Australian Standard™

Instrument transformers—

Part 2: Single-phase inductive voltage transformers
(IEC 60044-2:199[illegible] MOD)

Standards Australia

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 13 December 2002 and published on 3 February 2003.

The following are represented on Committee EL-013:

Australian Electrical and Electronic Manufacturers Association

CSIRO

CIGRE AP12

Electricity Supply Association of Australia

University of South Australia

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Part 2: Single-phase inductive voltage transformers (IEC 60044-2:199[illegible] MOD)

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PREFACE

This Standard was prepared by the Standards Australia Committee EL-013, Measurement and Protection Transformers to partially supersede AS 1243—1982 for single phase inductive transformers one year after publication. During this period, it is anticipated that regulatory authorities will approve current transformers to either Standard. AS 1243—1982 will continue to apply to capacitor voltage transformers and three-phase voltage transformers only.

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 tes

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 has been reproduced from IEC 60044-2:1997, *Instrument transformers*—Part 1: *Voltage Transformers* (including Amendment 1: 2000). Some minor variations have been made for Australian conditions.

Variations to IEC 60044-2 (including Amendment 1:2000) are indicated at the appropriate places throughout this Standard. Strikethrough (~~example~~) identifies IEC tables, figures and passages of text which, for the purpose of this Standard, are deleted. Where tables, figures and passages of text 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 standard' should read 'this Australian Standard'.

(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 1.5 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 6.1, *Insulation requirements*.

(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*).

(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_n 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.

(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 2532 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 10.1, *Chopped impulse test on primary winding* and Clause 10.3, *Mechanical 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 0.9 to 1.1 U_n and a power factor of 1. See Clause 13.2, *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.

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Any IEC table, figure or passage of text that is struck-through is not part of this Standard. Any Australian table, figure or passage of text that is added (and identified by shading) is part of this Standard.

1 General

1.1 Scope

This part of IEC 44 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

~~The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 44. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 44 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.~~

References to International Standards that are struck through in this Clause are replaced by references to equivalent 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 appropriately identified.

IEC 28: 1925, *International standard of resistance for copper*

~~IEC 38: 1983, *IEC standard voltages*~~

AS 60038, *Standard voltages*