AS 1033.1—1990
Reconfirmed 2018

Australian Standard®

High voltage fuses (for rated voltages exceeding 1000 V)

Part 1: Expulsion type

This Australian Standard was prepared by Committee EL/7, Power Switchgear. It was approved on behalf of the Council of Standards Australia on 31 January 1990 and published on 11 June 1990.

The following interests are represented on Committee EL/7:

Australian-British Chamber of Commerce

Australian Electrical and Electronic Manufacturers Association

Confederation of Australian Industry

Electrical Supply Association of Australia

Institution of Engineers, Australia

Railways of Australia Committee

Testing Authorities

Workers Compensation and Rehabilitation Authority of New South Wales

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STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 1033.1–1990
High voltage fuses (for rated voltages exceeding 1000 V)
Part 1: Expulsion type

RECONFIRMATION NOTICE

Technical Committee EL-007 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 1 August 2018.

The following are represented on Technical Committee EL-007:

Australian Industry Group
Energy Networks Australia
Engineers Australia
The University of New South Wales

NOTES

Australian Standard®

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PREFACE

This Standard was prepared by the Standards Australia Committee on Power Switchgear to supersede AS 1033, *High-voltage expulsion and similar fuses*. It is the first of the following series of Standards:

AS 1033.1 *High voltage fuses (for rated voltages exceeding 1000 V)–Expulsion and similar type* (this Standard).

AS 1033.2 *High voltage fuses (for rated voltages exceeding 1000 V)–Current-limiting (powder-filled) type.*

It is envisaged that the following Standard will also be added:

AS 1033.3 *High voltage fuses (for rated voltages exceeding 1000 V)–Application guide.*

This Standard is based on IEC 282-2: *High-voltage fuses*, Part 2–*Expulsion and similar fuses* and its Amendment No 1 and acknowledgement is made of the assistance received therefrom. Acknowledgement is also made of the contribution from the University of Sydney with regard to spark production classes and test procedures for their verification.

The requirements of this Standard reflect developing Australian practice and differ considerably from those of the 1970 edition of IEC 282-2. However, the format of this Standard is similar to that of IEC 282-2, as it is envisaged that it may form the basis of a revision of IEC 282-2.

This Standard differs significantly from AS 1033–1971. The major changes are as follows:

(a) Reference is made to AS 2650 for normal service conditions, special service conditions, rated voltages, insulation levels and temperatures.

(b) The definitions of homogeneous series of expulsion and similar fuses is revised.

(c) A definition of spark is included and spark production classes and tests are included for all breaking current tests.

(d) Three-phase and single-phase breaking current tests are specified as alternatives for Test Duties 1 to 4.

(e) Transient recovery voltage (TRV) requirements are specified for Test Duty 4.

(f) Section 3 provides for classification of expulsion fuses for their TRV capability in Test Duties 1, 2 and 3, speed of operation and spark production.

(g) No application guide is included as it is envisaged that this will be covered by AS 1033.3

(h) Fuse-links are not illustrated or dimensioned in Appendix A, as this may restrict development of fuses with improved characteristics.

(i) Appendices B to F are added.

Owing to the effect of these differences on the format of this Standard, the text of this Standard is not marked to show where it differs from IEC 282-2.

CONTENTS

STANDARDS AUSTRALIA

Australian Standard

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Part 1: Expulsion type

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE. This Standard specifies requirements for high voltage expulsion fuses, including boric acid type fuses, disconnector fuses, and drop-out fuses designed for use on alternating current systems of 50 Hz and 60 Hz and of rated voltages exceeding 1000 V up to and including 72.5 kV.

NOTES:

1. Fuses required for the protection of capacitors are subject to additional requirements (see IEC 549).
2. This Standard covers only the performance of fuses each comprising a specific fuse-base, fuse-carrier and fuse-link which have been tested in accordance with this Standard, and no guarantee of the performance of other combinations can be implied from this Standard.
3. For guidance on the presentation of characteristics, special tests and test conditions see Appendix C.

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

AS
1306 High voltage a.c. switchgear and controlgear—Disconnectors (isolators) and earthing switches

1852 International electrotechnical vocabulary
1852(151) Electrical and magnetic devices
1852(441) Switchgear, controlgear and fuses

1931 High voltage testing techniques
1931.1 Part 1: General definitions, test requirements, test procedures and measuring devices

2006 High voltage a.c. switchgear and controlgear—Circuit-breakers for rated voltages above 1000 V

2650 High voltage a.c. switchgear and controlgear—Common requirements

2752 Preferred numbers and their use

IEC
549 High voltage fuses for the external protection of shunt power capacitors

UL
94 Tests for flammability of plastic materials for parts in devices and appliances

1.3 SERVICE CONDITIONS.

1.3.1 Normal service conditions. Normal service conditions shall be in accordance with Clause 2.1 of AS 2650.

NOTE: The time/current characteristics of a fuse are based on a specific value of temperature (usually 20°C, see Clause 4.3.1), and deviation from this temperature, may appreciably alter these characteristics. When necessary the manufacturer should be consulted regarding appropriate derating factors for rated current.

1.3.2 Special service conditions. For special service conditions, see AS 2650.

1.4 ALTITUDE CORRECTION FACTORS.

1.4.1 Altitude correction factors for test voltages and rated voltages. Altitudes for normal service are up to 1000 m. Where a fuse is required for use at altitudes above 1000 m, either–

(a) its rated voltage, when multiplied by the appropriate correction factor from Table 1.1, shall be at least equal to the highest system voltage; or

(b) the test voltage withstand levels specified in Clause 3.6 as applicable to insulating parts in air, shall be multiplied by the appropriate correction factor from Table 1.1 and shall be further adjusted by the atmospheric correction factors given in AS 1931.1.

TABLE 1.1

ALTITUDE CORRECTION FACTORS FOR VOLTAGES

Maximum altitude m	Correction factor for test voltages referred to sea level	Correction factor for rated voltages
1 000	1.0	1.0
1 500	1.05	0.95
3 000	1.25	0.80