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

**GB/T 229-2020**

Replacing GB/T 229-2007

**Metallic Materials — Charpy Pendulum Impact Test Method**

**金属材料 夏比摆锤冲击试验方法**

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## Foreword

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

This standard replaces GB/T 229-2007 "Metallic materials - Charpy pendulum impact test method". Compared with GB/T 229-2007, the main technical changes are as follows:

- In the scope, ADD the unnotched specimens; MAKE requirements for the terms and definitions, symbols and descriptions, dimensional deviations, specimen installation of unnotched specimens (see Chapter 1, 3.2.1, Table 1, Table 2, 8.1, Appendix A);
  - ADD the symbol B of specimen thickness; ADD the symbol  $\alpha$  of the angle when the pendulum is released; ADD the description of the elevation angle  $\beta_1$  and  $\beta_2$ ; ADD the symbol KN of the nominal value of the initial potential energy; ADD the symbol M of the moment; ADD the energy loss symbol p caused by pointer friction, the energy loss symbol p' caused by bearing friction and air resistance, the correction symbol  $p\beta$  for the energy loss caused by the elevation angle  $\beta$ ; MODIFY the symbol of shear section rate, which is changed to SFA; ADD the transition temperature symbol Tt27 corresponding to the specified absorption energy value of 27J, the transition temperature symbol Tt50%US corresponding to 50% of the energy absorbed on the upper platform, the transition temperature symbol Tt50%SFA corresponding to the shear section rate of 50%, the transition temperature symbol Tt0.9 corresponding to lateral expansion value 0.9 mm (see Table 1; Table 1 of the 2007 edition);
  - SUPPLEMENT and IMPROVE the principle of impact test (see Chapter 5; Chapter 5 of the 2007 edition);
  - ADD the determination of friction loss (see 8.2);
  - MODIFY the test temperature requirements (see 8.3.3; 8.2.3 of the 2007 edition);
  - ADD the necessary and optional content of the test report [see 9.1 g), 9.2 j), k)];
  - ADD the Informative Appendix E "Measuring uncertainty of absorbed energy value K" (see Appendix E);
- temperature compensation value (see Appendix E of the 2007 edition).

This standard uses the redrafting method to amend and adopt ISO 148-1:2016 "Metallic materials - Charpy pendulum impact test - Part 1: Test method".

Compared with ISO 148-1:2016, this standard has structural differences, adding clause 8.9 test results.

Compared with ISO 148-1:2016, this standard has technical differences. The terms involved in these differences have been marked by a vertical single line (|) on the outer margins.

The technical differences between this standard and ISO 148-1:2016 and the reasons are as follows:

- In the scope of Chapter 1, ADD the unnotched specimens to suit China's national conditions;
- Regarding normative references, this standard has adjusted the technical differences to adapt to Chinese technical conditions. The adjustments are reflected in Chapter 2 "Normative references". The specific adjustments are as follows:
  - USE GB/T 3808 which adopts the international standard through modification to replace ISO 148-2 (see 7.2, E.2.1.2);
- In Table 1, ADD the symbols KT and descriptions that were missed in the ISO standard; ADD the symbols and descriptions of the unnotched specimens correspondingly due to the addition of unnotched specimen in the Scope; CLARIFY the units of  $\beta_1$  and  $\beta_2$  as "°" and the unit of K1, K2, KN as "J", to avoid unit confusion;
- MODIFY the last two paragraphs of the principle of Chapter 5 to be a note, because this part of the content is a further explanation of the principle;
- In 6.1.2, ADD the "specimens of other thicknesses can also be used through agreement", to expand the scope of application of this standard;
- In 6.4, ADD that "the cutting of specimen blanks shall be carried out in accordance with the relevant product standards or the provisions of GB/T2975" for the convenience of actual operation;
- In Table 2, ADD the size and tolerance of U-notch specimens which have a ligament width of 8 mm; ADD the notes for unnotched specimens; ADJUST the angle tolerance between adjacent longitudinal surfaces of the specimen; DELETE the tolerance grades of the two notches, to meet China's national conditions;
- For the convenience of application, ADD the symbols KW2 and KW8 used for the pendulum hammer blade of the unnotched specimen in 7.3;
- In order to facilitate the operation of the application of unnotched specimens, ADD the requirements for the installation position of unnotched specimens and the pretest inspection requirements in 8.1;
- ADD the detailed requirements for bearing friction and windage loss in 8.2.2, to facilitate the implementation of the standard;
- In 8.5, ADD the lower limit of use of the testing machine and the requirements for resolution; ADD note 2 to explain it, to improve the operability of the standard and facilitate the implementation of the standard;
- In order to increase the operability, ADD the description in 8.6 when the pendulum does

not break the specimen due to insufficient impact energy of the testing machine and the measured absorbed energy exceeds the energy range of the testing machine;

- In 8.9, ADD the energy-absorption rounding-off requirements to improve the standard operability;
- In 9.1, ADD the item c) notch type and ligament width (notch depth); in item d), thickness of 5 mm and 3 mm" due to data errors; ADD the requirements for clamps for unnotched specimens; ADD the requirements for clamps for Unotches, to improve the standard operability, to facilitate the implementation of standards.

This standard has made the following editorial changes:

- In the note of 3.1.2, ADD the expression that "use the letter W to represent unnotched specimens".

This standard was proposed by the China Iron and Steel Association.

This standard shall be under the jurisdiction of the National Steel Standardization Technical Committee (SAC/TC 183).

Drafting organizations of this standard: Central Iron and Steel Research Institute, Metallurgical Industry Information Standards Institute, Shanxi Taigang Stainless Steel Co., Ltd., Shanghai Shenli Testing Machine Co., Ltd., Shenzhen Wance Testing Equipment Co., Ltd., Nanjing Iron and Steel Co., Ltd., National Iron and Steel Co., Ltd. Product Quality Supervision and Inspection Center, Pabo Testing Technology Service Co., Ltd., Lixi (Shanghai) Scientific Instrument Co., Ltd., Qiqihar Huagong Machine Tool Co., Ltd., Minmetals Yingkou Medium Plate Co., Ltd., Shougang Group Co., Ltd., Chengdu Iron and Steel Research Institute Testing and Certification Co., Ltd., Dalian Hope Physical and Chemical Testing Technology Co., Ltd., Shanghai Institute of Materials.

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## 1 Scope

This standard specifies the Charpy pendulum impact test method for measuring the energy absorbed by impact specimens (V-shaped, U-shaped notch, unnotched specimens) in the impact test of metallic materials.

This standard applies to the Charpy pendulum impact test under room temperature, high temperature or low temperature conditions, but does not include the instrumental impact test method, the content of this part is as shown in GB/T 19748.