AS 60052—2005
IEC 60052, Ed.3.0 (2002)

AS 60052—2005

Australian Standard™

Voltage measurement by means of standard air gaps

STANDARDS AUSTRALIA

This Australian Standard was prepared by Committee EL-007, Power Switchgear. It was approved on behalf of the Council of Standards Australia on 20 December 2004.
This Standard was published on 1 February 2005.

The following are represented on Committee EL-007:

Australian British Chamber of Commerce
Australian Electrical and Electronic Manufacturers Association
Energy Networks Association
Engineers Australia
Testing interests (Australia)

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about Standards can be found by visiting the Standards Web Shop at www.standards.com.au and looking up the relevant Standard in the on-line catalogue.

Alternatively, the printed Catalogue provides information current at 1 January each year, and the monthly magazine, *The Global Standard*, has a full listing of revisions and amendments published each month.

Australian Standards™ and other products and services developed by Standards Australia are published and distributed under contract by SAI Global, which operates the Standards Web Shop.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.org.au, or write to the Chief Executive, Standards Australia, GPO Box 5420, Sydney, NSW 2001.

This Standard was issued in draft form for comment as DR 04496.

Australian Standard™

Voltage measurement by means of standard air gaps

Originated as AS C329—1969.
Previous edition AS 2886—1986.
Revised and redesignated as AS 60052—2005.

Published by Standards Australia GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 6457 6

PREFACE

This Standard was prepared by the Standards Australia Committee EL-007, Power Switchgear to supersede AS 2886—1986.

The objective of this Standard is to provide recommendations for the construction and use of standard air gaps for the measurement of peak values of voltage.

This Standard is identical with, and has been reproduced from, IEC 60052, Ed.3.0(2002), *Voltage measurement by means of standard air gaps*.

Sphere-gaps have been used as a simple and reliable method for measurement of peak voltage in many industrial test facilities for 75 years, and the values of tables I and II in AS 2886—1986 have been accepted as an International Consensus Standard of Measurements**.** These tables appear in this Standard as Tables 2 and 3.

There is no information in the references as given in Annex A, with regard to traceability to national standards of measurement. However, the dispersion in the measured values of sparkover voltages upon which tables 2 and 3 are based, does not exceed 3% for a 95% confidence level.

The tables are, therefore, to be used as mean values with an uncertainty of 3% for a 95% confidence level.

The material on rod-rod gaps for reliable measurement of high direct voltages has been included here to form an integrated standard on high voltage measurements using standard air gaps.

Four informative annexes are included:

Annex A gives the limits of voltage and frequency over which tables 2 and 3 have been derived from experiments and can be presumed to be accurate within the limits specified in Clause 4.1.

Annex B gives the procedure by which the values in tables 2 and 3 have been derived from previous national standards and other sources.

Annex C provides information on additional irradiation, which may be needed in certain situations.

Annex D provides information on the uncertainty and calibration of sphere-gaps.

This Standard differs from AS 2886—1986 in the following areas:

(i) Title changed so that it now refers to all standard air gaps and not only sphere-gaps as previously.

(ii) Information regarding methods of irradiation used in sphere-gap measurements of voltages below 50 kV peak or with spheres of diameter 12.5 cm or less is now contained in Annex C.

(iii) The conventional deviation z is used to define the use of a sphere-gap as a standard measuring device.

(iv) More thorough specification is given for the measurement of all types of voltage using sphere-gaps.

(v) The equation for relative air density has been updated.

(vi) The table of relative air density (d) and corresponding correction factor (k) for values of relative air density between 0.70 and 1.15 has been removed.

(vii) An equation for humidity correction factor is given.

(viii) Information on the use of standard rod-rod gaps for the measurement of direct voltages, formerly included as Appendix C to AS 1931.1 has been transferred to this Standard.

(ix) Information on the use of standard air gaps for performance checks of approved measuring systems has been added.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.

(b) In the source text ‘this international standard’ should read ‘this Australian Standard’.

(c) A full point should be substituted for a comma when referring to a decimal marker.

The terms ‘normative’ and ‘informative’ are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

CONTENTS

Page

NOTES

STANDARDS AUSTRALIA

Australian Standard

Voltage measurement by means of standard air gaps

1 Scope

IEC 60052 sets forth recommendations concerning the construction and use of standard air gaps for the measurement of peak values of the following four types of voltage:

a) alternating voltages of power frequencies;

b) full lightning impulse voltages;

c) switching impulse voltages;

d) direct voltages.

Air gaps constructed and used in accordance with this standard represent IEC standard measuring devices in accordance with IEC 60060-2 and are primarily intended for performance checks of high voltage measuring systems.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

References to international standards that are struck through in this clause are replaced by references to Australian Standards that are listed immediately thereafter and identified by shading. Any Australian Standard that is identical to the International Standard it replaces is identified as such.

~~IEC 60060-1:1989, *High-voltage test techniques – Part 1: General definitions and test requirements*~~

AS 1931.1, *High-voltage test techniques,* Part 1: *General definitions and test requirements* (identical to IEC 60060-1:1989 including Corrigendum:1992)

~~IEC 60060-2:1994, *High-voltage test techniques – Part 2: Measuring systems*~~

AS 1931.2, *High-voltage test techniques,* Part 2: *Measuring systems* (identical to IEC 60060-2:1994)

3 Definitions

vacant

4 Standard sphere-gap

The standard sphere-gap is a peak voltage measuring device constructed and arranged in accordance with this standard. The points on the two spheres which are closest to each other are called the sparking points. Figures 1 and 2 show two arrangements, one of which is typical of sphere-gaps with a vertical axis and the other of sphere-gaps with a horizontal axis.