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Power transformers -
Part 4: Lightning impulse and switching impulse tests of power transformers and reactors

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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IEC 60076-4 has been prepared by IEC technical committee 14: Power transformers. It is an International Standard.

This second edition cancels and replaces the first edition published in 2002. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) lightning impulse tests in the presence of a relative overshoot value of 5 % or more (8.1.2). The 2002 edition did not specified how to proceed when the overshoot exceeds 5 %. In this revision, the testing laboratory is permitted to carry out the tests provided that the voltage function calculation, as defined in IEC 60060-1:2010, is applied;
b) newly introduced test voltage for tail-chopped lightning impulse tests (8.2.2);

c) switching impulse tests on 3 phase transformers, test connections (see Figure 5 and Figure 6);

d) new Glaninger circuit in Clause A.3 about low-impedance windings (L_t < 20 mH);

e) new Annex C with examples of oscillograms with peak voltage overshoot.

The text of this International Standard is based on the following documents:

Draft	Report on voting
14/1204/FDIS	14/1208/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 60076 series, published under the general title *Power transformers*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

1 Scope

This part of IEC 60076 applies to lightning and switching impulse tests on power transformers and reactors.

Information is given on waveforms, test circuits including test connections, earthing practices, failure detection methods, test procedures, measuring techniques and interpretation of results.

Where applicable, the test techniques are as described in IEC 60060-1 and IEC 60060-2.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60060-1:2010, *High-voltage test techniques - Part 1: General definitions and test requirements*

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

IEC 60076-3:2013, *Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air*

IEC 60076-6, *Power transformers - Part 6: Reactors*

IEC 61083-1, *Instruments and software used for measurements in high-voltage and high-current tests - Part 1: Requirements for instruments for impulse tests*

Bibliography

[1] IEC 60076-1:2011, *Power transformers - Part 1: General*

[2] IEC 61083-2:2013, *Instruments and software used for measurement in high-voltage and high-current tests - Part 2: Requirements for software for tests with impulse voltages and currents*

[3] IEEE C57.98TM-2011, *IEEE Guide for Transformer Impulse Tests*

[4] IEEE Std 4TM-2013, *IEEE Standard for High-Voltage Testing Techniques*