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**Categories and test methods of practical superconducting  
wires - General characteristics and guidance**

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### Foreword

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

This standard uses the redrafting method to modify and adopt IEC TR61788-20.2014 "Superconductivity Part 20. Practical superconducting wire

General Characteristics and Guiding Principles of Conductor Classification" and IEC 61788-21.2015 "Superconductivity Part 21. Superconducting Practical Superconducting Conductors"

General characteristics and guidelines of test methods.

Please refer to Appendix A for a list of comparisons between this standard and corresponding international standards.

The technical differences between this standard and IEC TR61788-20.2014 and IEC 61788-21.2015 and the reasons are as follows.

--- With regard to normative quotation documents, this standard has been adjusted with technical differences to adapt to my country's technical conditions and adjustments

The situation is reflected in Chapter 2 "Regulatory Reference Documents", with specific adjustments as follows.

- \* Replaced IEC 60050 with GB/T 2900 equivalent to international standards;
- \* Replaced IEC 61788-3 with GB/T 18502 equivalent to international standards;
- \* Replaced IEC 61788-13 with GB/T 21227 equivalent to international standards;
- \* Replaced IEC 61788-1 with GB/T 21546 equivalent to international standards;
- \* Replace IEC 61788-5 with GB/T 22587 equivalent to international standards;
- \* Replaced IEC 61788-2 with GB/T 28871 equivalent to international standards;
- \* Replaced IEC 61788-8 with GB/T 30109 equivalent to international standards;
- \* Replaced IEC 61788-12 with GB/T 31522 equivalent to international standards;

- \* Replaced IEC 61788-6 with GB/T 31527 equivalent to international standards;
- \* Replaced IEC 61788-10 with GB/T 31780 equivalent to international standards;
- \* Replaced IEC 61788-18 with GB/T 36611 equivalent to the international standard.

This standard has made the following editorial changes.

---In order to be more in line with the contents of the two international standards, the name of the standard was changed to "the classification and detection methods of practical superconducting wires are generally special

Sex and guidelines".

Please note that some content of this document may involve patents. The issuer of this document does not assume responsibility 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).

This standard was drafted by: Institute of Electrical Engineering, Chinese Academy of Sciences, Western Superconducting Material Technology Co., Ltd., Shanghai Jiaotong University, Shanghai University

Institute of Physics, Chinese Academy of Sciences.

## Introduction

Superconducting wires are the core and guarantee of many important industrial products. A unified superconducting wire standard will facilitate the formulation of procurement specifications and the

Design and engineering implementation, quality certification, equipment operating instructions, and the popularization and application of industrial technology.

Since the late 1960s, practical low-temperature superconducting (LTS) wires have been widely used (magnetic resonance imaging magnets, large scientific

And cutting-edge cutting-edge scientific instruments and equipment). The high-temperature superconductor (HTS) discovered in 1986 reduces the impact of superconducting technology on refrigeration systems.

Temperature requirements, thereby reducing the cost of using this technology.

Superconducting wires made of these new materials enable new applications, including some

Low-temperature superconducting wire cannot be used in applications at all. Many manufacturing processes and conductor configurations of superconducting wires have been

established.

It has universality and becomes the basis of industrial production of materials.

The shape of the practical superconducting wire is similar to the general copper and aluminum wire. For example, the appearance of low-temperature superconducting wires is comparable to commercial copper wires or tinned copper wires

Recently, because they are covered by metal stabilization layer or reinforcement layer. Usually practical superconducting wire is wound on a spool and provided in a long wire way.

As such, it can be used as an ordinary conductor in products and applications. However, the inherent technical properties of superconductivity require

Special considerations in purchasing, design and manufacturing, testing and certification, quality control and other business activities. To meet the needs of use and maintain superconducting work

Conditions and adaptation to mechanical stress and strain, the design of superconducting wire rods needs to consider the functions of different components in superconducting wires. According to the used

Superconducting materials and expected working conditions or environment, the manufacturer adjusted the components in the superconducting wire and released various forms of superconducting wire production.

Goods. The design and manufacture of equipment using superconducting wires must also take into account the unique properties of superconducting wires in operation. These technical attributes may be quite

Complex, although superconducting wire suppliers have done their best to market their products, non-technical users still have difficulty using practical superconductors

line. In this regard, standardization provides the most important characteristics of superconducting technology with public, undisputed reference information. worth taking note of

Yes, this standard gives the general performance parameters of practical superconducting wires at this stage, and does not regulate the specific specifications of wire or wire processing technology.

This standard is a guide to practical superconducting wire technology, describes the characteristics of different types of superconducting wire, and gives a measure of its key performance

The law is crucial to the specification and use of practical superconducting wire products. This standard is the primary standard for manufacturers and users in the field of

superconducting technology.

Used for testing, certification and quality control. Following this standard helps market development and product sales.

Practical superconducting wire classification and detection method

General features and guidelines

## 1 Scope

This standard gives the general characteristics of practical superconducting wires, and provides test methods for the mechanical, electrical and superconducting characteristics of practical superconducting wires

Application guide. Practical wire refers to a wire that can be continuously produced in commercial batches to a sufficient length and can be used for manufacturing equipment.

This standard pays special attention to the characteristics of practical superconducting wires different from conventional copper and aluminum wires.

This standard applies to various superconducting wires described in 2.4 of GB/T 2900.100-2017, including single-core, multi-core superconducting wires, and composite superconducting

Body and coated conductor, as well as other composite superconducting wires of integrated structure.

This standard does not apply to wires other than practical superconducting wires (such as prototypes, test specimens, and wires under development), and conductors composed of multiple wires

(Such as cable).

## 2 Normative references

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

Pieces. For the cited documents without date, the latest version (including all amendments) applies to this document.

GB/T 2900 (all parts) electrical engineering terminology [IEC 60050 (all parts)]

GB/T 18502 Critical current measurement DC threshold of silver and/or silver alloy coated Bi-2212 and Bi-2223 oxide superconductors

Current (GB/T 18502-2018, IEC 61788-3.2006, IDT)

GB/T 21227 AC loss measurement Cu/Nb-Ti multi-wire composite wire hysteresis loss