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Replacing GB/T 11022-2011

**Common specifications for high-voltage alternating-current
switchgear and controlgear standards**

高压交流开关设备和控制设备标准的共用技术要求

(IEC 62271-1:2017, High-voltage switchgear and controlgear - Part 1: Common
specifications for alternating current switchgear and controlgear, MOD)

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Foreword

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

This Standard replaces GB/T 11022-2011 "Common specifications for high-voltage switchgear and controlgear standards". Compared with GB/T 11022-2011, the main technical changes are as follows:

- Revise the previous Clause 1 "Overview" to Clause 1 "Scope" and Clause 2 "Normative references"; revise the "Scope" (see Clause 1 and Clause 2; Clause 1 of the 2011 edition);
- Add the terms "Internal insulation", "Site pollution severity (SPS) class", "Highest voltage for equipment", "Supply voltage (of auxiliary and control circuits)" and "Thermal time constant" (see Clause 3);
- Adjust "Normal and special service conditions" to Clause 4 (see Clause 4; Clause 2 of the 2011 edition);
- Revise the ambient air temperature range in "Normal service conditions" (see 4.1; 2.2 of the 2011 edition);
- Delete the previous Figure 1 "Altitude correction factor" and the calculation formula (see 2.3.2 of the 2011 edition);
- Add pollution requirements and ambient air temperature range for indoor applications under "Special service conditions" (see 4.2.3 and 4.2.4);
- Revise the wind speed requirements of "Special service conditions"; delete the requirements for ice coating (see 4.2.6; 2.3.6 and 2.3.7 of the 2011 edition);
- Add the description of ratings (see 5.1);
- Add the rated voltage class and rated insulation level applicable to the switchgear of alternator system; add the calculation method of additional voltage in the column (3) and column (5) in Table 1 (see 5.2 and 5.3);
- Modify the insulation level of rated voltage range II (see 5.3; 4.3 of the 2011 edition);
- Change the previous "Rated current" to "Rated continuous current" (see 5.5; 4.5 of the 2011 edition);
- Add the peak factor of rated peak withstand current at different time constants and rated frequencies (see 5.7);
- Add the rated short-circuit duration of 1 s; delete the previous requirements for 4 s

(see 5.8; 4.8 of the 2011 edition);

- Revise the "closing and opening devices and auxiliary and control circuits" in the previous subclause title TO "auxiliary and control circuits"; revise the corresponding content (see 5.9 and 5.10; 4.9 and 4.10 of the 2011 edition);
- Delete the previous requirements for "tolerance", "ripple voltage", "voltage dip and interruption" in rated voltage (see 4.9.3, 4.9.4, and 4.9.5 of the 2011 edition);
- Delete the requirement that the diameter of fastening screws and bolts shall not be less than 12 mm in "Earthing of switchgear and controlgear" (see 5.3 of the 2011 edition);
- Add the normal operation of electrical circuits (see 6.4.1);
- Delete the previous requirements for the enclosure of "Auxiliary and control equipment" (see 5.4.2 of the 2011 edition);
- Revise the requirements for "Protection against electric shock" (see 6.4.2; 5.4.3 of the 2011 edition);
- Delete the content of "Fire hazard" (5.4.4 of the 2011 edition);
- Add the requirements for "Manually operated actuators" (see 6.8);
- Revise the previous "Low- and high-pressure interlocking and monitoring devices" TO "Pressure/level indication" and revise the requirements (see 6.10; 5.9 of the 2011 edition);
- Revise the "Nameplates" requirements; add Table 9 (see 6.11; 5.10 of the 2011 edition);
- Delete the content of the protection class of "Protection against mechanical impact on equipment under normal service conditions (IK coding)" (Table 7 of 5.13.4 of the 2011 edition);
- Modify the requirements for the maximum permissible values of relative leakage rate of "Closed pressure systems for gas" (see 6.16.3; 5.15.3 of the 2011 edition);
- Delete the tightness requirements for liquid controllable pressure systems and liquid closed pressure systems (see 5.16.2 and 5.16.3 of the 2011 edition);
- Add "Filling pressure/levels for insulation and/or switching and operation" (see 6.22);
- Delete the relevant type test requirements for transfer and off-site production [see 6.1.1b) of the 2011 edition];

- Delete the requirements for grouping and quantity of test objects for type tests (see 6.1.2 of the 2011 edition);
- Add the requirement that "The type test report for performance verification shall be used together with the original type test report" [see 7.1.1c)];
- Add the requirements of a statement that the test object complies with the drawings submitted and of the location, laboratory name where the tests were conducted and date of test in "Information to be included in type-test reports" (see 7.1.3; 6.1.4 of the 2011 edition);
- Revise the test criteria of 7.2.5b) (see 6.2.5 of the 2011 edition);
- Add the requirements for the polarity of test voltage treatment; add the description of the symbols used in Tables 10 to 13 (see 7.2.6 and the notes in Tables 10 to 13);
- Modify the voltage value applied to the terminals on both sides in the preferred method (see 7.2.7.2; 6.2.7.2 of the 2011 edition);
- Revise the requirements for the distribution of test voltage for insulation between poles in switching impulse voltage tests (see 7.2.8.3; 6.2.8.3 of the 2011 edition);
- Modify the applicable scope of radio interference voltage test (see 7.3; 6.3 of the 2011 edition);
- Add the electrical continuity of earthed metallic parts test AND the resistance measurement of contacts and connections in the main circuit as a condition check (see 7.4.3 and 7.4.4);
- Change the previous "Temperature-rise tests" to "Continuous current tests"; incorporate the previous "Temperature rise" content (see 7.5; 4.5.2 and 6.5 of the 2011 edition);
- Revise the rated current value of switchgear and controlgear for which "the tests may be made with the three poles connected in series" in the continuous current test (see 7.5.2; 6.5.2 of the 2011 edition);
- Introduce "OG" (oxidizing gas) and "NOG" (not oxidizing gas) to replace the previous "air" and "SF₆" respectively (see Table 14 of 7.5.5.1; Table 3 in 4.5.2 of the 2011 edition);
- Revise the temperature rise/temperature limits of parts in Tables 1, 2, and 4 (see Table 14 of 7.5.5.1; Table 3 in 4.5.2 of the 2011 edition);
- Add accessible surface categories and their corresponding permissible temperature rise/temperature limits (see Table 14 of 7.5.5.1);
- Add the standard ambient air temperature value during tightness tests; give the

Common specifications for high-voltage alternating-current switchgear and controlgear standards

1 Scope

This Standard specifies the terms and definitions, service conditions, ratings, design and construction, type tests, and routine tests requirements of high-voltage alternating-current switchgear and controlgear.

This Standard applies to AC switchgear and controlgear designed for indoor or outdoor installation and for operation in power systems at service frequencies up to and including 50 Hz and having voltages at or above 3 kV.

This Standard applies to all high-voltage AC switchgear and controlgear except as otherwise specified in the relevant product standards for the particular type of switchgear and controlgear.

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 3.6 kV and above. In practical applications, the rated voltage range of medium-voltage switchgear is usually 3.6 kV~63 kV; the rated voltage range of high-voltage switchgear is 72.5 kV~252 kV; the rated voltage range of extra-high-voltage switchgear is 363 kV~800 kV; the rated voltage range of ultra-high-voltage switchgear is 1100 kV and above.

Note 2: High-voltage AC switchgear and controlgear with a rated frequency of 60 Hz may refer to this Standard.

Note 3: The high-voltage AC switchgear and controlgear used in the power supply and distribution system of electrified railways may refer to this Standard.

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 156-2017 Standard voltages (IEC 60038:2009, MOD)

GB/T 311.1-2012 Insulation co-ordination - Part 1: Definitions, principles and rules (IEC 60071-1:2006, MOD)

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