

ICS 29.02

CCS K 09



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

GB/T 39462-2020

Safety guidelines for low-voltage DC systems and equipment

低压直流系统与设备安全导则

Issued on: November 19, 2020

Implemented on: June 1, 2021

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This document was drafted in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Part

1. Structure and Drafting Rules of Standardization Documents". Please note that certain contents of this document may involve patents. The issuing agency of this document is not responsible for identifying patents. This document was proposed and managed by the National Electrical Safety Standardization Technical Committee (SAC/TC25). Drafting organizations of this document. Beijing Institute of Electrical Technology and Economics of Machinery Industry, Shanghai Electrical Apparatus Research Institute (Group) Co., Ltd., Jiangsu Hewangyuan Electric Co., Ltd., China Railway Ninth Bureau Group Electrical Engineering Co., Ltd., Siemens (China) Co., Ltd., Xu Ji Group Co., Ltd., Shenzhen Shenzhen Feibo Laser Technology Co., Ltd., Suzhou Electric Apparatus Research Institute Co., Ltd., Guangnan Electric Testing Center (Guangdong) Co., Ltd., State Grid Jiangsu Electric Power Co., Ltd. Electric Power Research Institute, Beijing ABB Low Voltage Electric Co., Ltd., Schneider Electric (China) Co., Ltd. Shanghai Branch, Hangzhou Zhijiang Switch Co., Ltd., Guangdong Product Quality Supervision and Inspection Institute, Foshan Yifeng Electric Industrial Co., Ltd. Company, Guangdong Weizhaoye Optoelectronic Energy Saving Co., Ltd., Jiangmen Leqi Electric Co., Ltd., Xingjian Artificial Intelligence Technology (Shanghai) Co., Ltd., Shanghai Research Institute of Work Safety, Rudong Comprehensive Inspection and Testing Center. The main drafters of this document. Li Feng, Ji Huiyu, Zhu Tianyi, Qiu Xiaojie, Ma Hong, Hu Hongyu, Zhou Junhua, Zeng Shujun, Fang Xiaoyan, Hu Jin, Ma Guifen, Zeng Yanhong, Li Qiang, Lin Yongqing, Wang Nong, Han Zhigang, Dai Shuidong, Wu Wei, Zhong Xiaoxiao, Dong Hongliang, Tan Zhuohe, Huang Jiayi, Huang Lixin, Zhang Hongquan and Liu Yang. Safety guidelines for low-voltage DC systems and equipment

1 Scope

China's national safety guidelines for low voltage direct current systems and equipment. It specifies the terms and definitions, the general provisions including the determination of safety factors, and the requirements. Low voltage DC distribution is being reconsidered because so much of what is now connected is natively DC - photovoltaic generation, batteries, LED lighting, electronics, vehicle charging - and each conversion between AC and DC costs efficiency and adds equipment. What the revival has to confront is that DC is not simply AC without the alternation, and its hazards differ in ways that matter. A DC arc does not self-extinguish, because there is no current zero, so switchgear and protection designed for AC will not interrupt it; DC through the body has different physiological effects at the same voltage; and stray DC current causes electrolytic corrosion where AC would not. Guidelines rather than a specification is the right form for a field this early.

This document establishes the overall safety principles and safety factors to be considered for low-voltage DC systems and equipment. This document applies to DC systems and equipment with a DC voltage of 1500V and below, and provides guidance for considering safety factors.

2 Normative references

The contents of the following documents constitute indispensable clauses of this document through normative references in the text. Among them, dated reference documents, Only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 4776-2017 Electrical Safety Terminology

GB 19517 National Electrical Equipment Safety Technical Code

GB/T 34924-2017 Low-voltage electrical equipment safety risk assessment and risk reduction guide

3 Terms and definitions

The following terms and definitions defined in GB/T 4776-2017 apply to this document.

3.1 Low voltage DC system and equipment Power supply or electrical systems and equipment used for power generation, transformation, transmission, distribution, energy storage or use of electricity with a rated output voltage not exceeding 1500V DC.

4 General

4.1 General The basic safety requirements specified in GB 19517 apply to this document. There are differences between DC and AC. In addition to meeting the basic safety requirements specified in GB 19517, low-voltage DC systems and equipment should also consider the The safety factors specified in Chapter 5 of the document to ensure the safety under the expected use and reasonable expected misuse, and take corresponding protective measures. Low-voltage DC system and equipment's own factors become safety factors, which shall be determined in accordance with GB/T 34924-2017.

4.2 Determination of safety factors The safety factors (also referred to as risk factors) of low-voltage DC systems and equipment are in addition to the requirements specified in Appendix A of GB/T 34924-2017 In addition to consideration, the factors proposed in Chapter 5 of this document should also be considered. On the basis of considering safety factors, according to GB/T 34924-2017 Conduct electrical safety risk assessments for low-voltage DC systems and equipment in the methods specified in, and give necessary warnings for residual risks and inform the measures to be taken.