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

**GB/T 1817-2017**

Replacing GB/T 1817-1995

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**Test method for impact toughness of cemented carbides at  
room temperature**

硬质合金常温冲击韧性试验方法

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### Foreword

GB/T 1817-2017 was issued on 14 October 2017 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 May 2018. It replaces GB/T 1817-1995, and the previous editions of the standard were GB 1817-1979 and GB/T 1817-1995.

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

Compared with GB/T 1817-1995 the main technical changes are: the normative references have been added; the statement of the principle has been revised; the deflection requirement has been deleted; a requirement for the parallelism of the specimen has been added; a tolerance requirement for the span of the anvil supports has been added; and a requirement for the ambient temperature of the test has been added.

The standard was proposed by the China Nonferrous Metals Industry Association and is under the jurisdiction of the National Technical Committee on Nonferrous Metals of Standardization Administration of China (SAC/TC 243).

### 1 Scope

China's national test method for the impact toughness of cemented carbides at room temperature. Cemented carbide is the material of cutting tools, mining bits and wear parts: extremely hard, and for that reason brittle. Hardness alone does not tell you whether a tool will survive an interrupted cut or a rock face, because what breaks it is not steady pressure but a blow, and a material can be hard and still shatter. The pendulum test answers that question directly - a hammer of known energy swings down, breaks the specimen in one stroke, and the energy lost between the swing before and the swing after, divided by the

cross-sectional area, is the impact toughness. This standard specifies the method of determining that value and applies to the determination of the impact toughness of cemented carbide materials at room temperature. The 2017 edition added the normative references, revised the statement of the principle, dropped the deflection requirement, and added requirements for specimen parallelism, for the tolerance on the anvil span and for the ambient temperature of the test.

This standard specifies the method for determining the impact toughness of cemented carbides at room temperature.

This standard applies to the determination of the impact toughness of cemented carbide materials at room temperature.

## 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 3808 Verification of pendulum impact testing machine.

GB/T 8170 Rules of rounding off for numerical values and expression and judgement of limiting values.

JJG 145 Verification regulation of pendulum impact testing machines.

## 3 Symbols and definitions

The symbols and definitions used in this standard are given in Table 1. They are: the impact energy absorbed, in joules; the impact toughness value, in joules per square centimetre; the cross-sectional area of the specimen, in square centimetres; the energy of the pendulum before it breaks the specimen and the energy of the pendulum after it breaks the specimen, both in joules; the mass of the pendulum, in kilograms; the distance from the axis of rotation of the pendulum to its centre of gravity, in metres; the angles of rise of the pendulum before and after the specimen is broken, in degrees; and the acceleration due to gravity, in metres per second squared.

## 4 Principle of the method and formula for calculating the impact energy

4.1 The specimen on the impact testing machine is broken in a single blow by a pendulum swinging down from a set height. The energy absorbed in breaking the specimen is determined from the difference between the energy of the pendulum before and after the break, and the impact toughness value of the material is the work absorbed per unit of cross-sectional area. The principle is shown schematically in Figure 1.