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**Charpy pendulum impact test —
Reference test pieces for verification
of testing machines**

ICS 77.040.10

Descriptors : charpy impact tests, test equipment, test specimens

Reference number : JIS B 7740 : 1999 (E)

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B 7740 : 1999

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of International Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law. Consequently **JIS B 7740:1990** is replaced with **JIS B 7740:1999**.

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Charpy pendulum impact test — Reference test pieces for verification of testing machines

Introduction This Japanese Industrial Standard has been prepared based on **ISO/FDIS 148-3**, *Metallic materials — Charpy pendulum impact test — Part 3: Preparation and characterization of Charpy V reference test pieces for verification of testing machines* published in 1994 without modifying the technical contents.

The portions with dotted underlines in this Standard are the matters not included in the original International Standard.

1 Scope This Standard covers the requirements, preparation and methods of qualifying test pieces that are used to indirectly verify pendulum impact testing machines for Charpy impact test in accordance with **JIS B 7722** and with the certificate for reference test pieces.

It describes notched test pieces with nominal dimensions identical to those specified in **JIS Z 2202**. However, the tolerances are more stringent. The chemical composition or heat treatment or both are varied according to the energy level desired.

Reference test pieces are qualified on reference pendulum impact machines which are also described in this document.

Remarks: The International Standard corresponding to this Standard is as follows:

ISO/FDIS 148-3 *Metallic materials — Charpy pendulum impact test — Part 3: Preparation and characterization of Charpy V reference test pieces for verification of testing machines*

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards indicated below shall be applied.

JIS B 7722 *Charpy pendulum impact test — Verification of testing machines*

Remarks: ISO/FDIS 148-2:1994 *Metallic materials — Charpy pendulum impact test — Part 2: Verification of testing machines* is identical with the said standard.

JIS Z 2202 *Test pieces for impact test for metallic materials*

Remarks: ISO/DIS 148-1:1996 *Metallic materials — Charpy impact test (V-notch and U-notch)* is identical with the said standard.

JIS Z 2242 *Method of impact test for metallic materials*

Remarks: ISO 83:1976 *Steel — Charpy impact test (U-notch)*, ISO 148:1983 *Steel — Charpy impact test (V-notch)* is identical with the said standard.

3 Definitions For the purposes of this Standard, the following definitions apply.

3.1 industrial machine Pendulum impact testing machine used for industrial, general or research laboratory testing of metallic materials. These machines are not used to establish reference values.

3.2 reference machine Pendulum impact testing machine used to determine the reference energy of a reference test piece. The verification requirements for this grade of machine are more stringent than those for industrial machines (see table 2).

3.3 Definitions pertaining to energy

3.3.1 actual absorbed energy (absorbed energy), A_V The total energy required to break a test piece when tested by a pendulum impact testing machine. It is equal to the difference in the potential energy from the starting position of the pendulum to the end of the first half-swing during which the test piece is broken.

3.3.2 indicated absorbed energy (indicated energy), A_S The energy value indicated by the pointer or other readout device of a pendulum impact testing machine.

3.3.3 reference energy, A_R The absorbed energy associated with reference test pieces, determined from tests made using reference machines. It is the mean value of the set tested (see also clause 6).

3.4 lot A definite quantity of reference test pieces manufactured under identical conditions of production.

3.5 reference test piece An impact test piece used to verify the suitability of an industrial pendulum impact testing machine by comparing the indicated energy measured by that machine to the reference energy associated with the test piece.

3.6 certified reference test piece An impact test piece used to verify reference machines by comparing the impact energy measured by that machine to the certified reference value associated with the test piece.

Note: The certified reference value is the value determined by a national or international body following an intercomparison exercise carried out on a group of reference machines within its jurisdiction.

3.7 set A group of test pieces chosen at random from a lot.

3.7.1 characterization set A set of test pieces taken from a lot in accordance with clause 6 and used to determine the reference energy of the lot.

3.7.2 reference set A set of test pieces chosen in accordance with clauses 6 and 8 used to verify a pendulum impact testing machine.

3.8 Definitions pertaining to the test piece (placed in the test position on the supports of the machine)

3.8.1 height The distance between the notched face and the opposite face.

3.8.2 width The dimension perpendicular to the height and parallel to the notch.

3.8.3 length The largest dimension at right angles to the notch.

4 Symbols and designations The symbols and designations used in this Standard are as indicated in tables 1 and 2 and attached figures 1 and 2.

Table 1 Symbols and their meanings

Symbol	Unit	Meaning
A_V	J	Actual absorbed energy; absorbed energy
A_S	J	Indicated absorbed energy; indicated energy
A_R	J	Reference energy of a set of Charpy reference test pieces

5 Reference test machine

5.1 Characteristics The characteristics of reference machines used to determine the reference energy of reference test pieces shall comply with the requirements of **JIS B 7722** except as modified below:

5.1.1 Geometrical characteristics (see table 2 and attached figures 1 and 2)

- a) The radius of curvature of the anvils shall be $(1^{+0.10}_{0.0})$ mm.
- b) The angle between the anvil and the support shall be $90^\circ \pm 0.10^\circ$.
- c) The distance between the anvils shall be $(40^{+0.1}_{0.0})$ mm.
- d) The striking edge shall remain within 0.25 mm of the plane of symmetry of the anvils.
- e) The striker shall conform to the geometry specified in **JIS B 7722** for either the 2 mm or the 8 mm striker.