Rep (based on, and generally aligned with, IEC 383:1983)

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Australian Standard®

Insulators—Porcelain and glass for overhead power lines—Voltages greater than 1000 V a.c.

Part 1: Test methods

STANDARDS AUSTRALIA

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The following interests are represented on Committee EL/10:

Australian Electrical and Electronic Manufacturers' Association

Australian Porcelain Insulators and Technical Ceramic Manufacturers' Association

Confederation of Australian Industry

Electrical and Radio Federation of Victoria

Electricity Supply Association of Australia

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Australian Standard®

Insulators—Porcelain and glass for overhead power lines—Voltages greater than 1000 V a.c.

Part 1: Test methods

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PREFACE

This Standard was prepared by Standards Australia's Committee on Overhead Lines and is Part 1 of a new three-part Standard AS 2947, viz.

AS 2947 *Insulators—Porcelain and glass for overhead power lines—Voltages greater than 1000* V *a.c.*

Part 1: Test methods.

Part 2: Characteristics.

Part 3: Couplings.

These parts together supersede AS 1137.1—1981, *Porcelain and glass insulators for overhead power lines (for voltages greater than 1000* V *a.c.).*

This Standard specifies requirements for testing insulators of ceramic material or glass for use on a.c. overhead power and traction lines with a nominal voltage greater than 1000 V and a frequency not greater than 100 Hz.

This Standard differs from AS 1137.1—1981, in the following ways:

(a) Is based on, and generally aligned with, IEC 383, *Tests on insulators of ceramic material or glass for overhead lines with a nominal voltage greater than 1000* V and IEC draft revisions of IEC 383.

(b) An optional residual strength type test for cap and pin string insulator units has been included.

(c) Test procedures for the optional radio influence voltage and impulse overvoltage puncture type tests have been modified.

(d) A thermal-mechanical performance test and mechanical performance test on string insulator units in accordance with IEC 575, has been included as a mandatory type test.

(e) A ten-year validity period for mechanical type test certificates has been specified.

(f) Electrical withstand tests on string insulator units are specified to be performed on short standard strings.

(g) Sample sizes as a function of lot size have been amended to reflect IEC practice.

(h) The sample tests have been increased for small lot sizes to maintain current confidence levels.

(i) On rejection of a lot following failure of the sample test(s), provision has been made for the resubmission of that lot for acceptance by agreement between purchaser and manufacturer.

(j) The following tests are no longer required: High frequency tests, timeload test and corona-extinction voltage test.

(k) The verification of the locking system has been specified as a sample test.

(l) Electro-mechanical and mechanical tests on string insulator units, line post insulators, and pin insulators are to be taken to failure and the mode of failure is to be recorded.

The Standard does not specify the design or specific material requirements for insulators nor does it specify applications for service conditions. This Standard is a performance and test specification.

In the preparation of this Standard, consideration was given to the following IEC publications:

IEC 383: *Tests on insulators of ceramic material or glass for overhead lines with a nominal voltage greater than 1000* V.

IEC 437: *Radio interference test on high-voltage insulators.*

IEC 506: *Switching impulse tests on high-voltage insulators.*

IEC 507: *Artificial pollution tests on high-voltage insulators to be used on a.c. systems.*

IEC 575: *Thermal-mechanical performance test and mechanical performance test on string insulator units.*

IEC 591: *Sampling rules and acceptance criteria when applying statistical control methods for mechanical and electromechanical tests on insulators of ceramic material or glass for overhead lines with a nominal voltage greater than 1000* V.

Acknowledgement is given to the assistance received from those sources.

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Part 1: Test methods

1 SCOPE AND GENERAL.

1.1 Scope. This Standard specifies requirements for testing insulators of ceramic material or glass for use on a.c. overhead power and traction lines with a nominal voltage greater than 1000 V and a frequency not greater than 100 Hz.

It applies to string insulator units, insulator strings, insulator sets and pin insulators, line post insulators and shackle insulators and to insulators of similar design when used in sub-stations.

This Standard does not apply to insulators forming parts of electrical apparatus, or to parts used in their construction, or to station post insulators.

The Standard is designed to—

define the terms used;
define insulator characteristics and prescribe the conditions under which the specified values of these characteristics shall be verified;
prescribe test methods;
prescribe acceptance criteria.

This Standard does not include requirements dealing with the choice of insulators for specific operating conditions.

Numerical values for insulator characteristics are specified in AS 2947.2.

NOTE: This Standard does not include artificial pollution tests. The subject and relevant test methods are under consideration. The subject is dealt with in a report for information (IEC 507) issued with the object of gaining experience in the field.

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

AS	
1199	Sampling procedures and tables for inspection by attributes
1214	Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series)
1399	Guide to AS 1199, Sampling procedures and tables for inspection by attributes
1650	Galvanized coatings
1931	High voltage testing techniques
1931.1	Part 1: General definitions, test requirements, test procedures and measuring devices
2490	Sampling procedures and charts for inspection by variables for percent defective
2947	Insulators—Porcelain and glass for overhead power lines—Voltages greater than 1000 V a.c.
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IEC	
507	Artificial pollution tests on high-voltage insulators to be used on a.c. systems
CISPR 1(1972)	Specification for CISPR radio interference measuring apparatus for the frequency range 0.15 MHz to 30 MHz

1.3 Definitions. For the purpose of this Standard the definitions below apply.

1.3.1 *String insulator unit*—cap and pin insulator or long rod insulator of which the fixing devices are suitable for flexible attachment to other string insulator units or to connecting accessories. Unless otherwise stated, the term 'string insulator unit' includes the locking device where used in the coupling.

1.3.2 *Long rod insulators*—string insulator unit consisting of an approximately cylindrical insulating part (the rod) provided with sheds and equipped at the ends with external or internal metal fittings.

1.3.3 *Insulator string*—one or more string insulator units, intended to give flexible support to overhead line conductors, and stressed mainly in tension.

1.3.4 *Insulator set*—assembly of one or more insulator strings suitably connected together, complete with fixing and protective devices as required in service.

1.3.5 *Pin insulator*—insulator consisting of an insulating component intended to be mounted rigidly on a supporting structure by means of a pin passing up inside the insulator. The insulating component may consist of one or more pieces of insulating material permanently connected together. The fixing of the insulating component to the pin can either be separable or permanent (pin insulator with integral pin).

Separable pin insulators are provided with an internal thread-form in accordance with AS 2947.3. The thread may be formed in the insulating component or be a metal insert cemented into the pin hole.

Unless otherwise stated, the term pin insulator does not include the pin if separable.

1.3.6 *Line post insulator*—insulator consisting of one or more pieces of insulating material permanently assembled with a metal base and intended to be mounted rigidly on a supporting structure with the metal base attached by means of a stud, or, one or more bolts.

1.3.7 *Shackle insulator*—insulator consisting of one part and secured by means of a spindle passing through it.

1.3.8 *Lot*—group of insulators offered for acceptance from the same manufacturer, of the same design and manufactured under similar conditions of production.