

ICS 29.180

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

GB/T 18494.3-2023

Replacing GB/T 18494.3-2012

Converter transformers - Part 3: Application guide

Issued on: March 17, 2023

Implemented on: October 1, 2023

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

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foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for Standardization Work Part 1: Structure and Drafting Rules for Standardization Documents"

drafting:

This document is part 3 of GB/T 18494 "Converter Transformers": GB/T 18494 has issued the following parts:

- Part 1: Industrial converter transformers;
- Part 2: Converter transformers for HVDC transmission;

--- Part 3: Application guidelines:

This document replaces GB/T 18494:3-2012 "Converter Transformers Part 3: Application Guidelines", and is consistent with GB/T 18494:3-2012

In addition to structural adjustments and editorial changes, the main technical changes are as follows:

---Changed the scope of application (see Chapter 1);

--- Added the need to distinguish between sinusoidal and non-sinusoidal grid-side voltages in the design of converter transformers (see Chapter 5);

---In the 12-pulse wave connection group diagram, the DyYy and DdYd connection methods are added; the third winding with filtering and compensation is added

Industrial equipment needs to consider the fact that the actual current is larger than the rated value (see 6:1);

---Optimized the style of the connection diagram; added the types of autotransformer introduction, including the autotransformer with coarse adjustment and fine adjustment

Open-phase schematic diagram, closed-phase schematic diagram of double-winding transformer with coarse adjustment and fine adjustment, etc: (see 6:2 and 6:3);

---Changed the temperature rise limit of hybrid insulation from "105°C" to "Refer to the limit allowed in 6:2 of GB/T 1094:2-2013",

Prompt that the application method of the new insulating material can be obtained from GB/T 1094:14 (see 8:1:2);

--- Increased the current distribution, loss and hot spot temperature rise of high-current windings (see 9:1:3);

--- Added the content of the stray increase in the loss of the loose coupling of the rectifier (see 9:1:5);

--- Increase the introduction of the transformer connected to the voltage source converter (see 9:1:8);

--- Increased the content considered in the temperature rise test of industrial converter transformers (see 9:2:5);

--- Added content about hot spots of oil tanks of industrial converter transformers (see 9:2:6);

--- Added the relevant content of the saturable reactor iron core and the balanced reactor iron core in the fuel tank (see 10:1:1);

--- Added the influence of harmonics on the core of the converter transformer (see 10:1:2);

--- Added content about the impact of the balanced reactor core design on noise (see 10:2:1);

--- Change the oil breakdown voltage and acid value test from once every two years to at least once a year (see 14:2:2);

--- Added a chapter on the design review of industrial and HVDC converter transformers (see Chapter 16):

This document is modified to adopt IEC 61378-3:2015 "Converter Transformers Part 3: Application Guidelines":

The technical differences between this document and IEC 61378-3:2015 and their reasons are as follows:

---In order to adapt to the technical conditions of our country, IEC 60076-5, IEC 60076-5, GB/T 1094:14 replaces IEC 60076-14:2013 (see 8:1:2, Chapter 12 and 16:3:4:3);

---Considering the different requirements for rated current in GB/T 18494:1-2014 and GB/T 18494:2-2022, in order to take into account my

According to the actual situation in China, the interpretation of ILN and Kh has been adjusted according to the situation in my country, and the current ratio kh, rated current

Symbol and interpretation of flow Ir and resistive loss IrR at rated current (see Clause 4);

---Considering the different requirements for rated current in GB/T 18494:1-2014 and GB/T 18494:2-2022, in order to take into account my

According to the actual situation of the country, the content of the rated value has been revised respectively (see the first paragraph, the second paragraph and the last paragraph in Chapter 5);

---In order to avoid misunderstanding, the words "when one converter transformer is connected as positive sequence" and "another converter transformer" in the original text of IEC are deleted:

The letter mark given in the brackets behind it when the connection is negative sequence" (see paragraph 1 above Figure 4 in 6:1);

---Considering that the marking habits of transformer terminals in my country are different from those in foreign countries, in order to take into account the actual situation in our country, the three-phase terminals of transformers are marked

The flag is changed from "U, V and W" to "A, B and C" (see Figures 7 to 12 in 6:2:3);

---Considering the difference in impedance deviation requirements for industrial converter transformers and HVDC power transmission converter transformers in my country, for

In order to take into account the actual situation in our country, the content of impedance deviation has been modified: For industrial converter transformers, the requirements are the same as

The original text of IEC is consistent; for HVDC power transmission converter transformers, the requirements are in accordance with the provisions of GB/T 18494.2-2022 (see paragraph 6 of 7:2);

---The rated power frequency of the power supply in our country is 50Hz: In order to meet the actual situation in our country, the 60Hz in the original IEC text is deleted, and only 50Hz is reserved (see 9:1:6);

--- In order to be compatible with the technical content of our standards, the monitoring item "repetitive shock waveform (RSO) or low Impulse voltage test response" (see 15:3:3):

The following editorial changes have been made to this document:

- The content of the introduction has been adjusted;
- Adjusted the order of titles and symbols in Chapter 4;
- Deleted the last paragraph in 8:2:2;
- Correct the clause number 9:1:5 mentioned in 9:2:3 to 9:1:6;
- Deleted the second paragraph of 13:2:1;
- The letter C representing the valve side is added to Figure 25a) of 13:2:5;
- Deleted footnote 3 in 15:3:3;
- The references have been adjusted:

Please note that some contents of this document may refer to patents: The issuing agency of this document assumes no responsibility for identifying patents:

Introduction

0:1 Overview

The formulation of the converter transformer standard is to establish a set of optimal evaluation criteria for the converter transformer, and provide a basis for the production of the converter transformer from the production materials:

Provide guidance on matters needing attention in selection, product design, product production, product inspection, product selection and operation and maintenance:

GB/T 18494 aims to establish principles and relevant regulations applicable to the design, manufacture, test methods, operation and maintenance of converter transformers, etc: