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

GB/T 1094.23-2019

**Power transformers -- Part 23: DC magnetic bias suppression
devices**

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Foreword

GB/T 1094 `` Power Transformer " is divided into the following parts.

- Part 1. General;
- Part 2. Temperature rise of liquid-immersed transformers;
- Part 3. Insulation level, insulation test and external insulation air gap;
- Part 4. Lightning and operating shock test guidelines for power transformers and reactors;
- Part 5. Ability to withstand short circuits;
- Part 6. Reactor;
- Part 7. Load guidelines for oil-immersed power transformers;
- Part 10. sound level determination;
- Part 10.1. Application guidelines for sound level determination;
- Part 11. Dry-type transformers;
- Part 12. Dry-type power transformer load guidelines;
- Part 14. Design and application of liquid-immersed transformers using high-temperature insulation materials;
- Part 16. Transformers for wind power generation;
- Part 18. Frequency response measurement;
- Part 23. DC bias suppression device.

This part is Part 23 of GB/T 1094.

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

This part uses the redrafting method to modify and adopt IEC TS60076-23..2018, Power Transformer Part 23. DC Bias Suppression

Installation ".

There are technical differences between this part and IEC TS60076-23..2018, and the terms related to these differences have passed the margin

The vertical single line (|) in the blank position is marked, and a list of corresponding technical differences and their causes is given in Appendix A.

The following editorial changes have also been made in this section.

--- The voltage and frequency in the examples are adjusted according to the actual situation in China;

--- Move the principle description of the DC bias suppression device in the second paragraph of the scope of IEC TS60076-23..2018 to the introduction;

--- Adjust 3.6 in IEC TS60076-23..2018 to 3.1 in this section and 3.1 in IEC TS60076-23..2018

Adjusted to 3.2 of this part, adding 3.2 "Resistor-type" limit to 3.2 in IEC TS60076-23..2018

It is adjusted and adjusted to 3.3 in this part, and 3.3 in IEC TS60076-23..2018 is added with a "Capacitor-

type) ", and adjusted to 3.4 of this part, and 3.4 and 3.5 in IEC TS60076-23..2018 to this part

Points 3.5.1 and 3.5.2;

--- Added Note 2 to 3.3 in this section;

--- Combined 4.2 and 4.1 of IEC TS60076-23..2018 with the cost part of 4.1, and adjusted 4.3 to 4.2 of this part;

--- Removed the description about the installation position and classification of DC bias suppression device in paragraph 5.1 of IEC TS60076-23..2018

The 5.4 in IEC TS60076-23..2018 was adjusted to 5.4.1 in this section, adding 5.4.2 and 5.4.3;

--- Added paragraph 2 (including note) and paragraph 6 in 5.2 of this section;

--- Adjust the content of paragraph 3 of 5.3 in IEC TS60076-23..2018 to the second paragraph of 5.3 of this part, and replace IEC TS60076-

23..2018 The second paragraph of 5.3 is adjusted and added to become the third paragraph of this section 5.3;

--- Merging Chapters 6 and 7 of IEC TS60076-23..2018 into Chapter 6 of this part, combining IEC TS60076-23.

Chapter 6 of.2018 is adjusted to 6.1 of this section, and Chapter 7 of IEC TS60076-23..2018 is adjusted to 6.2 of this section;

Removal of resistive material requirements in 6.1.2 of IEC TS60076-23..2018 to 6.1.4 of this section; add in this section

Added 6.1.8, 6.1.9, 6.2.6 and 6.2.10;

--- Adapted Chapter 8 of IEC TS60076-23..2018 to Chapter 7 of this part, and carried out the order of the chapters of the routine test

Adjustments; added 7.4 and 7.5 in this section;

--- Adjust Chapters 9, 10 and 11 of IEC TS60076-23..2018 to Chapters 8, 9 and 11 of this part

Chapter 10;

--- The order of the appendixes has been adjusted, and the appendixes A to G in IEC 60076-23..2018 have been adjusted to the appendixes in this part.

Record B ~ Appendix H, and adjusted the content of the appendix in accordance with China's actual application;

--- Adjust Table 2 of IEC TS60076-23..2018 to Table 3 of this section, and add Table 2 and Table 4 to this section;

--- Deleted Figure C.1 and Figure D.1 of IEC TS60076-23..2018, added Figure C.2, Figure D.1, Figure D.2, Figure D.3, Figure E.1,

Figure E.2, Figure G.3 and Figure H.1.

This section is proposed by China Electrical Equipment Industry Association.

This section is under the jurisdiction of the National Transformer Standardization Technical Committee (SAC/TC44).

This section was drafted. State Grid Shanghai Electric Power Company Electric Power Research Institute, Shenyang Transformer Research Institute Co., Ltd., East China Electric Power

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Introduction

In some cases, abnormal DC currents can occur in the AC grid, which can cause damage to power equipment such as power transformers that are grounded to the neutral point.

Profit influence.

Case 1. When the HVDC system is operating in single-pole loop or bipolar unbalance mode, the DC current is grounded through the transformer

The neutral point flows into the AC grid.

Case 2. During the solar magnetic storm, the geomagnetically induced current (GIC) flows into the AC grid.

Case 3. Electric traction locomotive and some large-capacity power electronic equipment may cause DC current to flow into the AC grid.

DC current flowing through the transformer winding will cause DC bias, which will bring hidden danger to the transformer and power system. DC bias current production

Mechanism and harmful effects, see Appendix B and Appendix C.

In order to suppress the DC bias current, the DC bias suppression device is usually connected in series to the neutral point circuit of the power transformer and the converter transformer.

It is used to suppress the DC bias current generated in single-maximum loop mode or bipolar unbalanced operating conditions of HVDC transmission systems. In metal

This device can also mitigate the flow of power transformers and converter transformers that may occur in the transient state of a DC line fault under the operating conditions of the return line.

DC current.