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

GB/T 10859-2008

Replacing GB/T 10859-2008

**Nickel base brazing filler metals - Part 1: Solid brazing filler
metals**

(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 1 of GB/T 10859 Nickel-based brazing alloys. GB/T 10859 has been published in the following parts.

- Part 1: Solid solder this document replaces GB/T 10859-2008 Nickel-based brazing alloys. Compared with GB/T 10859-2008, except for structural adjustments and editorial changes, in addition to the above, the main technical changes are as follows.
- Deleted the solder classification table (see 3.1 of the 2008 edition);
- Added 4 nickel brazing filler metal models and their chemical composition requirements. BNi66CrPCu, BNi68CrSiP, BNi60CrPSi, BNi58CrSiP (see Table 1);
- Added some product form requirements (see 5.1);
- Added the requirements for "surface quality" of nickel solder and its test methods (see 5.3 and 6.2);
- Changed the dimensional requirements for powder, foil, and rod nickel solder (see 5.4.1 to 5.4.3, 5.2 of the 2008 edition);

- Added the requirements for bending toughness of nickel foil strip solder and its test method (see 5.5 and 6.4);
- Changed the "Chemical Composition" analysis method (see 6.1, 6.1 of the 2008 edition);
- Changed the size detection method of powdered nickel brazing alloy (see 6.3.1, 6.2 of 2008 edition), and added the mechanical properties test of brazed joints (see 6.5) and solder wetting performance test (see 6.6);
- Changed the requirements for numerical rounding rules (see Chapter 7, 4.2 of the 2008 edition);
- Changed the requirements of "Inspection Rules" (see Chapter 8, 6.3 to 6.5 of the 2008 edition);
- Deleted the requirements for delivery status (see 5.3 of the 2008 version).

Introduction

Nickel-based brazing filler metals are used as connecting materials for refractory metals and high-temperature alloy components. They have excellent high-temperature strength, heat corrosion resistance, and oxidation resistance.

Its brazed joints have high strength and structural stability at high temperatures, so they are often used in aerospace, energy, ocean, and petroleum.

Chemical industry, agricultural machinery and other industrial fields. Nickel-based brazing filler metals and special alloys are prone to form brittle compounds during the brazing process, and their quality directly affects the product quality.

The performance and connection quality of the product are closely related to the performance of the product, so the formulation of its product standards is of great significance.

Brazing is one of the key basic technologies in the manufacturing industry. As the manufacturing industry develops towards green, intelligent and high-end directions, the demand for brazing materials and Technology has put forward new demands and higher challenges. Conventional solid nickel-based brazing materials such as rods and strips can no longer meet market demand.

The new nickel-based composite solders developed by the company, such as paste solders, adhesive tape solders, and preformed solders, have great potential for development.

"Nickel-based Brazing Alloy" is a universal product standard for hard brazing alloys and is intended to consist of the following parts.

- Part 1: Solid brazing filler metals. The purpose is to specify the requirements for solid

nickel-based brazing filler metal products suitable for brazing.

--- Part 2: Paste solder. The purpose is to specify the requirements for paste nickel-based solder products suitable for brazing.

--- Part 3: Adhesive tape brazing filler metals. The purpose is to specify the requirements for nickel-based brazing filler metal products in adhesive tape for brazing.

GB/T 10859 was first independently formulated in 1989 and revised in 2008. Its technical content has always been at the international leading level.

GB/T 10859-2008 has been issued and implemented for more than ten years. During this period, the preparation technology of nickel-based brazing alloys in my country has been improved and new products have been developed and applied.

It has played an important role in promoting the use of high-quality key connections in high-end equipment manufacturing industries such as aerospace, energy and ocean in my country.

Materials---Nickel-based brazing filler metal has a more significant significance. At present, with the rapid progress of non-ferrous material research and metallurgical technology, the new products developed have put forward higher requirements for intelligence, functionality, miniaturization, etc.

This revision of GB/T 10859 focuses on the technical requirements for high-end equipment manufacturing and adds the size of foil, strip and rod solder.

Specific requirements are required to meet the needs of integrated, functional and miniaturized products. With the changes in solder composition and analysis technology, engineering applications have increased.

The revised chemical composition list is more in line with the requirements of the product itself, thus promoting the development of nickel-based solid brazing filler metal products in my country.

Improvement and quality enhancement will promote industrial structure adjustment and provide important guarantees for the high-quality development of my country's brazing industry.

Nickel-based brazing filler metals Part 1: Solid brazing filler metals

1 Scope

This document specifies the model, technical requirements, test methods, rounding rules, inspection rules and packaging, marking, Quality certification requirements, etc.

This document applies to nickel-based solid solder used for brazing (hereinafter referred to as nickel solder).

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 1480 Metal powder dry sieving method for particle size determination GB/T 8170-2008 Rules for rounding off values and expression and determination of limit values GB/T 11363 Brazing joint strength test method GB/T 11364 Test method for wettability of solder GB/T 19077 Particle size distribution laser diffraction method

3 Terms and definitions

There are no terms or definitions that require definition in this document.

4.1 Model compilation method

Nickel brazing filler metal types consist of two parts.

- a) The first part uses "B" to indicate brazing filler metal.
- b) The second part consists of the chemical element symbols of the main alloy components. The first chemical element symbol Ni represents the nickel solder.

For basic components, the nominal mass fraction of Ni shall be indicated after the element symbol, and the value shall be an integer.

- c) The symbols of other elements are arranged in descending order according to their mass fractions. When several elements have the same mass fraction, they are arranged in order of their atomic mass fractions.

Arranged in ordinal order.

- d) Elements with a mass fraction of less than 1% do not need to be listed in the model. If an element is a key component of nickel solder and must be listed, it should be the chemical element symbol is indicated in brackets.

4.2 Model Examples

The comparison of nickel solder types in this document and other relevant standards is shown in Appendix A. Examples of nickel solder types in this document are as follows.