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

GB/T 29312-2012

**Low-voltage reactive power compensation switchgear
component**

(English Translation)

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1 Scope

This standard specifies terms and definitions, technical and test requirements for low-voltage reactive power compensation switchgear components.

This standard applies to low-voltage reactive power compensation switchgear components (hereinafter referred to as switchgear components), which have a rated AC voltage not exceeding 1000 (or 1140) V and a frequency not exceeding 1000 Hz.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document;

for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 5169.10 Fire hazard testing for electric and electronic products - Part 10.

Glow/hot-wire based test methods - Glow-wire apparatus and common test procedure (GB/T 5169.10-2006, IEC 60695-2-10.2000, IDT)

GB/T 5169.11 Fire hazard testing for electric and electronic products - Part 11.

Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products (GB/T 5169.11-2006, IEC 60695-2-11.2000, IDT)

GB/T 5169.12 Fire hazard testing for electric and electronic products - Part 12.

Glowing/hot-wire based test methods - Glow-wire flammability test method for materials (GB/T 5169.12-2006, IEC 60695-2-12.2000, IDT)

GB/T 5169.13 Fire hazard testing for electric and electronic products - Part 13.

Glowing/hot-wire based test methods - Glow-wire ignitability test method for materials

GB 7251.1-2005 Low-voltage switchgear and controlgear assemblies - Part 1.

Type-tested and partially type-tested assemblies (IEC 60439-1.1999, IDT)

GB/T 10233-2005 Basic testing method for low-voltage switchgear and controlgear assemblies

GB/T 15576-2008 Low-voltage reactive power compensation assemblies

The lower limit of the ambient air temperature is -5 °C.

5.1.1.2 Ambient air temperature of outdoor switchgear component

The ambient air temperature does not exceed +40 °C; its average temperature does not exceed +35 °C, in the 24 h period.

The lower limit of the ambient air temperature is -25 °C.

5.1.2.1 Atmospheric conditions for indoor switchgear components

The air is clean; the relative humidity shall not exceed 50%, when the maximum temperature is +40 °C. At lower temperatures, greater relative humidity is allowed. For example. The relative humidity is 90%, at +20 °C. However, it shall be considered that due to temperature changes, moderate condensation may occasionally occur.

5.1.2.2 Atmospheric conditions for outdoor switchgear components

When the maximum temperature is +25 °C, the relative humidity can be as high as 100%, for a short time.

5.1.3 Pollution level

The switchgear component shall be able to be used in an environment of pollution level

3. Other pollution levels can be considered, based on special applications or micro-environments.

5.1.4 Altitude

The altitude of the installation site shall not exceed 2000 m.

Note: For use at an altitude higher than 2000 m, it shall consider the reduction of the dielectric

strength and the reduction of the air cooling effect.

5.2 Special conditions of use

5.2.1

If it is used under the conditions of use, that do not meet the requirements of 5.1, it shall comply with the applicable special requirements standard or a special agreement, which is signed between the manufacturer and the user.

5.2.2

The manufacturer shall consider that when the switchgear component is used in the system with harmonics, the working current of the capacitor will increase; when the harmonic is serious, it may cause the zero-crossing detection error of the switching actions of the semiconductor electronic switch and the compound switch, thereby increasing the transient inrush current.

The manufacturer shall consider stating it in the conditions of use; if necessary, sign a special agreement, between the manufacturer and the user.

5.3 Transportation and storage conditions

If the conditions of transportation and storage are inconsistent with those specified in 5.1, a special agreement shall be signed, between the user and the manufacturer.

Unless otherwise specified, the temperature range between -25 °C and +55 °C is applicable for transportation and storage. In a short time (not more than 24 h), it can reach +70 °C.

After the switchgear component has been subjected to the above-mentioned high temperature, when it is not in operation, it shall not suffer any irreversible damage, AND shall work normally, under the specified conditions.

6.1 Appearance and structure

6.1.1

The shell of the switchgear component shall have sufficient mechanical strength, to withstand the mechanical force, that may be encountered during use or handling.

When the shell is made of non-rust-proof metal material, the inner and outer surfaces of the shell shall be coated. The coating layer shall be uniform and beautiful, with firm adhesion. When using a non-metallic shell, it shall use the flame-retardant materials.

6.1.2

The metal fasteners or metal supports, which are used in the switchgear component, shall be properly coated. The coating shall have firm adhesion; there shall be no peeling or peeling off.

6.1.3

The structural design of the switchgear component shall be beautiful in appearance, easy to maintain, install and debug. Circuit arrangement, component selection and structural design shall ensure the anti-interference performance of the switchgear component.

6.1.4

The fasteners used shall ensure that they will not be loosened or displaced, due to vibration under normal use conditions.

6.1.5

The insulated wires of the main circuit of the switchgear component shall be connected to the electrical components, by cold crimping terminals. The coordination between the cold crimping terminal and the insulated wire AND the quality of the crimping shall comply with the relevant standards.

6.2 Selection of components and accessories

All independent electrical components and accessories, which are installed in the

6.5.3.1 Test conditions.

Main circuit test voltage. Rated frequency, rated voltage $U_n \pm 5\%$;

Main circuit's test current (capacitive). Rated current $I_n \pm 5\%$.

6.5.3.2 At the moment when the controlled capacitor of the electromechanical

switchgear component is put into use, the peak inrush current, which is generated in the capacitor branch, shall be less than 50 times the rated current of the capacitor.

6.5.3.3 When the controlled capacitor of the semiconductor switchgear component and

the compound switchgear component is put into use, the peak value of transient inrush current, which is generated in the branch circuit of the capacitor, shall be less than 3 times the rated current of the capacitor.