



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

GB/T 20833.1-2021

**Rotating electrical machines - The winding insulation - Part 1:
Off-line partial discharge measurements**

Issued on: March 9, 2021

Implemented on: October 1, 2021

Issued by: SAMR; SAC

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Foreword

GB/T 20833 Rotating Electrical Machines - The Winding Insulation can be divided into the following 4 parts:

- Part 1: Off-Line Partial Discharge Measurements;
- Part 2: On-Line Partial Discharge Measurements;
- Part 3: Dielectric Dissipation Factor Measurement;
- Part 4: Measurement of Insulation Resistance Polarization Index.

This Part is Part 1 of GB/T 20833.

This Part was drafted as per the rules stipulated in GB/T 1.1-2009.

This Part replaced GB/T 20833.1-2016 Rotating Electrical Machines - The Stator Winding Insulation of Rotating Electrical Machines - Part 1: Off-Line Partial Discharge Measurements.

Compared with GB/T 20833.1-2016, the major technical changes of this Part are as follows:

- Modify the Scope of the standard and Normative References (see Clause 1 and Clause 2

of this Edition; Clause 1 and Clause 2 of the 2016 Edition);

--- Add Terms and Definitions (see Clause 3 of this Edition);

--- Modify the nature of partial discharge in the motor (see Clause 4 of this Edition; Clause

4 of the 2016 Edition);

--- Modify the impact of measuring instruments (see 5.4 of this Edition; 5.4 of the 2016 Edition);

--- Modify the minimum range of partial discharge data expression (see 6.2 of this Edition;

6.2 of the 2016 Edition);

--- Add calibration pulse level and tolerance (see 7.1 of this Edition);

--- Modify the standard measurement (see 7.3.2 and 7.3.3 of this Edition; 7.3.2 of the 2016 Edition);

--- Add the use of integrated test equipment (see 7.3.4 of this Edition);

--- Modify the partial discharge measurement of windings and winding components (see 9.1 of this Edition; 9.1 of the 2016 Edition);

--- Delete the electromagnetic probe (see 9.2.2 of the 2016 Edition);

--- Modified the evaluation of test results (see 10.1, 10.2.1 and 10.3.1 of this Edition; 10.1,

10.2.1 and 10.3.1 of the 2016 Edition);

--- Delete the annex of on-line partial discharge measurement (see Annex A of the 2016 Edition);

--- Add the influence of the test frequency parameter on the test process (see Annex A of this Edition);

--- Add other methods for determining the amplitude of partial discharge (see Annex B of this Edition);

--- Modify the method of off-line partial discharge detection and off-line location (see Annex C of this Edition, Annex B of the 2016 Edition);

--- Add interpretation of partial discharge measurement and induction discharge/vibration spark from terminal and star-connected neutral point (see Annex D of this Edition);

- Add the complete winding measurement connection circuit (see Annex G of this Edition);
- Modify the broadband and narrowband systems (see Annex H, 5.4 of the 2016 Edition).

This Part used translation method to equivalently adopt IEC 60034-27-1:2017 Rotating Electrical Machines - Part 27-1: Off-Line Partial Discharge Measurements on the Winding Insulation.

The Chinese documents that have consistent correspondence with the international documents

cited in this part are as follows:

- GB/T 7354-2018 High-voltage test techniques - Partial discharge measurements (IEC 60270-2000, MOD);
- GB/T 16927.1-2011 High-voltage test techniques-Part 1: General definitions and test requirements (IEC 60060-1:2010, MOD);
- GB/T 16927.2-2013 High-voltage test techniques - Part 2: Measuring systems (IEC 60060-2:2010, MOD);
- GB/T 17948.4-2016 Rotating electrical machines - Functional evaluation of insulation systems - Test procedures for form-wound windings - Evaluation by electrical endurance (IEC 60034-18-32:2010, IDT);
- GB/T 22720.2-2019 Rotating electrical machines - Qualification tests for the partial discharge resistant electrical insulation systems (Type II) used in rotating electrical machines fed from voltage converters (IEC 60034-18-42:2017, IDT);
- GB/T 20833.2-2016 Rotating electrical machines - The stator winding insulation of Rotating Electrical Machines - The Winding Insulation - Part 1: Off-Line Partial Discharge Measurements

1 Scope

This Part of GB/T 20833 provides a common basis with respect to partial discharge off-line measurements on the winding insulation of rotating electrical machines:

- measuring techniques and instruments;
- the arrangement of test circuits;

- normalization and testing procedures;
- noise reduction;
- the documentation of test results;
- the interpretation of test results.

The measurement methods described in this document are applicable to stator windings of machines with or without conductive slot coating and to the stator windings of machines made

with form wound or random wound windings. In special cases like high voltage rotor field windings, this document is applicable as well. The measurement methods are applicable when

testing with alternating sinusoidal voltages from 0.1 Hz up to 400 Hz; see Annex A.

Interpretation guidelines are given in this document and are applicable only if all the following

requirements are fulfilled:

- Measurements performed with power frequency of 50 Hz or 60 Hz, or when testing with power supply within a frequency range of 45 Hz to 65 Hz.
- Form wound windings and winding components such as bars and coils.
- Winding with conductive slot coating. This is usually valid for machines with voltage rating of 6 kV and higher.

For machines with random wound windings, form-wound windings without conductive slot coating, and testing at frequencies differing from power frequencies, the interpretation guidelines are not applicable. The testing procedures for off-line PD-measurements of this document can be used for assessing the uniform quality of manufacturing or/and the trending

of these kind of windings as well as converter driven machine windings.

NOTE: Testing of low voltage machines with so called Type I insulation systems is defined in IEC 60034-

18-41. Testing procedures for qualification of converter driven high voltage machines with so called Type

II insulation systems are dealt with in IEC 60034-18-42 (in addition to the optional electric tests described