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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 1094.1-2013

**[GB/T 1094.1-2013, Including 2017XG1] Power transformers --
Part 1: General
(English Translation)**

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Foreword

Clause 2, Clause 3, 11.2 ~ 11.12, Clause 12, Clause 13, Annex A ~ Annex F, Annex H, and Annex I of this Part are recommended, and the rest are mandatory.

GB 1094 Power transformers currently includes the following parts.

- Part 1.General;
- Part 2.Temperature rise for liquid-immersed transformers;
- Part 3.Insulation levels, dielectric tests and external clearances in air;
- Part 4.Guide to the lightning impulse and switching impulse testing - Power transformers and reactors;
- Part 5.Ability to withstand short circuit;
- Part 6.Reactors;
- Part 7.Loading guide for oil-immersed power transformers;
- Part 10.Determination of sound levels;

- Part 10.1.Determination of sound levels - Application guide;
- Part 11.Dry-type transformers;
- Part 12.Loading guide for dry-type power transformers;
- Part 14.Liquid-immersed power transformer using high-temperature insulation materials;
- Part 16.Transformers for wind turbine applications.

This Part is Part 1 of GB 1094.

This Part is drafted in accordance with the rules given in GB/T 1.1-2009.

This Part replaces GB 1094.1-1996, Power transformers - Part 1.General. Compared with GB 1094.1-1996, the main technical changes are as follows.

- Add the definition of harmonic content;
- Add a subclause on transport;
- Add functional method of specification;
- Add connection symbols for single phase transformers;
- Add safety and environmental requirements;
- Add requirements for liquid preservation systems;
- Add a clause on DC currents in neutral circuits;
- Adjust the test items;
- Add contents such as leak testing with pressure for liquid-immersed type transformers (tightness test), vacuum deflection test for liquid immersed transformers, pressure deflection test for liquid-immersed type transformers, and vacuum tightness test on site for liquid-immersed type transformers;
- Add informative annexes on facilities for condition monitoring to transformers and environmental and safety considerations.

This Part uses the re-drafting method to modify IEC 60076-1.2011 Power transformers - Part 1.General.

There are technical differences between this Part and IEC 60076-1.2011.The terms which are involved in these differences have been marked by vertical single lines (|) on

the outer page margins; Annex A gives a list of corresponding technical differences and their causes.

This Part also makes the following editorial changes.

- Change "Ei" and "Ii" in the key of 3.13.3 in IEC 60076-2011 to "E2i" and "I2i" respectively;
- Combine Figure 1a), Figure 1b) and Figure 1c) in IEC 60076-1.2011 into one figure;
- Remove the content of "Note" of 7.1.2 in IEC 60076-1.2011;
- Make the example under 7.2.4 in IEC 60076-1.2011 the content of 7.2.5;
- Adjust the layout of Table 1 in IEC 60076-1.2011;
- Modify the tap-position in Table B.2 and Table B.3 in IEC 60076-1.2011;
- Add the informative Annex A, where the technical differences between this Part and IEC 60076-1.2011 and the causes are listed;
- Add the informative Annex B, where the contents - vacuum deflection test for liquid immersed transformers and pressure deflection test for liquid-immersed type transformers - not adopted from IEC 60076-1.2011, are listed;
- Modify Annex A, Annex B, Annex C, Annex D, Annex E, Annex F and Annex G in IEC 60076-1.2011 to Annex D, Annex E, Annex F, Annex C, Annex G, Annex H and Annex I.

1 Scope

This part of GB 1094 applies to three-phase and single-phase power transformers (including auto-transformers) with the exception of certain categories of small and special transformers such as.

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.

GB 1094.2, Power transformers - Part 2. Temperature rise for liquid-immersed

transformers (GB 1094.2-2013, IEC 60076-2.2011, MOD)

3 Terms and definitions

Terms and definitions determined by GB/T 2900.15, and the following, are applicable to this document. For ease of use, some of the terms and definitions in GB/T 2900.15 are repeated below, and certain terms and definitions are modified.

4 Service conditions

This Part gives detailed requirements for transformers for use under the following conditions.

For transformers intended to be installed indoors, some of these environmental conditions may not be applicable.

5 Rating and general requirements

A two-winding transformer has only one value of rated power, identical for both windings.

The user shall specify the cooling medium (air or water).

If the user has particular requirements for the cooling method(s) or cooling equipment, this shall be stated in the enquiry.

6 Requirements for transformers having a tapped winding

This type of specification is intended to allow the purchaser to specify operational requirements and not the category of voltage variation or which winding is to be tapped.

This method of specification is not applicable to separate-winding transformers up to and including 2 500 kVA with a tapping range not exceeding $\pm 5\%$.

7 Connection and connection symbol

The existence of a stabilizing or a test winding (a delta or star-connected winding which is not terminated for external three-phase loading) is indicated, after the symbols of loadable windings, with the symbol "+d" or "+y" according to its connection as in the examples below.