

ICS 29.130.10

CCS K 43



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

**GB/T 28534-2012**

---

**The health and environmental impact on release of sulphur  
hexafluoride (SF<sub>6</sub>) used in high-voltage switchgear and  
controlgear**

高压开关设备和控制设备中六氟化硫（SF<sub>6</sub>）气体的释放对环境和健康的影响  
**(English Translation)**

**Issued on: June 29, 2012**

**Implemented on: November 1, 2012**

---

**Issued by: Standardization Administration of China**

## Table of Contents

Introduction

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 SF6 storage and transport

4.1 Overview

4.2 Storage container filled with SF6

4.3 Transport container containing SF6

4.4 SF6-filled electrical equipment storage and transportation

4.5 Liability

5 Safety and emergency rescue

5.1 GENERAL SAFETY RULES

5.2 In the case of abnormal release of SF6 fire due to external and internal arc fault caused by an additional security measure

5.3 Emergency equipment and handling

6 Training and certification

6.1 Overview

6.2 Training Module

6.3 Certificate

Category 7 SF6 processing device

7.1 Overview

7.2 Recovery

7.3 Hose connection

Portable gas measurement equipment 7.4

7.5 Gas sample cylinder

Appendix A (informative) sulfur hexafluoride

A.1 Introduction

A.2 chemical properties

A.3 Physical Characteristics

A.4 Electrical characteristics

A.5 treatment, health hazards and characteristics of

## Appendix B (Informative Appendix) SF6 environmental impact

### B.1 Introduction

### B.2 Ecotoxicology

### B.3 ozone depletion

### B.4 global warming and climate change (greenhouse effect)

### B.5 byproducts

### B.6 SF6 environmental policy compatible

## Appendix C (Informative Appendix) SF6 byproducts

### C.1 SF6 decomposition

## Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules.

This standard uses redrafted law revision using IEC 62271-303:2008 "high-voltage switchgear and control equipment Part 303. Six Sulfur hexafluoride (SF6) for use and handling. " this standard and IEC 62271-303:2008 technical differences and for the following reasons.

--- Delete irrelevant to the standard IEC 62271-303 in Chapter 7. During the installation process and the transfer of SF6, Chapter 8. make normal SF6 used during the life process, Chapter 9. Maintenance during the recovery and recycling of SF6, Chapter 10. At the end of life SF6 Power Disassemble the device.

The standard proposed by China Electrical Equipment Industrial Association.

This standard by the national high-voltage switch equipment Standardization Technical Committee (SAC/TC65) centralized.

This standard was drafted. Xi'an High Voltage Apparatus Research Institute Co., Ltd., Xi'an High Voltage Switch Co., Ltd., New Northeast Electric Gas (Shenyang) High Voltage Switchgear Co., Ltd., Shanghai days Ling Switch Factory Co., Limited ABB (China) Co., Ltd., Beijing Northern Electric shares Company, Jiangsu Province, such as high-pressure high Appliance Co., Ltd., Shanghai Electric Power Transmission Test Center Co., Ltd., Xiamen ABB High Voltage Switchgear Co., Secretary, Guangdong Fan Electric Equipment Manufacturing Co., Ltd., Shantou Zhengchao Electric Group Co., Ltd., Shenzhen Institute of Electrical Science, Ningbo Tianan set Group benefits and Electric Group Co., Ltd., Zhejiang Switch Factory Co., Ltd., Henan high level of electrical Co., Ltd., Xi'an Electrical Switch Ltd., Schneider Electric (China) Investment Co., Ltd. Taixing Branch Lide refrigeration equipment.

## Introduction

SF6 gas used in electrical switchgear and control equipment for over 30 years. It is mainly used for rated voltage above 1kV until the There has manufactured the highest rated voltage switchgear and control equipment. It is estimated that there are several million units filled with different types of SF6 units in operation.

According to GB/T 11022, there are three kinds of gas system is technically available.

--- Controllable pressure systems;

**Note 1:** Because unacceptable leak rate (see GB 7674), the new equipment is no longer controllable pressure systems.

--- Closed pressure systems. For the standard modern electrical equipment per year leak rate is 0.5% and 1% each inflatable compartments;

--- Sealed pressure system. For a modern medium voltage electrical equipment (commercially known as "lifelong seal products" or "hermetically sealed system"), the seal Sealing pressure of the system to the provisions of its expected life. Leakage performance with respect to life expectancy by the manufacturer to regulate set. Preferably of 20 years, 30 years and 40 years.

**Note 2:** In order to meet the anticipated requirements of life, that the annual rate of the leak sealed pressure system is less than 0.1%.

Electrical switching and control equipment used in the long-term experience has shown that SF6, as long as the establishment and comply with certain basic precautions and procedures Order, to benefit the operation, safety and working environment, for example.

--- Safe operation of equipment;

--- Optimization of resources and tools;

--- Minimize equipment downtime of;

--- SF6 Processing Standards trainers;

--- Emissions during gas processing operation is reduced to below the limit of physical function;

--- Avoid any deliberate emissions, such as emissions into the atmosphere;

--- During the transfer, use, operation and end of life processing SF6 consumption and emissions to a minimum.

Recently, on the latest technology in SF6 switchgear and control practices recommended by the equipment has been studied by the committee CIGREB3 B3.02 Working Group will be published [1]. This information is used to develop this standard.

High-voltage switchgear and control equipment in sulfur hexafluoride (SF6) the impact of the release of gases on the environment and health

## 1 Scope

This standard applies to the high-voltage switchgear and control equipment, normal and abnormal operation and environmental safety as well as personnel and handling SF6 Yung procedures, including the storage and transport as well as training of personnel of SF6.

Should be considered in these procedures is to ensure the safety of personnel working SF6 and SF6 emissions will be the most minimal to the environment reduced the number of Low demand.

This standard is generally applicable to a mixed gas of SF6.

**Note 1:** In order to facilitate the use of this standard, the voltage range of high-voltage switchgear in the usual sense generally refers to the rated voltage of 3.6kV and above. Practical applications, Rated voltage range is typically medium voltage switchgear is 3.6kV ~ 63kV; Rated voltage range of high-voltage switchgear is 72.5kV ~ 252kV; ultrahigh Rated voltage range voltage switchgear is 363kV ~ 800kV; rated voltage range UHV switchgear is 1100kV and above.

**Note 2:** The entire Standard, the term "electrical equipment" stands for "high-voltage and medium-voltage switchgear and/or control devices." in this standard, may not contain all the existing rules on SF6 (procedure), it is mainly security concerns, given the normal and abnormal operating conditions during the switching and control equipment used in SF6 for the object of the basic knowledge and guidance.

These proposals should ensure that staff as SF6 for the object to secure minimum requirements.

This standard applies to filled with switching and control equipment, industrial pure SF6 gas.

## 2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB 1984 high voltage AC circuit breaker (GB/T 1984-2003, IEC 62271-100, MOD) GB/T 2900.20-1994 Electrotechnical terminology voltage switchgear (IEC 60050, NEQ) GB 7144 cylinders color logo GB/T 8905 sulfur hexafluoride gas in electrical equipment management and testing guidelines (GB/T 8905-1996, IEC 60480, NEQ) GB/T 11022-2011 high-voltage switchgear and control equipment standard common technical requirements (IEC 62271-1:2007, MOD) GB/T 12022 Industrial sulfur hexafluoride (GB/T 12022-2006, IEC 376, IEC 376A, IEC 376B, MOD) GB/T 28537-2012 high-voltage switchgear and control