



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

GB/T 225-2006

Replacing GB/T 225-1988

Steel — Hardenability Test by End Quenching (Jominy Test)

钢 淬透性的末端淬火试验方法（Jominy试验）

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Quarantine;
Standardization Administration Committee..**

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Foreword

This Standard identically uses ISO 642:1999 Steel - Hardenability test by end quenching (Jominy test).

For easy use, this Standard made the following editorial modifications to ISO 642:1999:

- a) modified “this International Standard” to “this Standard”;
- c) used corresponding national standards to replace the references in ISO
- d) deleted “Foreword” and “Bibliography” of ISO 642:1999;

This Standard replaces GB/T 225-1988 Steel hardenability test by end quenching (Jominy test).

Compared with GB/T 225-1988, the main modifications in this Standard are as follows:

quenched (Jominy test)” to “Steel - Hardenability test by end quenching (Jominy test)”;

product surface was modified from (20 ± 5) mm to mm (5.1.2 b g) the sampling method was modified FROM sampling method according to test material size TO forging and machining; deleted 5.1.5 and 5.1.6 of GB/T 225- 1988; added sampling provisions on continuous casting products (see 5.1 of this Edition);

faces of the test piece in Figure 2 (see Figure 2);

j) deleted the provisions on indentation point stagger arrangement; added the provisions on indentation point position accuracy ± 0.10 mm (8.3.1 b of Edition 1988, 8.4.1.2 of this Edition);

k) self-tempering testing acid was modified to one type (8.1.3 of Edition 1988, l) Annex A of GB/T 225-1988 was adjusted to Annex B; added informative Annex A, Annex C.

Annex A, Annex B and Annex C of this Standard are informative.

This Standard was proposed by China Iron and Steel Industry Association.

This Standard shall be under the jurisdiction of National Technical Committee on Steel of Standardization Administration of China.

Main drafting organizations of this Standard: Baoshan Iron and Steel Co., Ltd. Special Steel Branch, Metallurgical Industry Information Standards Institute, Beijing Shougang Special Steel Co., Ltd., Iron and Steel Research Institute.

Main drafters of this Standard: Li Xiaodong, Luan Yan, Yu Xinxia, Wang Guimin, Sun Shiqiu.

Versions of standard substituted by this Standard are:

This Standard specifies a method for determining the hardenability of steel by end quenching (Jominy test) by using a test piece 25 mm in diameter and 100 mm long.

NOTE By agreement and for a defined field of application, the test described in this Standard may be replaced by the calculation of the Jominy curve in accordance with an accepted mathematical model (see annex C): In case of dispute, the test shall be carried out.

The following standards contain the provisions which, through reference in this Standard, constitute the provisions of this Standard. For dated references, subsequent amendments (excluding corrections) or revisions do not apply to this Standard. However, the parties who enter into agreement based on this Standard are encouraged to investigate whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

a) heating a cylindrical test piece to a specified temperature in the austenitic range for a specified period of time;

b) quenching it by spraying water on one of its ends under specified conditions;

the test piece, in order to determine the hardenability of the steel by variations of this hardness.

In the absence of specific requirements in the product standard, and unless otherwise agreed on the order and regardless of the thickness (or diameter) of the product, the sampling of test piece from the product can be made:

or by machining of test piece 1 with diameter mm whose axis shall be at least at mm from the surface product (see Figure 1).

In case of products from continuous casting, a minimum reduction ratio 8: 1 is recommended before sampling.

In all the forming processes preceding the machining of the test piece, the deformation of the product from all sides should be as uniform as possible.

In the case of a separately cast reference test piece, the original cross section before deformation must be at least three times that corresponding to the required diameter of 30 mm to 32 mm.

By special agreement, the test piece can be obtained by a suitable casting process and tested in the as-cast condition.

The flats of the test piece shall have their axes at approximately the same distance from the product surface (see Figure 1). For this purpose, the test piece shall be marked so that its position in the round bar can be clearly recognized.

The test piece shall consist of a round bar machined to a diameter of 25 mm and a length of 100 mm.

The end of the test piece which will not be quenched shall be 30 mm to 32 mm or 25 mm in

diameter, depending upon the form of that end. Two examples, test pieces with a flange or an undercut (to permit rapid centering and fitting in position for the quenching operation by means of an appropriate support) are shown in Figure 2.

The test piece shall, if necessary, be marked (on the end opposite to the end to be quenched) to enable its position to be identified in relation to the original product.

Unless otherwise agreed, the test piece shall be normalized before machining and quenching. The normalizing process shall be carried out at the average temperature within the range specified in the material standard. If the material standard does not specify a temperature for normalizing, the normalizing temperature shall be subject to special agreement or duly selected by the testing department. The holding time at normalizing temperature shall be mm.

The heat treatment shall be carried out in each case in such a way that the finishmachined test piece shows absolutely no traces of decarburization.

The cylindrical surface of the test piece shall be machined by fine turning; the surface of the test piece end to be quenched shall have a reasonably fine finish, preferably obtained by fine grinding, and should be free from burrs (see Figure 2).

The apparatus consists of a device for quenching the test piece.

The quenching device consists essentially of a means of suddenly inducing the water jet to impinge on the end of the test piece to be quenched. This can be realized e.g., by a quick action tap and a system to adjust the flow rate of the water or a disc allowing the water jet to be released and cut off rapidly (see Figure 3). In the case of a quick action tap the length of the water supply pipe behind the tap shall be at least 50 mm in order to ensure non-turbulent water flow.

6.2 The relative positions of the end of the water supply pipe and the test piece support shall be such that the distance between the end of the water supply pipe and the test piece end to be quenched is (12.5 ± 0.5) mm (see Figure 3).

The test piece support shall allow precise centering of the test piece above the end of the water supply pipe and the holding of it in position during spraying. It shall be dry while the test piece is being placed in position; the test piece shall be protected from water splashes while it is being placed in position as well as before and during the actual end quenching operation.

The height of the water jet above the end of the water supply pipe without the test piece in position shall be (65 ± 10) mm (see Figure 4).

1 Device for fixing and centering the test piece.

4 End of water supply pipe.

1 Height of free water jet.