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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/Z 20833.5-2023

Rotating electrical machines - The winding insulation - Part 5: Off-line measurement of partial discharge inception voltage under repetitive impulse voltage

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1.Structure and Drafting Rules of Standardization Documents"

Drafting.

This document is Part 5 of GB/T (Z) 20833 "Rotating Electric Machine Winding Insulation". GB/T (Z)20833 has issued the following

part.

---Part 1.Offline partial discharge measurement (GB/T 20833.1);

---Part 2.Online partial discharge measurement (GB/T 20833.2);

---Part 3.Dielectric loss factor measurement (GB/T 20833.3);

---Part 4.Insulation resistance and polarization index measurement (GB/T 20833.4);

---Part 5.Offline measurement of partial discharge onset voltage under repeated impulse voltages (GB /Z 20833.5).

This document is equivalent to IEC TS60034-27-5.2021 "Rotating electrical machines Part 27-5.Partial discharge initiation under repeated impulse voltages"

"Offline Measurement of Initial Voltage", the file type was adjusted from IEC technical specifications to my country's guiding technical documents.

This document has made the following minimal editorial changes.

---In order to coordinate with the existing standards, the name of the standard is changed to "Insulation of rotating electrical machine windings - Part 5.Partial stress under repeated impulse voltages"

Offline measurement of discharge onset voltage.

Please note that some content in this document may be subject to patents. The publisher of

this document assumes no responsibility for identifying patents.

Introduction

In recent years, with the development of power electronics technology, various power transmission systems (PDS) of variable frequency speed-regulated motors have emerged.

IEC TS60034-25[1] introduces the new impact of PDS on rotating electrical machines. The document states that due to the rapid duplication of power devices in PDS

Switching, the electrical insulation of the motor windings will be affected by high-frequency surge voltages. The severity of the shock depends on the frequency converter and motor ratings

values, converter topology, cable length between motor and converter, filtering, etc.

IEC 60034-18-41[2] was released in.2014 and is the first to describe Type I (without partial localization) used in inverter-powered rotating electrical machines.

International standard for design qualification and type testing of electrical) insulation systems. In this document, the use of power frequency or impulse power sources for two types of partial discharges is required.

Electrical (PD) test. For partial discharge measurements under impact, IEC 60034-18-41 refers to IEC TS61934, which provides the usual technical

Technical explanation and several partial discharge measurement methods. For practical testing guidance on the insulation of rotating electrical machine windings, this document is provided as a repeatable shock bar

It is compiled by offline measurement of partial discharge onset voltage RPDIV and extinction voltage RPDEV under the condition.

GB/T (Z) 20833 provides functional evaluation and special test procedures for the insulation of rotating electrical machine windings, and is intended to be composed of 5 parts.

---Part 1.Offline partial discharge measurements. The purpose is to specify a general basis for offline partial discharge measurements on the insulation of rotating electrical machine windings.

basic specifications. Including. measurement methods and instruments, test loop layout, standardization of test procedures, noise reduction, test results

Document preparation and evaluation of test results.

---Part 2.Online partial discharge measurement. The purpose is to stipulate the rated voltage of 3kV and above, no frequency converter power supply rotating power

Online measurement of partial discharge of machine stator winding insulation, including.

measurement technology and instruments, test circuit layout, standardization and sensitivity

Assessment, measurement procedures, noise reduction, documentation of test results, evaluation of test results.

---Part 3.Dielectric loss factor measurement. The purpose is to establish that under power frequency AC voltage, the rated voltage is 6kV and above.

Necessary conditions for dielectric loss factor measurement of the single formed stator bar and coil of the motor.

---Part 4.Insulation resistance and polarization index measurement. The purpose is to stipulate that it is applicable to low-voltage,

Minimum recommended values for insulation resistance and polarization index of windings of high-voltage AC and DC rotating electrical machines.

---Part 5.Offline measurement of partial discharge onset voltage under repeated impulse voltages. The purpose is to stipulate that it is suitable for voltage type frequency conversion

Off-line measurement method of partial discharge onset and extinction voltages of winding insulation of rotating electrical machines powered by a device under repeated impulse voltages.

Insulation of rotating electrical machine windings Part 5.Repeated shocks

Offline measurement of partial discharge onset voltage under voltage

1 Scope

This document specifies the offline measurement method of partial discharge onset and extinction voltage of winding insulation under repeated impulse voltages.

This document applies to rotating electrical machines powered by voltage-type frequency converters.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations

For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to

this document.

GB/T 23642-2017 Partial discharge (PD) voltage of electrical insulating materials and systems under conditions of instantaneous rise and repeated voltage surges

Gas measurement (IEC TS61934.2011, IDT)

Note. GB/T 20833.1-2021 Rotating electrical machine winding insulation Part 1.Offline partial discharge measurement (IEC 60034-27-1.2017, IDT)

IEC TS61934 Electrical testing of partial discharge (PD) on electrical insulating materials and systems under conditions of transient rise and repeated voltage surges

Note. GB/T 42287-2022 High voltage test technology electromagnetic and acoustic method for measuring partial discharge (IEC TS62478.2016, IDT)

3 Terms and definitions

The terms and definitions defined in IEC 60034-27-1, IEC TS61934 and the following apply to this document.

ISO and IEC maintain terminology databases used for standardization at.

3.1

Partial discharge partialdischarge; PD

An electrical discharge in which the insulation between conductors is only partially bridged. Such discharges may or may not occur near conductors.

3.2

Use the step-by-step voltage boosting method to apply the impulse voltage to the test sample until more than five local impulse voltages with the same peak-to-peak value appear in ten times.

Minimum peak-to-peak impulse voltage of discharge pulse.

Note. For the specified test time and test circuit layout, this value is the average value, and the voltage applied to the test sample adopts the step-by-step voltage boosting method. See 5.5 for details.

3.3

From the higher voltage value where the discharge is observed, the impulse voltage is applied to the test sample using the step-by-step voltage reduction method until ten peak-to-peak impulses occur.