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

**GB/T 14592-2014**

Replacing GB/T 14592-1993

**Molybdenum discs**

钼圆片

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Quarantine;  
Standardization Administration of the PRC**

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### Foreword

GB/T 14592-2014 was issued on 24 July 2014 by the General Administration of Quality Supervision, Inspection and Quarantine and the Standardization Administration of the People's Republic of China, and has been in force since 1 February 2015. It replaces GB/T 14592-1993.

The document is a recommended national standard: the /T in the designation marks it as recommended rather than compulsory.

### 1 Scope

China's national standard for molybdenum discs, the small round plates used as the base on which power semiconductor devices are built and as electrode and structural parts in vacuum electronic devices. Molybdenum is chosen for a physical reason rather than an electrical one: its coefficient of thermal expansion is close to that of silicon, so a silicon wafer soldered to a molybdenum disc can be heated and cooled through the thousands of cycles of a device's life without the joint tearing itself apart. It also conducts heat well and stands the temperatures of the joining process, which is what a power device needs, since almost all of its failures begin as heat that cannot get out. The standard specifies the requirements, test methods, inspection rules, marking, packaging, transport, storage, quality certificate and contents of the contract or order for molybdenum discs, and applies to discs used in power semiconductor devices and vacuum electronic devices. It classifies the product by grade and by delivery condition - blank, sandblasted, rough-turned,

fine-turned, wire electrical discharge cut and ground - and lays down the designation, the chemical composition, a minimum density, and the permitted deviations on diameter and thickness for each condition.

This standard specifies the requirements, test methods, inspection rules, marking, packaging, transport, storage, quality certificate and the contents of the contract or order for molybdenum disc products.

This standard applies to molybdenum discs used in power semiconductor devices and in vacuum electronic devices.

## 2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document, including all amendments, applies.

GB/T 2828.1 Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.

GB/T 3850 Determination of density for dense sintered metal materials and hardmetals.

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

YS/T 660-2007 Designation and chemical composition of molybdenum and molybdenum alloy processed products.

### 3.1 Product classification

3.1.1 The grades and delivery conditions of the product are given in Table 1. Grades Mo1 and Mo2 are supplied as blank, sandblasted edge-turned, rough-turned edge, fine-turned edge and precision-rolled wire electrical discharge cut, all in the annealed condition and each produced by its own method - punching and cutting, sandblasting and turning, rough grinding and turning, fine grinding and turning, precision rolling and wire cutting. Grade Mo1 is additionally supplied with a ground turned edge. The table gives the minimum diameter and the minimum thickness available in each condition.

3.1.2 The product type is written as the grade, the delivery condition and the dimensions in that order. For example a blank molybdenum disc of grade Mo1 with a nominal diameter of 20 mm and a thickness of 2 mm is designated Mo1M20 x 2.0; a sandblasted edge-turned disc of grade Mo2, 45 mm in diameter and 3 mm thick, is Mo2P45 x 3.0; and the rough-turned, fine-turned, wire-cut and ground conditions take the letters C, J, D and Y in the same position.

### 3.2 Chemical composition

The chemical composition of the product shall meet the requirements for grades Mo1 and Mo2 in YS/T 660-2007.

### **3.3 Density**

The density of the molybdenum disc shall be not less than 10.0 g/cm<sup>3</sup>.

### **3.4 Dimensions and permitted deviations**

3.4.1 The diameter of the product and its permitted deviations are given in Table 2, and the thickness and its permitted deviations in Table 3. Table 2 bands the diameter into six ranges and gives a separate deviation for the blank, the turned edge and the wire electrical discharge cut conditions; Table 3 bands the thickness into five ranges and gives a separate deviation for the blank and sandblasted, rough-ground, fine-ground and ground conditions. In both tables a note provides that tolerances for other sizes are settled by agreement between supplier and purchaser.