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Amendment 1-Aug 1994
Amendment 2-Aug 1995
Amendment 3 Mar 1997
AS 3947.1—1993
IEC 947-1:1988

Australian Standard®

**Low voltage switchgear and
controlgear**

Part 1: General rules

This Australian Standard was prepared by Committee EL/6, Industrial Switchgear and Controlgear. It was approved on behalf of the Council of Standards Australia on 8 September 1993 and published on 15 November 1993.

The following interests are represented on Committee EL/6:

Australian-British Chamber of Commerce
Australian Electrical and Electronic Manufacturers Association
Bureau of Steel Manufacturers of Australia
Electrical Contractors Association of Australia
Electricity Supply Association of Australia
Independent Electrical Switchboard Manufacturers Association
Institution of Engineers Australia
Railways of Australia Committee
The WorkCover Authority N.S.W.
Water Board, Sydney—Illawarra—Blue Mountains

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Amendment No. 3

to

AS 3947.1—1993

Low voltage switchgear and controlgear

Part 1: General rules

REVISED TEXT

The 1993 edition of AS 3947.1 is amended as follows; the amendments should be inserted in the appropriate place.

SUMMARY: This Amendment applies to Preface, Clauses 2.5.52, 7.1.2, 7.1.11, 7.2.3, 8.2.3, 8.2.6, 8.3.3.4, 8.3.3.4.2, 8.3.3.5.1, 8.3.3.5.2, 8.3.4.1.8, 8.3.4.3 and Appendices C, J, K and AA and is based on Amendment 2 (1995), Amendment 3 (1995) and Corrigendum (1996) to IEC 947-1:1988.

Published on 5 March 1997.

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Page 2 Preface

- 1 *Delete* the paragraph starting 'As advised in Appendix AA,'.
- 2 *Add* before paragraph starting 'References to other' the following text:
The term 'normative' has been used in this Standard to define the application of the appendix to which it applies. A 'normative' appendix is an integral part of the Standard.
- 3 *Add* the following Standard to the 'Reference to International Standard' listing:

IEC	AS
68 Basic environmental testing procedures	1099 Basic environmental testing procedures for electrotechnology
68-2-3 Part 2: Tests—Test Ca: Damp heat, steady state	1099.2 Part 2: Tests 1099.2.3 Test Ca—Damp heat, steady state
- 4 *Delete* reference to AS 1136 and AS 1136.1 (on Page 3) and *substitute* the following text:
AS
3439 Low-voltage switchgear and controlgear assemblies
3439.1 Part 1: Type-tested and partially type-tested assemblies

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Page 27 Clause 2.5.52

Substitute the text of this Clause with the following:

The highest r.m.s. value of the a.c. or d.c. voltage across any particular insulation which can occur when the equipment is supplied at rated voltage.

NOTES:

- 1 Transients are disregarded.
- 2 Both open-circuit conditions and normal operating conditions are taken into account.

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Page 42 Clause 7.1.2

Add the following text:

When contact pressure is transmitted through insulating materials other than ceramics, the maximum rated conductor cross-section is limited to 6 mm² (10 AWG) and compliance is to be checked by the additional tests of Clause 8.2.6.

NOTE: In the USA, the use of clamping units in which pressure is transmitted through insulating materials other than ceramic is permitted only in the following circumstances:

- 1 where the clamping unit is part of a terminal block;
 - 2 where a temperature test demonstrates that the temperature limitations of the insulation material and terminal in accordance with the product standard are not exceeded; and
 - 3 resilient metal is used in the clamping unit construction to compensate for loss of clamping pressure due to insulating material deformation.
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Page 47 Clause 7.1.11

Delete marginal bar.

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Page 51 Clause 7.2.3

Delete the existing Clause 7.2.3 and *substitute* the following new clause:

7.2.3 Dielectric properties

- (a) The equipment shall be capable of withstanding the dielectric tests specified in Clause 8.3.3.4. The following requirements are based on the principles of IEC 664 and 664A and provide the possibility of co-ordination of insulation of equipment with the conditions within the installation.

The equipment shall be capable of withstanding the rated impulse withstand voltage (see Clause 4.3.1.3) in accordance with the overvoltage category given in Appendix H or, where applicable, the corresponding a.c. or d.c. voltage given in Table XII. The withstand voltage across the contact gaps of devices suitable for isolation is given in Table XIV.

NOTE: The correlation between the nominal voltage of the supply system and the rated impulse withstand voltage of the equipment is given in Appendix H.

The rated impulse withstand voltage for a given rated operational voltage (see Notes 1 and 2 to Clause 4.3.1.1) shall not be less than that corresponding in Appendix H to the nominal voltage of the supply system of the circuit at the point where the equipment is to be used, and the appropriate overvoltage category.

- (b) Alternatively the method of verifying dielectric properties by a 1 min power-frequency test may also be applied in accordance with Appendix K and, if so, should be stated in the relevant product standard.

However, it should be borne in mind that, in this case, the requirements of insulation co-ordination cannot be verified.

This method shall not be used for equipment suitable for isolation.

- (c) For verifying the condition of the equipment after performance tests, the 1 min power-frequency test voltage is applied in accordance with Appendix K and the values of test voltage stated in the relevant product standard.
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Page 57 Clause 8.2.3

Delete marginal bar.

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Page 63 Clause 8.2.6

Add the following new clause after Clause 8.2.5:

8.2.6 Test for verification of clamping units transmitting contact pressure through insulating materials other than ceramics The test of electrical connection capability of clamping units in which contact pressure is transmitted through insulating materials other than ceramics is carried out on five new test specimens.

The test is made with new copper conductors without insulation having the maximum cross-sectional area.

The clamping units are connected in series with wire-loops, each having the minimum length between two clamping units as specified in the relevant product standard for the temperature rise test.

The conductors shall be connected in such a way that no additional mechanical force can influence the performance of the clamping units. Screws of the clamping unit shall be tightened with a torque in accordance with Table IV or with the torque specified by the manufacturer.

The voltage drop of the clamping unit shall be measured at an ambient temperature $(20 \pm 2)^\circ\text{C}$.

The test current is equal to the rated current specified in the relevant product standard.

The voltage drop of a clamping unit shall not exceed 15 mV.

8.2.6.1 Temperature cycling test The complete test arrangement including the conductors is placed without current in a heating cabinet which is initially kept at a temperature of $(20 \pm 2)^\circ\text{C}$.

The clamping units are then subjected to 384 temperature cycles having a duration of approximately 1 h, as follows.

The air temperature in the cabinet shall be raised in approximately 20 min to the maximum permissible temperature rise of the clamping unit as stated in the relevant product standard plus the maximum ambient temperature (40°C or value of the [T-marking]) plus 20°C .

NOTE: Devices with T-marking are intended for ambient temperature higher than 40°C (see IEC 998-1).

It is maintained within $\pm 5^\circ\text{C}$ of this value for approximately 10 min. The clamping units are then allowed to cool down in approximately 20 min to a temperature of approximately 30°C , forced cooling being allowed.

They are kept at this temperature for about 10 min and if necessary for measuring the voltage drop it is allowed to cool down further to a temperature of $(20 \pm 2)^\circ\text{C}$.

The voltage drop of each clamping unit shall be measured after each 48th cycle up to and including the 384th, each time at a temperature for the clamping units of $(20 \pm 2)^\circ\text{C}$.

The maximum allowable voltage drop measured with a current equal to the current as specified in the relevant product standard shall not exceed after 384 cycles the smaller of the following values:

- (a) either 22.5 mV or
- (b) 1.5 times the value measured after the 48th cycle.

NOTE: The product standard should clearly specify the points of measurement of the voltage drop.

The temperature in the heating cabinet shall be measured at a distance of at least 50 mm from the sample.

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