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**NATIONAL STANDARD OF THE
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GB/T 47024.2-2026

**Special test methods for electrical equipment at high altitude -
Part 2: Combined AC/DC voltage**

高原电工产品特殊试验方法 第2部分：工频/直流复合电压

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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 is Part 2 of GB/T 47024 "Special Test Methods for Electrical Products Used in High-Altitude Areas". GB/T 47024 has published the following... part.

1.Power Frequency/Harmonic Composite Current;

2.Power Frequency/DC Composite Voltage. 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 National Technical Committee on Environmental Technology Standardization for High-Altitude Electrical Products (SAC/TC330). This document was drafted by: China Southern Power Grid Co., Ltd. Ultra-High Voltage Transmission Company Electric Power Research Institute and Kunming Electrical Science Research Institute. Harbin University of Science and Technology, China Electric Power Research Institute Co., Ltd., Chongqing University, China Electric Power Research Institute Co., Ltd., China Electric Power Gas Equipment Group Science and Technology Research Institute Co., Ltd., Yunnan Power Grid Co., Ltd. Kunming Power Supply Bureau, Changjiang Electric Power New Energy Co., Ltd. Guangdong Power Grid Co., Ltd. Dongguan Power Supply Bureau, Yunnan Power Grid Co., Ltd. Honghe Power Supply Bureau, Xi'an Xi'an High Voltage Switchgear Co., Ltd. Company, Guangzhou Cable Co., Ltd., Xiangtan Electric Machinery Co., Ltd., Henan Pinggao Electric Co., Ltd., Guangdong Yuanguang Cable Industry Co., Ltd. Company, Dali Bureau of China Southern

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GB/T 47024 "Special Test Methods for Electrical Products in High-Altitude Areas" is proposed to consist of the following parts.

1.Power Frequency/Harmonic Composite Current. The purpose is to describe the operation of electrical products in high-altitude areas under power frequency/harmonic composite current. The methods for conducting tensile strength and temperature rise tests include the test principle, test conditions, test circuit and parameter calculation, test procedure, and test... Results evaluation and test report.

2.Power Frequency/DC Composite Voltage. The purpose is to describe the application of power frequency/DC composite voltage in electrical products under high-altitude environmental conditions. The voltage method includes the test principle, test conditions, test circuit and parameter calculation, test procedure, test result evaluation and test. Report.

---Part 3: DC/Impulse Composite Voltage. The purpose is to describe the DC/impulse

composite voltage applied to electrical products under high-altitude environmental conditions. The voltage method includes the test principle, test conditions, test circuit and parameter calculation, test procedure, test result evaluation and test. Report. Special test methods for electrical products in high-altitude areas Part

1 Scope

GB/T 47024.2-2026 is the Chinese national standard covering testing insulation under a combined AC and DC stress at altitude - the condition at a hybrid AC/DC substation on the plateau, where the reduced air density lowers the flashover voltage and the two stresses together are worse than either alone. Part 2 of the series, first edition, in force since 1 June 2026, and it belongs with the plateau environment classification GB/T 19608.3-2026. It was issued on 27 February 2026 and has been in force since 1 June 2026, as a first edition. The document is under the responsibility of the China Electrical Equipment Industry Association. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes the method for conducting power frequency/DC composite voltage tests on electrical products in high-altitude areas, including the test principle, test conditions, and test procedures. Test circuit and parameter calculation, test procedure, test result evaluation and test report. This document applies to plateau areas with altitudes above 1000m to 5000m, where AC voltage above 10kV and DC voltage above 3kV are required. Electrical products subjected to power frequency/DC composite voltage testing. For electrical products at other altitudes, the same guidelines apply.

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.

GB/T 311.1 Insulation Coordination Part

3 Terms and Definitions

The terms and definitions defined in GB/T 16927.1 and the following terms and definitions apply to this document.

3.1 AC/DC combined voltage AC voltage with DC bias.

Note. Generally, the waveform expression is $U = A \sin \omega t$, where U is the amplitude of

the composite voltage, A and B are the amplitudes of the DC voltage and AC voltage, respectively, and ω is the amplitude of the AC voltage. f represents the power frequency, and t represents time.

4. Experimental Principle Under high-altitude environmental conditions, a combined power frequency/DC voltage is applied to the test specimen, and the insulation capability of the specimen is tested according to a predetermined test procedure. Under the selected power frequency/DC voltage amplitude, the insulation capability test of the test specimen can be carried out using any of the following methods.

- a) Apply a power frequency voltage and a DC voltage to the two terminals of the test sample, respectively;
- b) Apply a combined power frequency/DC voltage to one terminal of the test specimen.