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

GB/T 42558.3-2024

**Seismic techniques for electrical equipment in converter
stations on plateaux - Part 3: Specification for seismic design**

高原用换流站电气设备抗震技术 第3部分：减隔震设计规范

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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 is required. This document is part 3 of GB/T 42558 "Seismic technology for electrical equipment of converter

stations for plateau use". GB/T 42558 has been published The following parts. -- Part

1 Scope

Part 3 of China's national standard for the seismic engineering of converter station electrical equipment on plateaux, covering design. Where Part 2 addresses testing what has been built, this part addresses designing it so that it survives. The measures available are limited by what the equipment is: a porcelain bushing cannot be made ductile, so the design works instead on the support - stiffening it to move the natural frequency away from the ground motion's energy, or the opposite approach of base isolation, which deliberately softens the mounting so that the equipment moves with the ground rather than being shaken by it. Altitude compounds the problem in a way peculiar to electrical equipment: thinner air has lower dielectric strength, so insulators must be longer at high altitude for the same voltage - and a longer insulator is a taller, more slender cantilever with a lower natural frequency, which is exactly what the seismic design does not want.

This document specifies the design requirements for vibration reduction and seismic isolation of electrical equipment in new, rebuilt and expanded converter stations in plateau areas, and describes the corresponding verification Proof method. This document is applicable to areas with voltage levels of ± 400 kV and above, altitudes of 1 000 m to 5 000 m, and seismic fortification intensity of 6 to 9 degrees. Design and verification of shock absorption and isolation of electrical equipment in flow stations. This article can be used as a reference for the shock absorption and isolation design of electrical equipment in other substation/converter station projects.

2 Seismic design specifications; --Part

3. Seismic isolation design specifications. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed by the China Electrical Equipment Industry Association. This document is under the jurisdiction of the National Plateau Electrical Products Environmental Technology Standardization Technical Committee (SAC/TC 330). This document was drafted by: China Electric Power Research Institute Co., Ltd., China Southern Power Grid Co., Ltd. Ultra-high Voltage Transmission Company Power Research Institute, Kunming Electric Science Research Institute, Tongji University, Institute of Engineering Mechanics, China Earthquake Administration, Xi'an Xidian High Voltage Switchgear Co., Ltd. Company, China Energy Engineering Group Yunnan Electric Power Design Institute Co., Ltd., Henan Pinggao Electric Co., Ltd., Chongqing University, Guangdong Yuan Optical Cable Industry Co., Ltd., Kunming High Altitude Electrical Appliance Testing Co., Ltd., China Southern Power Grid Co., Ltd. Ultra-high Voltage Transmission Company Qu Guanglei, Xin Ke, Li Weiguo, Wu Yue, Cao Shaohua, Qian Zhunli, Xiao Mingying, Fu Hongjun, Liao Jun, Shi Yanying, Wang Wei, Wang

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DC transmission is an important means to achieve high voltage, large capacity and long-distance power transmission. Due to factors such as power source location and environment, some stations Built in the plateau area, it has the characteristics of high altitude and high voltage level. Compared with the same type of electrical equipment at low altitude, it is different in structure, height, length and quality. There are obvious differences in the surface, which are reflected in being taller, longer, heavier and more flexible, and more stringent requirements are placed on the seismic performance of equipment in high seismic intensity areas. GB/T 42558 "High-altitude Converter Stations" is specially formulated to provide guidance for the seismic design, modeling calculation, testing and evaluation of the electrical equipment of such converter stations. "Seismic Technology for Electrical Equipment in Stations". GB/T 42558 is intended to consist of six parts. -- Part

1.Guidelines for seismic testing and evaluation. The purpose is to establish the electrical system for converter stations in high-seismic intensity areas in plateaus. General requirements and evaluation principles for equipment seismic testing. -- Part

2.Seismic design specifications. The purpose is to specify the overall requirements for seismic design of electrical equipment in converter stations for plateau use, Seismic design of equipment, seismic design of equipment coupling connections, and seismic structural measures for equipment. -- Part

3.Seismic isolation design specifications. The purpose is to specify the seismic isolation and seismic design calculations for electrical equipment in converter stations for plateau use. Methods, selection of shock absorbing and isolation devices, and construction requirements. --Part

4.Equipment selection specifications. The purpose is to guide the selection of electrical equipment in plateau converter stations and improve the Shock resistance. -- Part

5.Equipment Operation and Maintenance Guidelines. The purpose is to help operators better monitor and control electrical equipment in high-altitude converter stations. It provides a standard basis for measurement, inspection, evaluation, repair and maintenance. -- Part

6.Technical Specifications for Earthquake Monitoring Systems. The purpose is to define the applicable scope and monitoring objects of the plateau earthquake monitoring system. and layout, monitoring system composition and technical requirements, monitoring system testing, installation and acceptance, monitoring system management and maintenance, Storage and handling requirements for monitoring records. Earthquake-resistant technology for electrical equipment in converter stations for plateau use Part

3 Terms and definitions

The terms and definitions defined in GB/T 11804, GB 50260 and the following apply to this document.

3.1 Energy dissipation device A device installed on electrical equipment to absorb and dissipate the vibration energy of the equipment structure caused by earthquakes.

3.2 Structure with energy dissipated electrical equipment A structure formed by installing a vibration-absorbing device in electrical equipment.

5 Elastic sliding plate bearings for seismic isolation of buildings

GB/T 37358 Friction pendulum isolation bearings for buildings

GB/T 42558.1-2023 Earthquake resistance technology for electrical equipment of converter stations for plateau use Part