

CCS K 48



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

GB/T 4109-2022

Insulated bushings for alternating voltages above 1 000 V

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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 of Standardization Documents" drafted.

This document replaces GB/T 4109-2008 "Insulation bushings with AC voltage higher than 1000V", compared with GB/T 4109-2008,

In addition to structural adjustments and editorial changes, the main technical changes are as follows.

- Added resin impregnated fiber sleeve (RIS) (see 3.11.1);
 - Include bushings with $U_m \leq 1.1\text{kV}$, $U_m = 1100\text{kV}$ and $U_m = 1200\text{kV}$ (see Table 1);
 - Modify the load tolerance value of the casing cantilever in Table 1 (see Table 1);
 - Increase the temperature rise test and sealing test of the liquid insulating bushing defined in 3.4 (see Table 5);
 - For all capacitive bushings with $U_m \geq 72.5\text{kV}$, the lightning impulse dry withstand test is added to each test (see Table 5);
 - Modified the altitude correction procedure ($>1000\text{m}$) (see 5.2);
 - Added an explanation of the effect of very fast transient (VFT) on casing (see 5.5);
 - In the special test, the visible corona voltage test is added for the porcelain or inorganic material casing (see 7.2.4);
 - The long-term power frequency withstand voltage test is modified to be applicable to all transformer bushings with $U_m \geq 72.5\text{kV}$, and the long-term power frequency withstand voltage test has been modified.
- frequency withstand voltage curve (see 8.3);
- Expanded the scope of application of bushings in the lightning impulse dry withstand voltage test (see 9.3);

--- According to the requirements of relevant standards for transformers, the transformers in the type test and the lightning impulse dry withstand test in the test items are modified

Coefficient of bushing withstand voltage value (see 8.4, 9.3);

---According to the relevant national standards and actual conditions in my country, the insulation withstand level of various products in Table 4 has been modified (see Table 4);

--- Added water content determination (see 9.12) and dissolved gas gas chromatography analysis (see 9.13) in each test item.

This document is modified to adopt IEC 60137.2017 "Insulating Bushings for AC Voltages Above 1000V".

Compared with IEC 60137.2017, this document has many adjustments in structure, and the comparison list of structure number changes between the two documents

See Appendix A.

The technical differences between this document and IEC 60137.2017 and their reasons are as follows.

--- Replaced IEC 60038 with the normatively cited GB/T 156-2017, the degree of consistency between the two documents is modified, because

The voltage level used by my country's power grid is different from IEC ;

--- Replaced IEC 60071-1 with the normatively cited GB/T 311.1-2012, and the degree of consistency between the two documents is revised

change, because the voltage level used by my country's power grid is different from that of IEC ;

--- Replaced IEC 60059 with the normatively cited GB/T 762-2002, and the degree of consistency between the two documents is modified to

The current level used in my country's power grid is different from that of IEC ;

--- Added normative reference document GB/T 1094.1-2013;

--- Added normative reference document GB/T 1094.2-2013;

--- Added normative reference document GB/T 1094.3-2017;

--- Replaced IEC 60076-5 with the normatively cited GB/T 1094.5-2008, and the degree of consistency between the two documents is revised

to adapt to the technical conditions of our country and the actual situation of the power grid;

--- Replaced IEC 60076-7 with the normatively cited GB/T 1094.7-2008, and the degree of consistency between the two documents is revised

to adapt to the technical conditions of our country and the actual situation of the power grid;

---Add normative reference document GB /Z 1094.14-2011;

--- Replaced IEC 60296 with the normatively cited GB 2536-2011, and the degree of consistency between the two documents is modified to suit the

Use our country's technical conditions and the actual situation of the power grid;

--- Added normative reference document GB/T 2900.8-2009;

--- Added normative reference document GB/T 4585;

--- Added normative reference document GB/T 6553-2014;

--- Replaced IEC 60270 with the normatively cited GB/T 7354-2018, the degree of consistency between the two documents is modified, with

Applicable to my country's technical conditions and the actual situation of the power grid;

--- Replaced IEC 60480 with the normatively cited GB/T 8905-2012, the degree of consistency between the two documents is modified, with

Applicable to my country's technical conditions and the actual situation of the power grid;

--- Replaced IEC 62271-1 with the normatively cited GB/T 11022, and the degree of consistency between the two documents is modified to suit the

Use our country's technical conditions and the actual situation of the power grid;

--- Replaced IEC /T RCISPR18-2 with the normatively cited GB/T 11604, and the degree of consistency between the two documents is revised

to adapt to the technical conditions of our country and the actual situation of the power grid;

--- Added normative reference document GB/T 12022;

--- Added normative reference document GB/T 12944-2011;

--- Added normative reference document GB/T 14542-2017;

--- Replaced IEC 60060-1 with the normatively cited GB/T 16927.1, the degree of consistency between the two documents is modified, with

Applicable to my country's technical conditions and the actual situation of the power grid;

---Replace IEC 61462 with the normatively cited GB/T 21429-2008, the degree of consistency between the two documents is modified,

In order to apply to our country's technical conditions and the actual situation of the power grid;

--- Replaced IEC 62217 with the normatively cited GB/T 22079-2019, the degree of

consistency between the two documents is modified,

In order to apply to our country's technical conditions and the actual situation of the power grid;

--- Replaced IEC 62155.2003 with the normatively cited GB/T 23752-2009, and the degree of consistency between the two documents is

Modified to apply to the technical conditions of our country and the actual situation of the power grid;

--- Added normative reference document GB/T 25840-2010;

--- Replaced IEC /T S60815-2 with the normatively cited GB/T 26218.2, the degree of consistency between the two documents is modified,

In order to apply to our country's technical conditions and the actual situation of the power grid;

--- Replaced IEC /T S60815-3 with the normatively cited GB/T 26218.3, the degree of consistency between the two documents is modified,

In order to apply to our country's technical conditions and the actual situation of the power grid;

---Add normative reference document GB 50260-2013;

--- Added normative reference document JB/T 11052-2010;

---Replace IEC 61099 with normatively cited NB/SH/T 09945-2017, and the degree of consistency between the two documents is revised

to adapt to the technical conditions of our country and the actual situation of the power grid;

---According to the actual application of casing products in my country, there is no application of adhesive paper casing products in our country, and the 3.9 adhesive paper casing (RBP) is changed to

Grease-coated casing (LCF) for practical application in my country;

---According to the actual application of casing products in my country, 3.11 resin-impregnated fiber casing (RIS) is changed to impregnated fiber casing, and divided into

3.11.1 Resin Impregnated Fiber Sleeve (RIS) and 3.11.2 Rubber Impregnated Fiber Sleeve (RIF);

--- According to the relevant national standards and the actual situation in my country, the maximum voltage value of the equipment in 4.1 has been modified;