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

GB/T 1094.12-2013

Replacing GB/T 17211-1998

**Power transformers -- Part 12: Loading guide for dry-type power
transformers**

电力变压器 第12部分：干式电力变压器负载导则

(English Translation)

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References

Foreword

GB 1094 "Power Transformers" currently contains the following sections.

- Part 1. General;
- Part 2. liquid-immersed transformer temperature rise;
- Part 3. Insulation levels, dielectric tests and external insulation air gap;
- Part 4. Power transformers and reactors lightning impulse and switching impulse testing guidelines;
- Part 5. ability to withstand short circuit;
- Part 6. Reactors;
- Part 7. oil-immersed power transformer loading guidelines;
- Part 10. Determination of sound levels;
- Part 10.1. Determination of sound levels - Application guide;
- Part 11. Dry-type transformers;
- Part 12. Dry-type power transformer loading guidelines;
- Part 14. High temperature insulation materials liquid-immersed transformer design and application;
- Part 16. Wind power transformers.

This section GB Part 12 1094.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This Part replaces GB/T 17211-1998 "dry type power transformer loading guidelines." GB/T 17211-1998 corresponding IEC standard Quasi codenamed IEC 60905. 1987. Since the IEC standard code relating to power transformers are now adjusted to the IEC 60076 series, and in order IEC standards harmonized code and easy to use, this revision will be the standard code according to the new IEC standard series has been adjusted.

This section compared with the GB/T 17211-1998, the main technical changes are as follows.

- According to GB/T 1.1-2009 of the provisions of the standard structure has been adjusted. Among them, the increase in the "Normative references" and "Techniques Terms and definitions" section, and the original "Adjusting chapter Appendix C";
- Standard Scope increase forced air dry-type transformers, and an increase in "forced air" cooling mode hot temperature dry-type transformers Calculation liter;
- Increasing the transformer nameplate super dangerous operation instructions;
- Clear insulation failure is assumed due to the aging of the transformer end of life reasons, assumed the aging rate increases as temperature changes consistent with Azerbaijan Lunniwusi law, and further assume that the insulation system temperature for each additional 6K, aging rate doubled;
- Increasing the calculation methods and test methods for copper and aluminum conductor winding time constant. In the calculation method, using different from the past Experience winding material specific heat capacity data;
- Increased empirically determined constant time constant method;
- Select the text deleted instance load curve;
- Add a description of outdoor environmental conditions and operational impacts of the transformer housing;
- Increase in Appendix A "rate of aging." This appendix aging rate of solid insulation material and the relationship between "energy" were introduced and presented Based on the analysis of heat resistance Arrhenius law;
- Increase in Appendix B. "exemplary life lost three load mode." this section uses redrafted Law Amendment uses IEC 60076-12:2008 "Power transformers Part 12. Dry-type power transformers negative Load Guidelines. " this part of IEC 60076-12:2008 technical differences and for the following reasons.
- In order to meet our technical requirements, by modifying the normative references in adopting international standards GB 1094.11 instead of IEC 60076-11;
- To comply with China's actual situation, in 5.10.2, an effective heat capacity specific heat capacity calculated winding Formula epoxy material Value $24.5\text{W} \cdot \text{min}/(\text{K} \cdot \text{kg})$ and $0.408\text{W} \cdot \text{h}/(\text{K} \cdot \text{kg})$ were used instead of the symbol C1 and C2, while increasing to C1 and C2 described, with "Note 2. IEC 60076-12:2008 in, C1 to $24.5\text{W} \cdot \text{min}/(\text{K} \cdot \text{kg})$, C2 is $0.408\text{W} \cdot \text{h}/(\text{K} \cdot \text{kg})$ "instead of the IEC standard" Note 2. You can also use other winding insulation material and epoxy material. Correct this type of transformer, the corresponding specific heat $24.5\text{W} \cdot \text{min}/(\text{K} \cdot \text{kg})$ or $0.408\text{W} \cdot \text{h}/(\text{K} \cdot \text{kg})$ by the square of available manufacturing Experimental data instead. " for ease of use, this part of IEC 60076-12:2008 also made the

following editorial changes.

--- Introduction, added "For ease of use, this section gives life lost three load modes of calculation are shown in Appendix B Cases, and gives the symbol table "in Appendix C;

--- Table 3 for the format has been adjusted;

--- Table B.2 delete the rightmost four content;

--- Appendix C added symbols C1 and C2.

Please note that some of the content of this document may involve patents. Release mechanism of the present document does not assume responsibility for the identification of these patents.

This part is proposed by the China Electrical Equipment Industrial Association.

This part of the National Standardization Technical Committee transformers (SAC/TC44) centralized.

This section is drafted. Shenyang Transformer Research Institute Co., Ltd., Shun Special Electric Equipment Co., Ltd., Jilin Electric Power Science Research Hospital, Pearl Electric Co., Ltd., Xinhua special Electric Co., Ltd., Wolong Electric Group Beijing Huatai Transformer Co., Ltd., CLP Power Gas Group Co., Ltd., Guangzhou Prosperous Electric Co., Ltd., Baoding Tianwei Sundaravej Transformer Co., Ltd., Guangdong Haihong Transformer Co., Ltd., Railway Electrification Bureau Group Baoding Railway Transformer Co., Ltd., Tianjin special variable electrical transformer Limited.

Introduction

This part of the operating temperature and heat aging perspective provides dry-type power transformer loading guidelines and norms. It gives a super amount nameplate Consequences of setting load, and select the appropriate ratings and load new devices offer designers guidance.

GB 1094.11 is the basis of the contract, including dry-type power transformer temperature rise under continuous load requirements and temperature rise test. should

Note that, GB 1094.11 refers to the average winding temperature rise, and this part refers to the hot temperatures, and the value is only guidance only.

This section gives some mathematical model used to determine the different loads at different temperatures of the cooling medium and the load varying with time period or the result of momentary change. The model provides a method to calculate the transformer operating temperature, in particular winding hot spot temperature. Hot spot temperature Used to assess the loss of life in a specific time period.

This section based on the calculation results of temperature measurements or