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

GB/T 30109-2013

**AC loss measurements -- Total AC loss measurement of round
superconducting wires exposed to a transverse alternating magnetic
field at liquid helium temperature by a pickup coil method**

交流损耗测量 液氦温度下横向交变磁场中圆形截面超导线总交流损耗的探测线圈
测量法

(English Translation)

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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 61788-8Ed.2.2010 "AC loss measurements at liquid helium temperatures transverse alternating magnetic field Circular cross-section superconducting wire coil to detect the total AC loss measurement. " this standard made editorial changes.

Correspondence between the consistency of the standards of international documents and normative references of the following documents.

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

This standard by the National Standardization Technical Committee proposed superconductivity.

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

Introduction

International Electrotechnical Commission Technical Committee superconducting (IEC/TC90) proposed using a magnetometer and detection coil method to measure a composite superconducting wire in Transverse magnetic field varies with time in exchange

losses. They represent a variety of measuring the impact delivered the most common transverse magnetic configuration --- Field Flow of standardized methods loss.

IEC/TC90 decided to split the proposal into two documents were covered by two standard methods. One of them is used to describe the hysteresis loss Consumption and at a low frequency magnetic field (or low field sweep rate) case total AC losses magnetometer measurements; Another method for describing a high-frequency magnetic Detection coil AC loss measurement of the total field (field sweep rate or higher) under. Magnetometer measurement frequency range 0Hz ~ 0.06Hz, Detection coil measurement frequency range of 0.005Hz ~ 60Hz, the overlapping portion (0.005Hz ~ 0.06Hz) are two methods can be used Frequency Range.

This standard relates to the detection coil method. Its ac loss Standard Test Method section refers to advanced materials and standards based on the count of Versailles Plan (VAMAS) in preliminary work on NbTi composite superconductors exchange losses standardized [1].

AC loss measurements at liquid helium temperatures alternating transverse Magnetic field superconducting wire circular cross-section of the total exchange loss Detection coil measurements

1 Scope

This standard specifies the use of coil measurements to detect the alternating magnetic field transverse composite superconducting wire of the total exchange loss methods. Loss may include Hysteresis loss, coupling loss and eddy current loss. IEC 61788-13 has been described only measure DC magnetic or low magnetic field sweep rate hysteresis loss Consumption standard method [2].

This standard applies to the pulse coil and AC coil metal and oxide superconducting wire circular cross section, time-varying magnetic (time-varying) of Field and/or current applications will produce exchange losses. In conventional coil applications in electromagnetic field configuration, exchange losses mainly from the (time-varying) magnetic field. For in a horizontal alternating magnetic field of the superconducting wire, the method usually used in liquid helium temperature, frequency range up to the upper limit frequency 50/60Hz Total AC loss measurement. Adopt the method of measuring the total AC loss superconducting filaments into the hysteresis loss, coupling loss between the wire and often Vortex guide section loss. In the outer superconducting wire no larger conductor sheath thickness is normal circumstances, exchange losses primarily hysteresis loss and Coupling loss; week since the coupling loss is proportional to frequency, the hysteresis loss in part by the lower frequency range the measured AC loss Loss consumption extrapolated to zero frequency estimate obtained.

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.

IEC 60050-815:2000 Electrotechnical terminology superconductivity
[Internationalelectrotechnicalvolcabulary (IEV) -Part 815. Superconductivity]

3 Terms and Definitions

IEC 60050-815:2000 definition of terms and definitions as well as the following terms and definitions apply to this document.

AC loss ACloss

Due to time-varying magnetic field or current composite superconductors in power consumption.

[IEC 60050-815. The 2000815-04-54] 3.2 Hysteresis loss Ph Superconductor in a magnetic field variation of one loss occurs, regardless of their loss of value and frequency of each cycle.

Note: The hysteresis loss by the magnetic flux pinning cause irreversible magnetic superconducting material caused.

[IEC 60050-815. The 2000815-04-55]