AS 60044.2—2007

Australian Standard®

Instrument transformers

Part 2: Inductive voltage transformers (IEC 60044-2:Ed.1.2 (2003) MOD)

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This Australian Standard® was prepared by Committee EL-013, Measurement and Protection Transformers. It was approved on behalf of the Council of Standards Australia on 17 January 2007.
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The following are represented on Committee EL-013:

- Australian Electrical and Electronic Manufacturers Association
- Cigre APA2
- Energy Networks Association
- National Measurement Institute
- University of South Australia

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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through public comment period.

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Part 2: Inductive voltage transformers (IEC 60044-2:Ed.1.2 (2003) MOD)

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PREFACE

This Standard was prepared by the Standards Australia Committee EL-013, Measurement and Protection Transformers to supersede AS 60044.2—2003.

The objective of this Standard is to provide users and manufacturers of voltage transformers with definitions of terms, safety requirements, methods of specifying performance and methods of test.

This Standard is Part Two of a series covering instrument transformers. This series consists of the following Standards:

AS

60044 Instrument transformers

60044.1 Part 1: Current transformers

60044.2 Part 2: Single-phase inductive voltage transformers (this Standard)

This Standard is an adoption with national modifications of IEC 60044-2, Ed.1.2 (2003), *Instrument transformers,* Part 2: *Inductive voltage transformers* (including Amendment 1:2001 and Amendment 2:2002).

Variations to IEC 60044-2, Ed.1.2 (2003) are indicated at the appropriate places throughout this standard. Strikethrough (~~example~~) identifies IEC text, tables and figures which, for the purposes of this Australian Standard, are deleted. Where text, tables or figures are added, each is set in its proper place and identified by shading (example). Added figures are not themselves shaded, but are identified by a shaded border.

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 Part of IEC 60044' should read 'this Part of AS 60044'.

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

In January 1997, the IEC commenced numbering its Standards from 60 000 by adding 60 000 to the number of each existing Standard. Publications printed earlier than 1997 will continue to carry the old series of numbers.

Attention is drawn to the following differences between this Standard and AS 1243—1982:

(a) This Standard introduces temperature rise testing of voltage transformers with voltage factors of 1.2 for 30 s, 1.9 for 30 s and 1.9 for 8 h starting after the voltage transformers have reached equilibrium at 1.2 U_n. See Clause 5.4, Limits of temperature rise.

(b) This Standard has a new thermal class for windings in oil and hermetically sealed that allows 65 K temperature rise (see Table 3, Limits of temperature rise of windings).

(c) This Standard introduces requirements and tests for winding withstand capability. See Clause 6.2, Short-circuit withstand capability.

(d) This Standard has highest voltages for equipment of 170 kV and 245 kV in place of 245 kV in AS 1243—1982. See Clause 6.1.1, Rated insulation levels for primary windings).

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(e) This Standard introduces reduced levels of permissible partial discharges across the complete range of system earthing types and voltages, with increases in prestress voltage level (from the current 1.3 U_m level to the induced voltage withstand test level) and in testing voltage level (from 1.1 U_m to 1.3 U_m). See Clause 6.1.2.3, Partial discharges, and Clause 9.2.4, Partial discharge measurement.

(f) This Standard introduces requirements for minimum insulator creepage distance and arcing/creepage ratio for four various pollution levels. See Clause 6.1.5, Requirements for the external insulation.

(g) This Standard requires repeated dielectric testing to be performed at 80% of the initial power frequency voltage (and not 75% as in AS 1243—1982). See Clause 7.2, Routine tests.

(h) This Standard covers measurement of dielectric dissipation factor as a special test and not as a routine test as does AS 1243—1982. See Clause 7.3, Special tests.

(i) This Standard requires testing of radio interference voltage with a prestress voltage of 1.5 $U_m/\sqrt{3}$, and a limit of 300 pC or 2500 μV at 1.1 $U_m/\sqrt{3}$. This test is also required for voltages 123 kV and upwards (and not from 245 kV as in AS 1243—1982). See Clause 8.5, Radio interference voltage measurement.

(j) This Standard includes requirements for measurement of partial discharges that are stricter than those in AS 1243—1982 (which calls up AS 2032 which has been withdrawn). See Clause 9.2.4, Partial discharge measurement.

(k) This Standard introduces new special tests of chopped impulse on primary winding and mechanical testing of primary terminals. See Clause 7.3, Special tests.

(l) This Standard requires that testing for accuracy be done at a primary voltage of 0.8 to 1.2 U_n and a power factor of 0.8 lagging. AS 1243—1982 requires that testing for accuracy be done at a primary voltage of 0.2 to 1.1 U_n and a power factor of 1. See Clause 12.2, Limits of voltage error and phase displacement for measuring voltage transformers.

(m) This Standard has Classes 3P and 6P and does not have the Classes 1P, 2P and 5P of AS 1243—1982. See Clause 13.1.1, Standard accuracy classes for protective voltage transformers.

(n) This Standard does not include requirements for voltage transformers for laboratory use (Class L in AS 1243). The committee considered that this class is no longer required.

(o) This Standard introduces a new special test for transmitted overvoltages. See Clause 7.3, Special tests.

The term 'normative' is used to define the application of the annex to which it applies. A normative annex is an integral part of a standard.

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Any table, figure or text of the international standard that is struck through is not part of this standard. Any Australian table, figure or text that is added is part of this standard and is identified by shading.

1 General

1.1 Scope

This part of IEC 60044 applies to new inductive voltage transformers for use with electrical measuring instruments and electrical protective devices at frequencies from 15 Hz to 100 Hz.

Although this standard relates basically to transformers with separate windings, it is also applicable, where appropriate, to auto-transformers. This standard does not apply to transformers for use in laboratories.

NOTE Requirements specific to three-phase voltage transformers are not included in this standard but, so far as they are relevant, the requirements in clauses 3 to 11 apply to these transformers and a few references to them are included in those clauses (e.g. see 2.1.4, 5.1.1, 5.2, and 11.2)

Clause 13 covers the requirements and tests, in addition to those in clauses 3 to 12, that are necessary for single-phase inductive protective voltage transformers. The requirements of clause 13 apply particularly to transformers which are required to have sufficient accuracy to operate protective systems at voltages that occur under fault conditions.

1.2 Normative references

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

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.

IEC 60028:1925, *International standard of resistance for copper*

~~IEC 60038:1983, *IEC standard voltages*~~

AS 60038, *Standard voltages*

~~IEC 60050(321):1986, *International Electrotechnical Vocabulary (IEV) – Chapter 321: Instrument transformers*~~

AS 1852.321, *International electrotechnical vocabulary,* Chapter 321: *Instrument transformers* (identical to IEC 60050(321):1986)

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

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