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**Seamless thin-wall molybdenum tubes**

无缝薄壁钼管

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# Seamless thin-wall molybdenum tubes

## 1 Scope

This document specifies the classification and marking, technical requirements, test methods, inspection rules, marking, packaging, transportation, storage, accompanying documents, and order form content of seamless thin-wall molybdenum tubes.

This document is applicable to seamless thin-wall molybdenum and molybdenum-alloy tubes with a wall thickness not greater than 1.5 mm produced by pressure processing. They are mainly used as nuclear cladding tubes, heat tubes, high-temperature fuel protection tubes, draft tubes, tubular electrodes, thermocouple protection tubes, and high-temperature furnace components, etc.

## 2 Normative references

The contents of the following documents, through normative references in this text, constitute indispensable provisions of this document. Among them, for dated references, only the edition corresponding to that date applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 228.1 Metallic materials - Tensile testing - Part 1: Method of test at room temperature

GB/T 241 Metal materials - Tube - Hydrostatic pressure test

GB/T 1031 Geometrical product specifications (GPS) - Surface texture: Profile method - Surface roughness parameters and their values

GB/T 4325 (all parts) Methods for chemical analysis of molybdenum

## 3 Terms and definitions

This document does not have terms and definitions that need to be defined.

## 4 Classification and marking

### 4.1 Product classification

Products are divided into six categories according to chemical composition: MG-Mo, MG-MoLa, MG-MoCe, MG-MoY, MG-MoW, MG-MoRe.

**5.6.3** After acid and alkali washing, the surface of the product shall have a silvery white metallic luster.

## **6 Test methods**

**6.1** The determination of the chemical composition of the product shall be carried out in accordance with the provisions of GB/T 4325 (all parts). The analysis methods for elements not included in GB/T 4325 (all parts) shall be determined through consultation between the supplier and the purchaser.

**6.2** The dimensions of the product are measured using measuring tools with corresponding precision.

**6.3** The mechanical properties of the product are determined according to the provisions of GB/T 228.1.

**6.4** The hydrostatic pressure test of the product shall be carried out according to the provisions of GB/T 241.

**6.5** The surface roughness of the product shall be measured according to the provisions of GB/T 1031; or determined through consultation between the supplier and the purchaser.

**6.6** The appearance quality of the product shall be inspected visually.

## **7 Inspection rules**

### **7.1 Inspection and acceptance**

**7.1.1** The product shall be inspected by the supplier or a third party, to ensure that the product quality complies with the provisions of this document and the order form.

**7.1.2** The purchaser can inspect the received products according to the provisions of this document. If the inspection results are inconsistent with the provisions of this document and the order form, it shall be submitted to the supplier in written form; the supplier and the purchaser shall negotiate to resolve it. Objections pertaining to appearance quality shall be raised within one month from the date of receipt of the product. Objections pertaining to other performances shall be raised within three months from the date of receipt of the product. If arbitration is required, it shall be determined by consultation or sampling made jointly by both parties at the purchaser place.

### **7.2 Lot grouping**

Products shall be submitted for acceptance in lots. Each lot consists of products of the

**7.5.5** If the surface roughness does not meet the requirements of this document, it is allowed to take double number of samples to repeat the test. If any result of the repeated test is nonconformity, this lot of products shall be judged as nonconformity.

**7.5.6** If the appearance quality does not meet the requirements of this document, the product shall be judged as nonconformity.

## **8 Marking, packaging, transportation, storage, and accompanying documents**

### **8.1 Marking**

#### **8.1.1 Product marking**

The following marks shall be printed on the products that have passed the inspection:

- a) Category;
- b) Status;
- c) Specification;
- d) Lot number.

#### **8.1.2 Package marking**

Products shall be packed into boxes. Each box shall be marked with:

- a) Supplier name and trademark;
- b) Product name and category;
- c) There shall be obvious "moisture-proof" signs or words on the packaging;
- d) Lot number.

### **8.2 Packaging, transportation, and storage**

#### **8.2.1 Packaging**

Products shall be packaged piece by piece. The packaging materials shall be moisture-proof paper, oil-proof paper, foam paper, or other suitable materials. Place the packaged products in paper (wooden) boxes one by one; fix them with soft filling materials around them. If there are special requirements, the packaging method negotiated between the supplier and the purchaser can be used.

### 8.2.2 Transportation

When the product is transported, moisture or acidic-alkaline gases shall be prevented. Bumping is strictly prohibited.

### 8.2.3 Storage

The storage room shall be dry, ventilated, and free of acid and alkali. The storage period should not exceed two months.

### 8.3 Accompanying documents

Each lot of products shall be accompanied by accompanying documents. In addition to supplier information, product information, number of this document, exit-factory date, or packaging date, it should include the following contents.

- a) Product quality assurance letter; the content is as follows:
  - Main performance and technical parameters of the product;
  - Product characteristics (including characteristics of manufacturing process and raw materials);
  - Responsibility for product quality;
  - Quality certification obtained by the product; various analysis and inspection results with inspection seals of the supplier's technical supervision department.
- b) Product conformity certificate; the content is as follows:
  - Inspection items and their results or inspection conclusions;
  - Lot size or lot number;
  - Inspection date;
  - Inspector's signature or seal.
- c) Inspection reports in the process of product quality control AND finished-product inspection reports.
- d) Product instructions: Correct handling, use, storage methods, etc.
- e) Other.

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Accountable person and shareholder: Wayne Zheng

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, [Sales@ChineseStandard.net](mailto:Sales@ChineseStandard.net)

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

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