



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

GB/T 4787.1-2021

**Grading capacitors for high-voltage alternating current
circuit-breakers - Part 1: General**

Issued on: May 21, 2021

Implemented on: December 1, 2021

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

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Abbreviations and symbols	5
5 Normal and special conditions of use	6
6 Rating	7
7 Design and structure	8
8 Type test	9
9 Routine test	15
10 Rules for transportation, storage, installation, operation and maintenance	16
11 Security	17
12 Environmental aspects	18
Appendix A (informative) Structural changes of this document compared with IEC 62146-1.2016	19
Appendix B (informative) Technical differences between this document and IEC 62146-1.2016 and their reasons	23
Appendix C (Informative) Corrosion. Information about the conditions of use and recommended test requirements	25
Appendix D (informative) Self-resonant frequency measurement	26
Appendix E (informative) Summary of test items	27
References	29
Figure 1 Insulation type test	10
Figure 2 Insulation routine test	15
Figure D.1 Self-resonant frequency measurement record (see 8.7) Example	26
Table 1 Standard insulation level	7
Table 2 Partial discharge measurement voltage and allowable value	12
Table A.1 Comparison between this document and IEC 62146-1.2016 chapter number ...	19
Table B.1 Technical differences between this document and IEC 62146-1.2016 and their reasons	23

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"
Drafting.

This document is the first part of GB/T 4787 "Voltage Equalizing Capacitors for High Voltage AC Circuit Breakers". GB/T 4787 has released the following section.

---Part 1. General Provisions.

This document replaces GB/T 4787-2010 "Voltage Equalizing Capacitors for High-Voltage AC Circuit Breakers". Compared with GB/T 4787-2010, except for

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

--- Deleted "this standard does not apply to high-voltage ceramic capacitors" in the scope chapter (see Chapter 1 of the 2010 edition), and added GIS

Related content and requirements for mounted capacitors (see Chapter 1);

--- Changed the normative reference documents (see Chapter 2, Chapter 2 of the 2010 edition);

--- 20 terms such as "arc distance" have been added (see Chapter 3);

--- The optimal value of the highest temperature around the GIS built-in capacitor has been added (see 5.2.1);

--- Added "mechanical stress and vibration" (see 5.2.3);

--- Added "Additional Use Conditions for GIS Built-in Capacitors" (see 5.2.4);

--- Added "Earthquake" (see 5.3.2);

--- Added the calculation formula of "capacitor rated voltage" (see 6.1);

--- The standard value of rated frequency "50Hz and 60Hz" has been added (see 6.3);

--- The capacitance deviation is specified according to the product category (see 7.1);

--- Added "Minimum withstand value of mechanical bending load" and calculation formula (see 7.4);

--- Added "Requirements for Capacitor Enclosed Medium" (see 7.5);

--- Deleted the "discharge test" in the type test (see Chapter 7 of the 2010 edition), and added the "radio interference voltage (RIV) test"

"Test" "Self-resonance frequency measurement" and "Tightness test of GIS built-in capacitors" (see 8.6, 8.7, 8.10);

---Changed the test procedure, measured voltage and allowable partial discharge level for partial discharge measurement (see 8.4.4, 7.3.8 in.2010 edition);

--- Change "Lightning impulse withstand voltage test" to "Lightning and impulse chopping voltage test", and change the test judgment standard to "Rated

The capacitance, tandelta and partial discharge of the voltage measurement unit are verified" (see 8.4.6, 7.3.6.1 of the.2010 edition);

---The test judgment standard of "power frequency voltage test" is changed to "to verify by measuring the capacitance, tandelta and partial discharge of the unit with rated voltage"

(See 8.4.7, 7.3.5.1 of the.2010 edition);

--- "2h power frequency withstand voltage test" is changed to "voltage test under low temperature and high temperature" (see 8.5, 7.3.5 in.2010 edition);

---The name of "mechanical strength test" is changed to "mechanical bending test", and the calculation formula of test force is given (see 8.8,.2010 edition

7.3.9);

---Changed the method and technical requirements of the leak test in the type test item (see 8.9, 7.3.2 of the.2010 edition);

--- Deleted the "discharge test" in the routine test project (see 7.3.7 of the.2010 edition), and added GIS built-in capacitor seal

Sexual test requirements (see 9.6.3);

---Changed the test method and technical requirements of the leak test in the routine test project (see 9.6, 9.6 of the.2010 edition);

--- Added "Transportation, Storage, Installation, Operation and Maintenance Rules" (see Chapter 10);

---Change the "safety" technical requirements (see Chapter 11, Chapter 9 of the.2010 edition);

---Changed the "environmental aspects" technical requirements (see Chapter 10,.2010 edition of 9.2).

This document uses the redrafting method to modify and adopt IEC 62146-1.2016 ``Voltage equalizing capacitors for high-voltage AC circuit breakers-Part 1.

General Provisions.

Compared with IEC 62146-1.2016, this document has structural adjustments. Appendix A lists this document and IEC 62146-1.2016

The comparison list of the chapter number comparison.

Compared with IEC 62146-1.2016, this document has technical differences, and the clauses related to these differences have been passed on the outer margins.

The vertical single line (I) of the position is marked, and a list of the corresponding technical differences and their reasons is given in Appendix B.

This document has made the following editorial changes.

---In accordance with the requirements of GB/T 1.1-2020, the compilation of the "Scope" chapter was standardized;

---Adjusted references.

Introduction

IEC /TC33 is formulating IEC 62146-2 "Voltage Equalizing Capacitors for High Voltage AC Circuit Breakers Part 2. TRV Capacitors". for

In order to better adopt international standards, the National Power Capacitor Standardization Technical Committee (SAC/TC45) decided after research that the high-voltage AC circuit breaker

The voltage equalizing capacitor GB/T 4787 is intended to be composed of the following two parts.

---Part 1. General Provisions;

---Part 2. TRV capacitors.

Voltage equalizing capacitor for high voltage AC circuit breaker

Part 1. General Provisions

1 Scope

This document specifies the use conditions, ratings, design and structure, testing, transportation, storage, and safety of voltage equalizing capacitors for high-voltage AC circuit breakers.

Installation, operation and maintenance rules, safety, and environmental aspects.

This document applies to voltage equalizing capacitors connected in parallel with the breaker of the circuit breaker. Its function is to improve the two extinguishing chamber units of the multi-fracture circuit breaker.

Terminal voltage distribution.

The equalizing capacitor can also be used in parallel with the arc extinguishing chamber unit on the single-break circuit breaker to suppress the transient recovery voltage (TRV).