

ICS 31.060.70

CCS K 42



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

GB/T 11024-1989

**Shunt capacitors for a.c. power systems having a rated voltage
above 1 000 V -- Part 1: General
(English Translation)**

Issued on: March 25, 2019

Implemented on: October 1, 2019

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

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Foreword

GB/T 11024 "Parallel capacitors for AC power systems with a nominal voltage above 1000V" is divided into four parts.

--- Part 1. General;

--- Part 2. Aging test;

--- Part 3. Protection of shunt capacitors and shunt capacitor banks;

--- Part 4. Internal fuses.

This part is the first part of GB/T 11024.

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

This part replaces GB/T 11024.1-2010 "Parallel capacitors for AC power systems with a nominal voltage of 1000V or higher" Points. General Principles, compared with GB/T 11024.1-2010, the main technical content changes are as follows.

---According to China's specific situation, the discharge device outside the capacitor usually uses a discharge coil, so it has been added in the terminology and definition chapter.

The terminology and definition of "discharge coil" (see Chapter 3);

--- Because the overvoltage test has been added to the type test project, the "test unit" and the "comparable element" have been added to the terminology and definition chapter.

Three related terms and definitions, such as "design" and "inter-element insulation" (see Chapter 3);

--- According to the specific circumstances of our country, the test of the external fuses used in capacitors in the type test project was deleted (in the case of device test) Carry out" (see 6.3, 6.2 of 2010 edition);

--- In order to clarify the coverage of the type test, at the end of the type test clause, add a sentence "Type test can cover certain Range of capacitor design, coverage rules as specified in 6.4 of DL/T 840-2016" (see 6.3);

- Replace the term "durability test" with "aging test" and reinterpret it (see 6.5.1, 6.4 of 2010 edition);
 - Add a "tolerance blasting energy test" in the special test, and interpret it; correspondingly delete the "C.4.2 capacitor" in Appendix C the type test of the casing is under consideration" (see 6.5.2 and C.4.2, 2010 editions 6.4 and C.4.2);
 - In the three-phase capacitor unit, the ratio of the maximum value to the minimum value of the capacitance measured between any two line terminals is specified to be smaller Within the scope (see 7.2, 7.2 of the 2010 edition);
 - The AC test voltage and DC test voltage between terminals are modified according to IEC (see Chapter 9, Chapter 9 of the 2010 edition);
 - Modified the qualification criteria for the thermal stability test (see Chapter 13, Chapter 13 of the 2010 edition);
 - Deleted the test method for the positive impact of the capacitor unit in the lightning impulse voltage test between the terminal and the outer casing (see 15.2, Chapter 16 of the 2010 edition);
 - The overvoltage test is included as a type test item in this section. With the overvoltage cycle test in GB/T 11024.2-2001 Compared with the test method, the test procedure, the number of times of daily application and the total number of times applied by the overvoltage combination have been modified and added Test item for applying voltage (see Chapter 16, GB/T 11024.2-2001 version 2.1.3.1);
 - Deleted the provisions of the "Inter-terminal voltage test of the unit within 5 min after the test" in the short-circuit discharge test (see Chapter 17 of the 2010 edition);
 - Modified the standard insulation level according to GB/T 311.1-2012, and added the system nominal voltage of 750kV and 1000kV Standard insulation level (see 18.1, 18.1 of the 2010 edition);
 - For the installation of equipment above 1000m above sea level, an altitude correction factor for determining the outer insulation performance is proposed (see 18.2.1, 27.8.1) of the 2010 edition;
 - Considering that the capacitor bank has different neutral grounding methods, when the capacitor fails and is disconnected from the power supply, the capacitor may the overvoltage is different, so the current carrying of the discharge circuit should be discharged under the corresponding different overvoltage peaks.
- Requirements for competence (see Chapter 21, Chapter 21 of the 2010 edition);
- In order to improve safety and security, it is added that "the resonant current generated by the capacitor bank in the no-load state of the transformer should be avoided." Container" (see 27.6.1);

- Because the main content of 27.7.2 is the performance of the circuit breaker, the original title of the circuit breaker "no heavy breakdown" is changed to "circuit breaker" Performance" and modify the content accordingly (see 27.7.2, 27.7.2 of the 2010 edition);
- Increased the recommended value of the specific creepage ratio selection (see 27.9.1);
- Revised the data in Table 7 "Relationship between standard lightning impulse withstand voltage and minimum air distance" (see 27.9.2, 2010) Version 27.9.2);
- In order to improve safety and security, at the end of C.3, "the fuse should not be severely broken when it is opened"; at the end of C.5.1 Add "Because the structural parts of the fuse are prone to aging and corrosion, it is necessary to replace the fuses whose parts have been rusted and the tail line has been loosened, so as to avoid Heavy breakdown due to poor breaking performance, resulting in an expansion accident" (see C.3 and C.5.1);
- The original inrush current calculation formula does not take into account the influence of the power supply. It is only suitable for the case where the capacitor bank is not connected in series with the series reactor, so GB 50227-2017 has been revised (see D.4, 2010 edition of D.4);
- Add a paragraph at the end of Appendix E.2. "Capacitors with internal fuses, it is not recommended to use external fuses at the same time" (see appendix E.2);
- Because the overvoltage test is included in this part as a type test item, an informative appendix "Component and Capacitor Housing" has been added.

Definition of dimensions" (see Appendix F).

This section uses the redrafting method to modify the use of IEC 60871-1:2014 "parallel voltage 1000V or more AC power system parallel Capacitor Part 1. General.

This section has a small amount of structural adjustment compared to IEC 60871-1:2014, and the international standard term 3.9 is adjusted to this part.

3.12; 3.10~3.12 is adjusted to 3.9~3.11 of this part; 3.22 is adjusted to 3.26 of this part.

The technical differences between this part and IEC 60871-1:2014 and their reasons are as follows.

---About the normative reference documents, this part has made technical adjustments to adapt to China's technical conditions, adjustments the situation is reflected in Chapter 2, "Regulatory Citations", and the specific adjustments are as follows.

- Replace IEC 60871-4:1996 with GB/T 11024.4-2019 modified to international standards (see Chapter 1, Section Chapter 6, Chapter 7 and Appendix E);
- Replace IEC 60549 with GB/T 15166.4 modified to international standards (see Appendix C and Appendix E);

- Replace IEC 60060-1 with GB/T 16927.1-2011 modified to international standards (see 5.2 and Chapter 15);
- Replace IEC/T S60815 (all parts) with GB/T 26218 (all parts) modified to international standards, two the degree of consistency between the various parts of the standard is as follows.
 - GB/T 26218.1 Selection and sizing of high-voltage insulators for use under filthy conditions - Part 1. Definitions, Information and general principles (GB/T 26218.1-2010, IEC/T S60815-1.2008, MOD);
 - GB/T 26218.2 Selection and sizing of high-voltage insulators for use under filth conditions - Part 2.
Use porcelain and glass insulators (GB/T 26218.2-2010, IEC/T S60815-2.2008, MOD) (see 27.9.1);
 - GB/T 26218.3 Selection and sizing of high-voltage insulators for use under s Composite insulators (GB/T 26218.3-2011, IEC/T S60815-3.2008, MOD) (see 27.9.1);
- Increased references to GB/T 1984 and DL/T 840-2016;
- According to the need, in Chapter 3, four phases such as "discharge coil", "test unit", "comparable component design" and "inter-element insulation" were added.
Terms and definitions (see 3.22~3.25);
- Added in 5.2 "Test Conditions" "The waveform and deviation of the test voltage shall comply with 6.2.1 of GB/T 16927.1-2011" Claim";
- In order to clarify the coverage of the type test, at the end of the 6.3 "type test" clause added "type test can cover certain Range of capacitor design, coverage rules as specified in 6.4 of DL/T 840-2016";
- According to the specific situation of China, a "tolerance of blasting energy test" was added to the 6.5 "special test", and the corresponding deletion was the relevant content of "C.4.2 Type test of capacitor casing is under consideration" in Appendix C;
- According to the specific situation of China, the allowable value of the capacitance deviation of the capacitor bank in Chapter 7 is in accordance with 3Mvar and below, 3Mvar it has been separately stipulated to be consistent with GB/T 30841-2014;
- According to the specific situation of China, the capacitor loss tangent (tan delta) in Chapter 8 is limited, and will be in Chapter 8 the contents of the fuse loss are placed in Appendix C;
- The content of the standard insulation level expressed in Tables 3 and 4 of IEC 60871-1 does not conform to China's national conditions, so it is deleted.