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AS 60044.1—2007

Australian Standard®

Instrument transformers

Part 1: Current transformers (IEC 60044-1 Ed.1.2 (2003) MOD)

STANDARDS
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- University of South Australia

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Australian Standard®

Instrument transformers

Part 1: Current transformers (IEC 60044-1 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 60044.1—2003.

This Standard incorporates Amendment No. 1 (January 2012). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

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

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

AS

60044 Instrument transformers

60044.1 Part 1: Current transformers (this Standard)

60044.2 Part 2: Single-phase inductive voltage transformers

This Standard is an adoption with national modifications and has been reproduced from IEC 60044-1, Ed.1.2 (2003), *Instrument transformers – Part 1: Current transformers*, (including Amendment 1: 2000 and Amendment 2:2002).and has been varied as indicated to take account of Australian conditions.

Variations to IEC 60044-1, 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.

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.

Attention is drawn to the following differences between this Standard and AS 1675—1986 which is now obsolescent.

(a) This Standard has a new thermal class for windings in oil and hermetically sealed that allows 65 K temperature rise. See Table 2, Limits of temperature rise of the windings.

(b) This Standard has highest voltages for equipment of 170 kV and 245 kV in place of 245 kV in AS 1675—1986. See Table 3, Rated insulation levels for transformer primary windings.

(c) 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 times the nominal voltage of the system 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 5.1.2.2, Partial discharges and Clause 8.2.2.2, Partial discharge test procedure.

(d) This Standard allows a maximum permissible voltage across secondary winding of up to 4.5 kV or for current transformers having a rated knee point e.m.f. greater than 450 V, 10 times the rated knee point voltage up to a limit of 10 kV. See Clause 5.1.5, Inter-turn insulation requirements.

(e) This Standard introduces requirements for minimum insulator creepage distance and arcing/creepage ratio for various pollution levels. See Clause 5.1.6, Requirements for the external insulation.

(f) This Standard requires repeated dielectric testing to be performed at 80% of the initial power frequency voltage (and not 75% as in AS 1675—1986). See Clause 6.2, Routine tests.

(g) This Standard covers measurement of dielectric dissipation factor as a special test, and not as a routine test as does AS 1675—1986. See Clause 6.3, Special tests.

(h) This Standard tests radio interference voltage with a prestress voltage of 1.5 Um/√3, and a limit of 300 pC or 2500 µV at 1.1 Um/√3. This test is also required for voltages 123 kV and upwards (and not from 245 kV as in AS 1675—1986). See Clause 7.5, Radio interference voltage measurement.

(i) This Standard includes requirements for measurement of partial discharges different to those in AS 1675—1986 (which calls up AS 2532 which has been withdrawn). See Clause 8.2.2, Partial discharge measurement.

(j) This Standard introduces new special tests of chopped impulse on primary winding and mechanical testing of primary terminals. See Clause 6.3, Special tests.

(k) Special Metering Classes are introduced in this Standard as classes 0.2S and 0.5S, with a current range from 1-120% (that can be extended to 150% and 200%). AS 1675—1986 has classes 0.1ME, 0.2ME and 0.5ME for secondary currents 1 A and 5 A, but the current range is 2.5-125/150/200%. See Clause 11.2, Limits of current error and phase displacement for measuring current transformers.

(l) This Standard allows a higher error margin for errors measured at 5% and 20% of rated current than does AS 1675—1986, but better accuracy can be achieved by selecting a different class for such needs. See Clause 11.2, Limits of current error and phase displacement for measuring current transformers.

(m) This Standard requires a maximum current of 120% for accuracy testing of metering CTs instead of the 125% required in AS 1675—1986. See Clause 11.2, Limits of current error and phase displacement for measuring current transformers.

(n) This Standard allows protection classes 5P and 10P to have current errors at rated current of 1% and 3% respectively. See Clause 12.3, Limits of errors for protective current transformers.

(o) Tests for accuracy are done at 1.0 power factor in AS 1675—1986. This Standard requires tests for accuracy to be done at 0.8 power factor or at 1.0 power factor with the results converted to equivalent results at 0.8 power factor. See Clause 12.3, Limits of errors for protective current transformers.

(p) AS 1675—1986 covered class PS which is not covered in this Standard. However, class PR (air gaps) of this Standard deals with requirements of this type. See Clause 13, Additional requirements for class PR protective current transformers.

(q) This Standard includes a class PX which covers all requirements of class PL in AS 1675—1986. See Clause 14, Additional requirements for class PX protective current transformers.

(r) This Standard does not have requirements for thermal stability testing.

(s) This Standard has no requirements for variation of error margins during accuracy testing of metering cores.

(t) This Standard introduces a test of transmitted overvoltage as a special test. See Clause 6.3, Special tests.

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NOTES

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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 newly manufactured current transformers for use with electrical measuring instruments and electrical protective devices at frequencies from 15 Hz to 100 Hz.

Although the requirements relate basically to transformers with separate windings, they are also applicable, where appropriate, to autotransformers.

Clause 11 covers the requirements and tests, in addition to those in clauses 3 to 10, that are necessary for current transformers for use with electrical measuring instruments.

Clause 12 covers the requirements and tests, in addition to those in clauses 3 to 10, that are necessary for current transformers for use with electrical protective relays, and in particular for forms of protection in which the prime requirement is the maintenance of accuracy up to several times the rated current.

For certain protective systems, where the current transformer characteristics are dependant on the overall design of the protective equipment (for example high-speed balanced systems and earth-fault protection in resonant earthed networks), additional requirements are given in clause 13 for class PR transformers and in clause 14 for class PX transformers.

Clause 13 covers the requirements and tests in addition to those in clauses 3 to 10 that are necessary for current transformers for use with electrical protective relays, and in particular for forms of protection in which the prime requirement is the absence of remanent flux.

Clause 14 covers the requirements and tests in addition to those in clauses 3 to 10 that are necessary for current transformers for use with electrical protective relays, and in particular for forms of protection for which knowledge of the transformer's secondary excitation characteristic, secondary winding resistance, secondary burden resistance and turns ratio is sufficient to assess its performance in relation to the protective relay system with which it is to be used.

Current transformers intended for both measurement and protection shall comply with all the clauses of this standard.

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