUIREMENTS FOR CERTAIN ELECTRICAL EQUIPMENT	
3.1 ROTATING ELECTRICAL MACHINES	11
3.2 LUMINAIRES DESIGNED FOR MAINS SUPPLY	11
3.3 MEASURING INSTRUMENTS AND MEASURING TRANSFORMERS	12
3.4 TRANSFORMERS OTHER THAN MEASURING TRANSFORMERS	12
3.5 GENERAL PURPOSE CONNECTION AND JUNCTION BOXES	12
3.6 CABLE GLANDS	12
3.7 CAPACITORS	12
SECTION 4. VERIFICATION AND TESTS	
4.1 TYPE VERIFICATION AND TESTS	14
4.2 ELECTRIC STRENGTH	14
4.3 ROTATING ELECTRICAL MACHINES	14
4.4 LUMINAIRES DESIGNED FOR MAINS SUPPLY	14
4.5 MEASURING INSTRUMENTS AND MEASURING TRANSFORMERS	14
4.6 TRANSFORMERS OTHER THAN MEASURING TRANSFORMERS	14
4.7 ROUTINE VERIFICATION AND TESTS	14
SECTION 5. MARKING	
5.1 GENERAL	15
APPENDICES	
A TYPICAL 'Ex e' TERMINALS	16
B GUIDANCE FOR THE THERMAL PROTECTION OF CAGE MOTORS IN SERVICE	17
C LAMP HOLDERS AND LAMP CAPS FOR LUMINAIRES DESIGNED FOR MAINS SUPPLY	18
D CAGE MOTORS — METHODS OF TEST AND OF CALCULATION ...	19
E METHOD FOR DETERMINING PERMISSIBLE MAXIMUM DISSIPATING POWER	21

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
ELECTRICAL EQUIPMENT FOR EXPLOSIVE ATMOSPHERES —
EXPLOSION-PROTECTION TECHNIQUES

PART 6: INCREASED SAFETY

SECTION 1. SCOPE AND DEFINITIONS

1.1 SCOPE. This Standard specifies requirements for the design, construction and testing of increased safety electrical equipment, type of protection 'e', intended for use in hazardous areas.

This Standard supplements AS 2380.1.

This Standard applies to electrical equipment and parts of electrical equipment which do not produce sparks or arcs or dangerous temperatures in normal service and which have rated voltages not exceeding 11 kV (phase-to-phase).

NOTE: Electrical equipment which does not produce electric sparks or arcs in normal service attains the degree of safety required for electrical equipment of type of protection 'e' increased safety only by the application of the specific measures prescribed in this Standard.

1.2 REFERENCED DOCUMENTS. The documents below are referred to in this Standard.

AS	
1194	Winding wires Part 1: Enamelled round copper winding wires (AS 1194.1)
1359	Rotating electrical machines — General requirements Part 21: Classification of methods of cooling (AS 1359.21)
1939	Classification of degrees of protection provided by enclosures for electrical equipment
1828	Electrical equipment for explosive atmospheres — Cable glands
2325	Tungsten filament lamps for general service
2380	Electrical equipment for explosive atmospheres — Explosion-protection techniques Part 1: General requirements (AS 2380.1)
2420	Fire test methods for solid insulating materials and non-metallic enclosures used in electrical equipment
2480	Electrical equipment for explosive atmospheres — Flameproof enclosure — Type of protection d
2768	Electrical insulating materials — Evaluation and classification based on thermal endurance
3000	SAA Wiring Rules
3008	Electrical installations — Selection of cables Part 1: Cables for alternating voltages up to and including 0.6/1 kV (AS 3008.1)
3140	Approval and test specification for Edison-type screw lampholders

IEC

- 61 Lamp caps and holders together with gauges for the control of interchangeability and safety
61-1: Lamp caps
61-2: Lampholders
- 664 Insulation co-ordination within low-voltage systems including clearances and creepage distances for equipment
664A — First supplement

1.3 DEFINITIONS. For the purpose of this Standard the definitions given in AS 2380.1 and those below apply.

1.3.1 Increased safety — type of protection applied to electrical equipment that does not produce arcs or sparks in normal service in which additional measures are applied so as to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks.

NOTES:

1. This type of protection is denoted by 'e'.
2. Equipment producing arcs or sparks in normal service is excluded by this definition.

1.3.2 Limiting temperature — maximum permissible temperature for electrical equipment or a part of an electrical equipment. It is the lower of the two temperatures determined by:

- (a) The danger of ignition of the explosive gas atmosphere.
- (b) The thermal stability of the materials used.

NOTE: This temperature may be the maximum surface temperature (see AS 2380.1) or a lower value (see Clause 2.9).

1.3.3 Initial starting current I_A — highest r.m.s. value of current absorbed by an a.c. motor when at rest, or by an a.c. magnet with the armature clamped in the position of maximum air gap, when supplied at rated voltage and rated frequency.

NOTE: Transient phenomena are ignored.

1.3.4 Starting current ratio I_A/I_N — ratio between initial starting current I_A and rated current I_N .

1.3.5 Time t_E — time taken for an a.c. winding, when carrying the initial starting current I_A , to be heated up to the limiting temperature from the temperature reached in rated service at the maximum ambient temperature.

1.3.6 Thermal current limit I_{th} — r.m.s. value of the current required to heat up the conductor within 1 s from the temperature reached in rated service at the maximum ambient temperature to the limiting temperature.