The National Standard of the People's Republic of China

GB/T 1043-93

Plastics-Determination of charpy impact strength of rigid materials

Replace GB 1043-79


1 Subject content and scope of application

This standard specifies the charpy impact test machine shall be used to apply once impact bending load on rigid plastic test samples so as to damage the test samples and the method of measuring the material impact ductility with the energy absorbed per unit area when the test samples are damaged.

This standard applies to rigid thermoplastics and thermoset plastics, including filled plastics and fiber reinforced plastics and these plastic products. This standard does not apply to rigid foamed plastic.

2 Referenced standard

GB 2918 Plastics—Standard atmospheres for conditioning and testing
GB 5471 Preparation method for compression moulding of specimens of thermosetting moulding materials
GB 9352 Plastics-Compression moulding test specimens of thermoplastic materials
GB 11997 Plastics-Preparation and use of multipurpose test specimens

3 Terms

3.1 Charpy impact strength of unnotched specimens
Under impact load, when the unnotched specimens are damaged, the ratio of absorbed impact energy and the original cross-sectional area of the test sample is expressed in kJ/m².

3.2 Charpy impact of notched specimens
Under impact load, when the notched specimens are damaged, the ratio of absorbed impact energy and the original cross-sectional area of the specimens are expressed in kJ/m².

3.3 Relative impact strength
The ratio of notched test sample impact strength and unnotched specimens impact strength or the ratio of similar test sample type A and type B notch impact strength.

The ratio of type C notch test sample impact strength and type A or B notched specimens impact strength shall not be used as a measure of the relative impact strength.

3.4 Complete break
After an impact, the test sample can be divided into two or several sections.

3.5 Partial break
For an incomplete destruction, i.e. the cross-section of unnotched specimens or notch test sample shall be cut by 90% at least.

3.6 Non-break
For an incomplete destruction, i.e. the cross-section of unnotched specimens or notch test sample shall be cut by 90% at most.
4 Principle
The pendulum with a known energy shall be used to strike the specimens which is supported into horizontal beam and once pendulum impact can damage the specimens. Impact line is located in the midst of two bearings, if it is notched specimens, the impact line shall be aligned to notch and the energy difference of the pendulum before and after the impact shall be used to determine the energy absorbed when the specimen is damaged. Then its impact strength shall be calculated according to the original cross-sectional area of the test sample.

5 Apparatus
5.1 Testing machine
Tester shall be pendulum type and include the pendulum, specimens bearing, energy indicating mechanism, machine body and other major components. It can indicate the impact energy absorbed in the process of damage of specimens.
Testing machine shall have the characteristic parameters shown in Table 1. And these parameters shall be regularly inspected by national metrology authorities.

Table 1 Characteristics parameter of pendulum impact testing machines

<table>
<thead>
<tr>
<th>Impact energy J</th>
<th>Impact velocity</th>
<th>Maximum allowable friction loss</th>
<th>Tolerance after correction J</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic speed m/s</td>
<td>Limit deviation %</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>2.9</td>
<td>±10</td>
<td>4</td>
</tr>
<tr>
<td>1.0</td>
<td>2.9</td>
<td>±10</td>
<td>2</td>
</tr>
<tr>
<td>2.0</td>
<td>2.9</td>
<td>±10</td>
<td>1</td>
</tr>
<tr>
<td>4.0</td>
<td>2.9</td>
<td>±10</td>
<td>0.5</td>
</tr>
<tr>
<td>7.5</td>
<td>3.8</td>
<td>±10</td>
<td>0.5</td>
</tr>
<tr>
<td>15.0</td>
<td>3.8</td>
<td>±10</td>
<td>0.5</td>
</tr>
<tr>
<td>25.0</td>
<td>3.8</td>
<td>±10</td>
<td>0.5</td>
</tr>
<tr>
<td>50.0</td>
<td>3.8</td>
<td>±10</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Note: Results obtained by different pendulum can not be compared.

5.2 Pendulum body
Pendulum body is a core part of the testing machine, which includes rotating shaft, pendulum bar, pendulum, striking blade and other components.
5.2.1 The distance from axis of rotation to the striking center of the pendulum shall be the same with the distance from the axis of rotation to the center of the specimens and the difference between them shall not exceed ± 1% of the latter.
5.2.2 The provision angle of striking blade is 30 ° ± 1 ° and the end circular arc radius is 2.0 ± 0.5mm. When pendulum swings downward, the central deviation for blade through the space between two supports shall not exceed ± 0.2mm, the blade shall be in contact with the specimens striking surface. Contact line shall be perpendicular to the longitudinal axis of the specimens and the deviation does not exceed ± 2°.

5.3 Specimens bearing
It’s two rigidly mounted support blocks, make the test sample be horizontal and the deviation within 1/20 or less. In the moment of an impact, the striking surface of specimens shall be parallel
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