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

GB/T 24276-2025

Replacing GB/T 24276-2017

**A method of temperature-rise verification of low-voltage
switchgear and controlgear assemblies by calculation**

通过计算进行低压成套开关设备和控制设备温升验证的一种方法

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document replaces GB/T 24276-2017 "A Method for Verifying Temperature Rise of

Low-Voltage Switchgear and Controlgear Assemblies by Calculation".

Compared with GB/T 24276-2017, the main technical changes in the "Law" are as follows, apart from structural adjustments and editorial modifications.

- The file range has been changed (see Chapter 1, Chapter 1 of the 2017 edition);
- Added assumptions to the calculations (see 5.1);
- Increased the upper limit of the internal air temperature of the complete set of equipment (see 5.4);
- Added further considerations to the calculations (see Chapter 6);
- Symbols, units, and names have been added (see Table 2);
- Increased the shell factor d when the number of partitions is 4 and 5 (see Tables 4 and 5);
- Add algebraic equations to the different curves included in this document (see Tables 6, 7, 8, 9, 10 and 11).

This document is equivalent to IEC TR60890:2022 "Verification of temperature rise of low-voltage switchgear and controlgear assemblies by calculation" One method.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Electrical Equipment Industry Association.

This document is under the jurisdiction of the Technical Committee on Standardization of Low Voltage Switchgear and Controlgear Assemblies (SAC/TC266).

Introduction

The IEC 61439-1 standard specifies temperature rise verification for low-voltage switchgear and controlgear assemblies as part of a series of design verifications.

The test can be conducted, and other methods can be selected under specified conditions. The initial manufacturer is responsible for selecting the method for temperature rise verification. If applicable, this document can also be used for temperature rise verification of similar products conforming to other standards (such as IEC 60204-1). For a given internal air temperature rise...

For enclosures conforming to IEC 62208, the calculation method can also be used to determine the heat dissipation capacity of the enclosure. The factors and coefficients set in this document are derived from...

Based on measurement data from a large number of complete sets of equipment, this method has also been verified by comparing it with experimental results.

Calculations are performed on low-voltage switchgear and control systems.

A method for verifying equipment temperature rise

1 Scope

This document specifies the calculation of internal air temperature rise within the enclosure of low-voltage switchgear and controlgear assemblies or similar products conforming to their respective standards.

One method.

This method is mainly applicable to enclosed complete sets of equipment or partitioned cabinet units of complete sets of equipment without forced ventilation. This document still applies to such cases.

Some technical guidelines are provided for adapting this method and applying it to forced ventilation. The results obtained using this method are subject to accurate power loss assessment.

The direct impact of temperature. This power loss is used as input for thermal calculation.

Note: The air temperature inside the enclosure is equal to the ambient air temperature outside the enclosure plus the air temperature rise caused by the power loss of the equipment installed inside the enclosure.

Using this method, the maximum daily average ambient air temperature outside the complete set of equipment at the installation location is specified to be between 10°C and 50°C.

The daily temperature does not exceed the maximum daily average temperature by more than 5K.

Several appendices in this document provide information on how factors not considered in the calculation methods described herein affect the internal temperature rise of complete sets of equipment.

South. For example, the entire equipment is exposed to solar radiation. In this case, a different verification method than that used in this paper is employed to ensure the design's clear results.

Results and verification.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this

document; for undated references, the latest version (including all amendments) applies.

This document.

assemblies

Note: GB/T 7251 (all parts) Low-voltage switchgear and controlgear assemblies [IEC 61439 (all parts)]

3 Terms and Definitions

The terms and definitions defined in IEC 61439 (all parts) apply to this document.

4 Verification conditions

When this calculation method is applied to low-voltage switchgear and control equipment, the following conditions must be met.

---The complete set of equipment is designed for AC current not exceeding 1600A and frequency not exceeding 60Hz. For higher current ratings or frequencies...

Considering the eddy current effect on the internal temperature distribution of complete sets of equipment that meet relevant product standards, this method can be combined with additional verification.

Use them together.

Note 1: Considering the significant increase in power loss caused by magnetic effects (eddy currents, proximity effect, skin effect), IEC 61439-2 specifies a current limit of 1600A.

Additional requirements.

---The complete set of equipment is designed for DC current not exceeding 3200A. For higher rated currents, this equipment shall comply with the relevant product standards.

This method can be used in conjunction with additional validation.

---Conductors carrying AC currents exceeding 200A and the arrangement of adjacent structural components make eddy current and hysteresis losses negligible.