ICS 17.220.20 29.050
CCS H 21

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 25897-2020

Replacing GB/T 25897-2010

Residual resistance ratio measurement. Residual resistance ratio of Nb-Ti and Nb[3]Sn composite superconductors

Issued on: December 14, 2020 **Implemented on: July 1, 2021**

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

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1:1-2009:

This standard replaces GB/T 25897-2010 "Superconductivity: Determination of the Residual Resistance Ratio of Niobium-Titanium Composite Superconductors", and is compatible with GB/T 25897-2010

Compared with:2010, the main technical changes are as follows:

---Added the measurement method of the residual resistance ratio of niobium to tin (Nb3Sn) (see full text);

---Modified the minimum distance between the two voltage contacts during sample preparation from 25mm to 15mm (see Chapter 6,:2010

Chapter 6 of the edition);

---Modified the current density of the input current when measuring room temperature resistance, from 0:1A/mm2~1A/mm2 to 0:1A/mm2~

2A/mm2 (see 7:1, 7:1 in:2010 edition);

---Modified the content of Appendix A (A:1 is the:2010 version of A:6; A:3 is the:2010 version of A:4, and adds b) and e)

4); A:4 is the:2010 version of A:1; the:2010 version of A:3 is deleted);

---Replaced most of the contents of Appendix B (the terms and definitions in the:2010 edition of B:2 were deleted, and B:3 and B:4 were added);

---Added Appendix C:

This standard uses the translation method equivalent to IEC 61788-4:2020 "Superconductivity Part 4: Measurement of Residual Resistance Ratio Niobium-Ti (Nb-Ti)

Measurement of residual resistance ratio of composite superconductor with niobium and tin (Nb3Sn)":

The Chinese documents that have a consistent correspondence with the international documents cited in this standard are as follows:

---GB/T 2900:100-2017 Superconductivity in electrical engineering terms (IEC 60050-815:2015, IDT):

This standard has made the following editorial changes:

---Modify the standard name to "Residual resistance ratio measurement of niobium-titanium (Nb-Ti) and niobium tin (Nb3Sn) composite superconductor residual resistance

Ratio measurement:

Please note that certain contents of this document may involve patents: The issuing agency

of this document is not responsible for identifying these patents:

This standard was proposed by the Chinese Academy of Sciences:

This standard is under the jurisdiction of the National Superconducting Standardization Technical Committee (SAC/TC265):

Drafting organizations of this standard: Western Superconducting Materials Technology Co:, Ltd:, Institute of Physics, Chinese Academy of Sciences, Institute of Engineering and Technology

Co:, Ltd:, Huazhong University of Science and Technology, Guangdong Power Grid Co:, Ltd: Electric Power Research Institute, Institute of Plasma Physics, Chinese Academy of Sciences:

Introduction

In niobium-titanium (Nb-Ti) and niobium tin (Nb3Sn) composite superconductors, copper (Cu), copper/copper-nickel (Cu/Cu-Ni) or aluminum (Al) are both used as

The matrix material is also used as a stabilizing material: When the superconductor fails locally, it can play a role of shunting, and can

The heat is transferred to the surrounding cooling medium, making it possible for the superconductor to recover its superconducting properties: Therefore, the resistance of the base material at low temperature

Rate is an important characteristic index of composite superconducting materials, which is related to the stability and AC loss of superconducting materials: The residual resistance ratio is defined as

The ratio of the resistance value of the composite superconductor at room temperature to the resistance value just above the superconducting transition temperature:

This standard specifies the test method for the residual resistance ratio of Nb-Ti and Nb3Sn composite superconductors: The composite superconductor just exceeds the superconducting transition

The resistance value at temperature is measured using the curve method: Other methods of measuring the resistance are described in A:3:

Residual resistance ratio measurement niobium-titanium (Nb-Ti)

And niobium tin (Nb3Sn) composite superconductor

Residual resistance ratio measurement

1 Scope

This standard specifies the copper (Cu), copper-nickel (Cu-Ni), copper/copper-nickel (Cu/Cu-Ni) matrix and aluminum under the condition of no strain and no applied magnetic field:

(Al) Test method for residual resistance ratio (RRR) of niobium-titanium (Nb-Ti) and niobium-three-tin (Nb3Sn) composite superconductors in the matrix: This standard applies to

The residual resistance ratio is less than 350, the cross section is less than 3mm2, and the residual resistance ratio of the integrated superconductor with rectangular or circular cross section is measured:

the amount: For the Nb3Sn composite superconductor, the sample undergoes reaction heat treatment:

2 Normative references

The following documents are indispensable for the application of this document: For dated reference documents, only the dated version applies to this article

Pieces: For undated references, the latest version (including all amendments) applies to this document:

IEC 60050-815 International Electrotechnical Term (IEV) Part 815: Superconductivity (InternationalElectrotechnicalVo-

cabulary-Part 815:Superconductivity)

3 Terms and definitions

The following terms and definitions defined by IEC 60050-815 apply to this document:

ISO and IEC maintain a terminology database for standardization at the following address:

* IEC Electropedia: http://www:electropedia:org

* ISO online browsing platform: http://www:iso:org/obp

3:1

Residual resistance ratio residualresistanceratio;RRR

The ratio of the resistance value at room temperature to the resistance value just above the superconducting transition temperature:

Note: This standard stipulates that the resistance of Nb-Ti and Nb3Sn composite superconductors at 293K (20 degrees C) is room temperature resistance: The residual resistance ratio of the composite superconductor is

Formula (1) is calculated: