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

GB/T 10228-2023

Replacing GB/T 10228-2015

**Technical parameters and requirements for dry-type power
transformers**

干式电力变压器技术参数和要求

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Foreword

This Document was drafted as per the rules specified in GB/T 1.1-2020 Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents. This Document replaced GB/T 10228-2015 Specification and Technical Requirements for Dry- Type Power Transformers. Compared with GB/T 10228-2015, the major technical changes of this Document are as follows besides the structural adjustments and editorial modifications:

--- Reduce the no-load loss of Level-6kV and Level-10kV non-excitation voltage regulating distribution transformers by an average of about 20% respectively; and reduce the no-load current (rated capacity of 250kVA and above) by an average of about 20% respectively (see Table 1 of this Edition; Table1 of the 2015 Edition);

--- Reduce the no-load loss of Level-6kV and Level-10kV non-excitation voltage regulating power transformers by an average of about 20% respectively; and reduce the no-load current by an average of about 20% (see Table 2 of this Edition; Table 2 of the 2015 Edition);

--- Reduce the no-load loss of Level-6kV and Level-10kV on-load voltage regulating distribution transformers by an average of about 20% respectively; and reduce the no-load current by an average of about 20% (see Table 3 of this Edition; Table 3 of the 2015 Edition);

--- Reduce the no-load loss of the Level-20kV non-excitation voltage regulating distribution transformer by an average of about 10% respectively; and reduce the no-load current by an average of about 10% respectively (see Table 4 of this Edition; Table 4 of the 2015 Edition);

--- Reduce the no-load loss the Level-35kV non-excitation voltage regulating distribution

transformer by an average of about 10% respectively; and reduce the no-load current by an average of about 10% respectively (see Table 5 of this Edition; Table 5 of the 2015 Edition);

--- Reduce the no-load loss of the Level-35kV non-excitation voltage regulating power transformer by an average of about 10% respectively; and reduce the no-load current by an average of 10% respectively (see Table 6 of this Edition; Table 6 of the 2015 Edition);

--- Reduce the no-load loss of the Level-35kV on-load voltage regulating power transformer by an average of about 10% respectively; and reduce the no-load current by an average of 10% respectively (see Table 7 of this Edition; Table 7 of the 2015 Edition);

--- Modify "different insulation system temperature" to "different insulation heat resistance grades"; and change the expression (see Clause 4 of this Edition; Clause 4 of the 2015 Edition);

--- Made the corresponding adjustments to the inspection rules and methods (see Clause 6 of this Edition; Clause 6 of the 2015 Edition). This Document was proposed by China Electrical Equipment Industry Association. This Document shall be under the jurisdiction of National Technical Committee on Transformer of Standardization Administration of China (SAC/TC 44). Please note some contents of this Document may involve patents. The issuing agency of this Document shall assume the responsibility to identify these patents. Drafting organizations of this Document: Shenyang Transformer Research Institute Co., Ltd.; Sunten Electric Equipment Co., Ltd.; Shanghai Huguang Transformer Co., Ltd.; Pearl Electric Co., Ltd.; Chint Electric Co., Ltd.; China Electric Power Research Institute Co., Ltd.; Wolong Electric Group Beijing Huatai Transformer Co., Ltd.; Haihong Electric Co., Ltd.; Guangzhou CRRC Junfa Electric Co., Ltd.; TBEA Intelligent Electric Co., Ltd.; Xi'an High Voltage Apparatus Research Institute Co., Ltd.; Tianjin Tebian Electric Transformer Co., Ltd.; Hainan Jinpan Smart Technology Co., Ltd.; Guangdong Kang Dewei Electrical Co., Ltd.; Shenyang Zhongbian Electric Co., Ltd.; Jiangsu Yawei Transformer Co., Ltd.; Baoding Tianwei Shunda Transformer Co., Ltd.; Chenglai Electric Technology Co., Ltd.; Zhejiang Jiangshan Transformer Co., Ltd.; Hefei Yuanzhen Power Technology Co., Ltd.; Chongqing Wangbian Electric (Group) Corp., Ltd.; Wuhu Jinniu Electric Co., Ltd.; Wujiang Transformer Co., Ltd.; TBEA Hunan Electrical Co., Ltd.; Shandong Dachi Electric Co., Ltd.; Tiansheng Electric Co., Ltd.; and Electric Power Research Institute of Guangdong Power Grid Co., Ltd. Chief drafting staffs of this Document: Zhang Zhongguo, Yi Jiliang, Yang Miao, Long Ye, Cai Dingguo, Li Jingbiao, Fu Chao, Qi Yingshi, Han Yu, Xu Kaixuan, Fan Jianping, Fang Yujie, Lixuan jiannan, Zhao Wenzhong, Li Zhiguo, Wang Wenguang, Tian Guishu, Tian Zhengwen, Qin Jinli, Zheng Guopei, Jiang Zhenjun, Xiong Shifeng, Zou Hong, Liu Chaofeng, Lin Canhua, Xu Jianjun, Zhang Jilan, Zhou Xiaoya, and Lin Chunyao. This Document was first-time published in 1988; first-time revised in 1997; second-time revised in 2008; third-time revised in 2015; it is fourth-time revised hereby. Technical Parameters and Requirements for Dry-Type Power Transformers

1 Scope

GB/T 10228-2023 is the Chinese national standard on technical parameters and requirements for dry-type power transformers, in the field of electrical engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 23 May 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 December 2023. Classification: ICS 29.180, CCS K41. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This Document specifies the performance parameters, technical requirements, inspection rules and methods, marking, packaging, transportation and storage of dry-type power transformers. This Document is applicable to non-excitation and on-load voltage regulation three-phase dry-type power transformer with rated capacity of 30kVA and above, rated frequency of 50Hz, indoor use, electrical steel made of iron core, and voltage levels of 6kV, 10kV, 20kV and 35kV. This Document does not apply to gas-filled transformers.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 191 Packaging - Pictorial Marking for Handling of Goods

GB/T 1094.1 Power transformers - Part 1: General

GB/T 1094.11 Power transformers - Part 11: Dry-type transformers

GB/T 1094.12 Power transformers - Part 12: Loading guide for dry-type power transformers

GB/T 2900.95 Electrotechnical terminology - transformers, voltage regulators and reactors

GB/T 5273 Terminals for transformers, high-voltage apparatus and bushings

GB/T 5465.2 Graphical symbols for use on electrical equipment - Part 2: Graphical symbols

JB/T 501 Test guide for power transformers

JB/T 10088 Sound level for 6kV~500kV power transformers

6.2.3 The winding resistance unbalance rate shall be calculated by taking the maximum

value minus the minimum value of the three-phase measured value as the numerator, and the three-phase measured average value as the denominator.

6.2.4 The resistance values between all corresponding terminals shall be measured and compared.

6.3 Insulation resistance measurement The insulation resistance of the transformer shall be measured before the transformer leaves the factory; and the measured value of the insulation resistance (including the temperature and relative humidity during the measurement) shall be provided.

6.4 On-load tap-changer test For on-load voltage regulating transformers, after the transformer (including on-load tap-changer) has been assembled, the on-load tap-changer shall be subjected to an operation test.

7 Marking, Packaging, Transportation and Storage

7.1 Each winding of the transformer shall have corresponding wiring terminal signs, and all signs shall be firm and corrosion-resistant.

7.2 The words and signs on the outer wall of the transformer packing box shall withstand the wind and the sun; and shall not be blurred by the rain. The contents shall include:

- a) The name of the manufacturer;
- b) The name and address of the consignee;
- c) Product name and model;
- d) Gross mass and total mass of the transformer;
- e) Outline dimensions of the packaging box;
- f) The storage and transportation instruction marks of the packaging box (where "upward", "moisture-proof", "handle with care", "lift from here" and so on shall be marked in accordance with the provisions of GB/T191).

7.3 The documents packed with the transformer shall include:

- a) Packing list;