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

GB/T 26168.1-2018

**Electrical insulating materials -- Determination of the effects of
ionizing radiation -- Part 1: Radiation interaction and dosimetry**

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Foreword

GB/T 26168 "Electrical insulation materials to determine the impact of ionizing radiation" is divided into the following parts.

- Part 1. Radiation interactions and dosimetry;
- Part 2. Irradiation and test procedures;
- Part 3. Application grading system in a radiation environment;
- Part 4. Assessment procedures for aging during operation.

This part is the first part of GB/T 26168.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GB/T 26168.1-2010 "Electrical insulation materials to determine the effects of ionizing radiation - Part 1. Radiation

Use and dosimetry, compared with GB/T 26168.1-2010, the main technical content changes are as follows.

- Revised the normative reference document (see Chapter 2, Chapter 2 of the.2010 edition);
- Amend the "4.1 Radiation Field Assessment" to "4.1 Overview" (see 4.1,.2010 edition 4.1);
- Removed 4.2 and 4.3 (2010 and 4.2 and 4.3);
- 4.3.1.1, 4.3.1.1, 4.3.1.2 and 4.3.2 are sequentially extended to 4.2~4.5 (see 4.2~4.5, 4.3.1 of the.2010 edition)
- 4.3.1.1, 4.3.1.2 and 4.3.2);
- Added "Impact of Radiation Devices on Performance Evaluation of Material Samples" (see Chapter 5);

---Modified the contents of Chapter 5 ~ Chapter 7 (see Chapter 6 ~ Chapter 8, Chapter 5 - Chapter 7 of the.2010 edition);

--- Added Chapter 9, "Monitoring Radiation" (see Chapter 9);

--- Modified Appendix A. Amend "Appendix A Charged Particle Equilibrium Thickness" to "Chemical Reaction of Radiation in Interactions and Dosimeters"

Should be" (see Appendix A, Appendix A of the.2010 edition);

--- Removed Appendix B (see Appendix B of the.2010 edition).

This section uses the translation method equivalent to the use of IEC 60544-1.2013 "Electrical insulation materials to determine the effects of ionizing radiation Part 1.

Radiation Interactions and Dosimetry.

The documents of our country that have a consistent correspondence with the international documents referenced in this part are as follows.

--- GB/T 26168.2-2018 "Electrical insulating materials to determine the effects of ionizing radiation - Part 2. Irradiation and test procedures"

(IEC 60544-2.2013, IDT);

--- GB/T 26168.3-2010 "Electrical insulating materials to determine the effects of ionizing radiation - Part 3

Classification System (IEC 60544-4.2003, IDT).

This part was proposed by China Electrical Equipment Industry Association.

This part is under the jurisdiction of the National Technical Committee for Standardization of Electrical Insulation Materials and Insulation Systems (SAC/TC301).

This section drafted by. Beijing Institute of Electrical and Mechanical Technology, Machinery Industry, Shenzhen Xusheng Sanyi Technology Co., Ltd., Suzhou Taihu Electric

Gongxin Materials Co., Ltd., State Grid Henan Electric Power Company Electric Power Research Institute, Shenzhen Woer Nuclear Materials Co., Ltd., Shanghai Electric

Cable Research Institute Co., Ltd., Jiangsu Shangshang Cable Group Co., Ltd., China Nuclear Power Engineering Co., Ltd., Guilin International Wire and Cable Group Co., Ltd.

Liability Company, Wuxi Jiangnan Cable Co., Ltd., Shanghai Zhizhenghua Polymer Materials Co., Ltd., China Guangdong Nuclear High-tech Nuclear Materials Group Co., Ltd.

Company, Jiangsu Dasheng High Polymer Co., Ltd., Shanghai Keming Transmission Technology Co., Ltd., Shanghai Haoxun Microwave Technology Co., Ltd., China Branch

Shanghai Institute of Applied Physics, Henan Enyi Gaoke Group Co., Ltd.

Introduction

Establishing standards for assessing the radiation resistance of insulating materials is complex because it is related to the conditions of use of the materials. As in the reactor

The operating life of a bent insulated cable in the operation of adding fuel means that the radiation dose can reduce one or more mechanical properties of the cable to the gauge.

The time of the setting. The operating temperature, the composition of the surrounding air, and the time to reach the total dose (dose rate) determine the rate and mechanism of chemical change.

An important factor. In some cases, short-term changes can also become limiting factors.

First, the area of exposure to which the material is exposed and the amount of radiation that is ultimately absorbed can be clarified. Second, according to the specified mechanical properties and electrical properties

Test methods are available to determine radiation degradation and combine these properties with actual requirements to form a suitable grading system.

Electrical insulation determines the effects of ionizing radiation

Part 1. Radiation interactions and dosimetry

1 Scope

This part of GB/T 26168 presents various factors to be considered for evaluating the effects of ionizing radiation on all types of organic insulating materials. needle

For X-rays, gamma rays and electron rays, dosimetry terminology, dose measurement methods, test radiation devices, evaluation and testing are also specified.

Edge material properties, recording the radiation process.

Dosage determination of the location of use of the material is not specified in this section.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

Electrical insulating materials - Determination of effects of ionizing radiation - Part 2. Irradiation and test procedures (Electricalinsu-

latingmaterials-Determinationoftheeffectsofionizingradiationoninsulatingmaterials-Part 2.

Procedures for irradiation and test)

Electrical insulating materials - Determination of effects of ionizing radiation - Part 4.

Grading systems for use in irradiation

(Electrical insulating materials - Determination of the effects of ionizing radiation - Part 4. Classification system for service in radiation environments)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Exposure

The intensity of the illumination that the material is exposed to in the electromagnetic radiation field (X-rays or gamma rays).

Note. The amount of exposure (X) is the quotient of dQ divided by dm, where dQ is the total electron released by photons in the atmosphere of mass dm (negative electron and positive

The absolute amount of total ion charge generated when electrons are completely blocked in the atmosphere. The calculation of the amount of exposure (X) is given by equation (1).

$X =$

dQ

Dm

(1)

The international unit of exposure is Coulomb per kilogram (C/kg), the original unit Roentgen (R). $1R = 2.58 \times 10^{-4} \text{ C/kg}$.

The amount of exposure describes the effect of ionizing radiation from an electromagnetic field on the material when irradiated in a standard reference material, the atmosphere.

3.2

Charge flux electron charge flounce

Q'

The ratio of dQ to dA, dQ is the number of electron charge collisions occurring over area dA over time t.

$Q' =$

dQ