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

GB/T 31527-2015

**Mechanical properties measurement -- Room temperature
tensile test of NbTi/Cu composite superconductors**

力学性能测量 NbTi/Cu复合超导线室温拉伸试验方法

(English Translation)

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References

Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules.

This standard uses the translation method is equivalent to using IEC 61788-6:2011 (Ed.3.0) "Superconductivity - Part 6. Mechanical properties measurement Cu/Nb-Ti composite superconducting wires at room temperature tensile test method. " Correspondence between the consistency of the standards of international documents and normative references of the following documents.

--- GB/T 228.1-2010 tensile testing of metallic materials - Part 1. room temperature test methods (ISO 6892-1:2009, MOD);

--- GB/T 12160-2002 metallic materials testing uniaxial extensometer calibration (ISO 9513:1999, IDT);

--- GB/T 13811-2003 Electrotechnical terminology superconductivity (IEC 60050-815:2000, MOD);

--- GB/T 13634-2008 uniaxial testing machines dynamometer calibration standard (ISO 376:2004, IDT);

Testing - Part 1 --- GB/T 16825.1-2008 metal material of static uniaxial testing machines. stretching and (or) pressure test Machine measuring system test and calibration (ISO 7500-1:2004, IDT).

Please note that some of the content of this document may involve patents. Release mechanism of the present document does not assume responsibility for the identification of these patents.

This standard was proposed by the Chinese Academy of Sciences.

This standard by the National Standardization Technical Committee superconducting (SAC/TC265) centralized.

This standard was drafted. Western superconducting materials Technology Co., Ltd., Institute of Physics, Northwest Nonferrous Metal Research Institute, Institute of Electrical Engineering, Chinese Academy of Sciences Institute of Physical and Chemical Technology.

Introduction

Today the practical application of NbTi/Cu (IEC standard for Cu/Nb-Ti, the country also known as NbTi/Cu) superconducting wire, multi-strand is small Core superconducting filaments embedded in a stabilizing and supporting the role of the base material made of

composite. Wherein the superconducting material is a Ti content of 40% NbTi alloy 50% (mass ratio) between the base material of a high purity oxygen-free copper or aluminum. Business superconducting wire having a high current density and a small cross Features cross-sectional area. Composite superconducting wire is mainly used in superconducting magnets around the system, the magnet winding superconducting wire will exert complex stresses and at a magnet charging due to their high current density superconducting wire will be under a lot of electromagnetic force. Thus, it is necessary to test the coiled ultra Mechanical properties of the wire.

Mechanical Performance Measurement NbTi/Cu composite superconducting wire at room temperature tensile test method

1 Scope

This standard specifies the NbTi/Cu composite superconducting wire room temperature tensile test method.

This test method for measuring the elastic modulus, proof strength (yielding a composite body of Cu generated) and tensile strength.

Elongation rate and yield is defined by the components of the second type NbTi proof strength only for reference (see A.1 and A.2).

This standard applies to testing cross-sectional area 0.15mm² ~ 2mm², copper super ratio is between 1.0 to 8.0 of a circular or rectangular cross section without Insulating coating sample.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

ISO 376 metallic materials uniaxial testing machines standard dynamometer calibration (Metalicmaterials-Calibrationof force-provinginstrumentsusedfortheverificationofuniaxialtestingmachines) ISO 6892-1 Tensile testing of metallic materials - Part 1. room temperature test methods (Metalicmaterials-Tensile testing-Part 1. Methodoftestatroomtemperature) Part 1 ISO 7500-1 testing of metallic materials of static uniaxial testing machines. stretching and (or) pressure testing machine measuring system Verification and calibration (Metalicmaterials-Verificationofstaticuniaxialtestingmachines-Part 1. Tension /compressiontestingmachines-Verificationandcalibrationoftheforce-measuringsystem) ISO 9513 metallic materials testing uniaxial extensometer calibration (Metalic materials-Calibrationof extensometersusedinuniaxialtesting) IEC 60050-815 International Electrotechnical Vocabulary - Part 815. Superconductivity (Internationalelectrotechnical

vocabulary-Part 815. Superconductivity)

3 Terms and Definitions

IEC 60050-815 and ISO 6892-1 define the following terms and definitions apply to this document.

Tensile stress at any one time during the test divided by the original specimen cross-sectional area of the tension provider.

Tensile strength R_m Maximum tensile test corresponding tensile stress.

Note: usually sign σ_{UTS} instead R_m .