



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

GB/T 3906-2020

**Alternating-current metal-enclosed switchgear and controlgear
for rated voltages above 3.6 kV and up to and including 40.5 kV**

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Table of Contents

Foreword...	6
1 Scope...	12
2 Normative references...	13
3 Terms and definitions...	14
4 Normal and special conditions of use...	25
5 Ratings...	25
5.1 Overview...	25
5.2 Rated voltage (Ur)...	26
5.3 Rated insulation level...	26
5.4 Rated frequency (fr)...	26
5.5 Rated current and temperature rise...	26
5.6 Rated short-time withstand current...	27
5.7 Rated peak withstand current...	27
5.8 Rated short circuit duration...	28

Foreword

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

This standard replaces GB/T 3906-2006 "Alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6 kV and up to and including

40.5 kV". Compared with GB/T 3906-2006, the main technical changes are as follows.

- ADD the terms such as solid-insulation embedded components (see Chapter 3);
- ADD the rating of the internal arc class (IAC), specifying the rated arc fault current and rated arc fault duration (see 5.101);
- ADD rated cable test voltage rating, specifying AC and DC test voltages (see 5.102);
- ADD the requirement that the main circuits in switchgear and controlgear use solid-insulation embedded components (see 6.4);
- ADD the X-ray emission test (see 6.21);

- ADD the requirements for insulation testing of normally produced products every eight years (see 7.1);
- ADD that "For metal-enclosed switchgear and controlgear with air insulation in the compartments and solid-insulation embedded components in the main circuit, if the use conditions in terms of condensation and pollution are stricter than the normal use conditions specified in this standard, it shall be tested in accordance with Appendix E; other types of metal-enclosed switchgear and controlgear may be determined by agreement between the manufacturer and the user" (see 7.2.9);
- ADD the test requirements for switchgear and controlgear with fluid-filled and/or main circuit using solid-insulation embedded components (see 7.2.10);
- CLARIFY the test voltage value and test duration of the cable test circuit (see 7.2.101);
- ADD the test operation requirements for doors or covers, shutters, wrong directions, etc., proposing test requirements for human operating handles, requiring verification of the integrity of other devices and slides that prevent access to the operating interface, proposing supplementary test requirements for motor drive interlocks, providing criteria for all the above tests (see 7.102.2);
- ADD the performance verification test for main circuits using solid-insulation embedded components (see 7.107);
- RE-GRADE equipment operation continuity into four levels LSC1/2/2A/2B, giving examples (see 9.102.3);
- ADJUST the content of 9.103, adding the IAC categories and other contents, adjusting Table 3 of GB/T 3906-2006 into 9.104;
- ADD the ratings for earthing circuits and cable tests (see 9.105, 9.106);
- ADD the environmental impact of the product (see Chapter 13);
- ADD the comparison of chapter number between this standard and IEC 62271-

200.2011 (see Appendix A);

- ADD the electric shock degree of protection of solid-insulation enclosed

switchgear and controlgear (see Appendix C);

- MODIFY Appendix E according to IEC 62271-304;

- ADJUST the maximum allowable partial discharge amount. For metal-enclosed switchgear and controlgear filled with fluid and/or main circuits using solid-insulation embedded components, the maximum allowable partial discharge amount under the test voltage is determined to be 20 pC. For other types of metal-enclosed switchgear and controlgear, the partial discharge measurement test is required to meet the final assembly level of not more than 100 pC (see F.5).

This standard, using the re-drafting method, to modify and adopt IEC 62271-200.2011 "High-voltage switchgear and controlgear - Part 200.AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV".

Compared with IEC 62271-200.2011, this standard has many adjustments in structure. Appendix A lists the comparison list of chapter numbers between this standard and IEC 62271-200.2011.

The technical differences between this standard and IEC 62271-200.2011, as well as their reasons, are as follows.

- Regarding normative references, this standard has made adjustments with technical differences, to adapt to China's technical conditions. The adjustments are reflected in Chapter 2 "Normative references". The specific adjustments are as follows.

- * USE GB/T 1984-2014, which modifies and adopts international standard, to replace IEC 62271-100;

- * USE GB/T 1985-2014, which modifies and adopts international standard, to replace IEC 62271-102;

- * USE GB/T 2900.20-2016, which modifies and adopts international standard, to replace IEC 60050-441.1984;

- * USE GB/T 3804, which modifies and adopts international standard, to replace IEC 62271-103;

- * USE GB/T 4208-2017, which identically adopts international standard, to replace

IEC 60529.1989;

- * USE GB/T 7354, which identically adopts international standard, to replace IEC 60270;

- * USE GB/T 11022-2011, which modifies and adopts international standard, to replace IEC 62271-1.2007;

- * USE GB/T 16926, which modifies and adopts international standard, to replace IEC 62271-105;

- * USE GB/T 16927.1-2011, which modifies and adopts international standard, to replace IEC 60060-1;

- * USE GB/T 20002.4-2015, which modifies and adopts international standard, to replace ISO/IEC Guide 51.2014;

- * USE GB/T 20138, which identically adopts international standard, to replace IEC 62262;

- * DELETE the references to IEC 60050-151, IEC 60470.1999, IEC 62271-201.2006, IEC/TS 62271-304;

- * ADD the references to GB/T 762, GB/T 1408.1-2016, GB/T 2423.1, GB/T 2423.2, GB/T 2423.22, GB/T 8905-2012, GB/T 14808-2016;

- MODIFY the "Scope". Article 1.1 in IEC 62271-200.2011 stipulates 1 kV and above but not more than 52 kV. According to the actual power grid situation in China, it is changed to 3.6 kV ~ 40.5 kV; Article 1.1 in IEC 62271-200.2011 stipulates that the frequency is 60 Hz and below, it is changed into 50 Hz and below in this standard (see Chapter 1);

- ADD the terms, such as "Solid-insulation embedded components" (see Chapter 3);

- ADD the requirement that the main circuits in switchgear and controlgear use solid-insulation embedded components (see 6.4);

- ADD the test requirements for normal production products every eight years (see 7.1);

- ADD that "For metal-enclosed switchgear and controlgear with air insulation in the