



Standard Specification for Sampling Procedure for Impact Testing of Structural Steel¹

This standard is issued under the fixed designation A 673/A673M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification establishes the procedure for longitudinal Charpy V-notch testing of structural steel and contains two frequencies of testing. The impact properties of steel can vary within the same heat and piece, be it as rolled, control rolled, or heat treated. The purchaser should, therefore, be aware that testing of one plate, bar, or shape does not provide assurance all plates, bars, or shapes of the same heat as processed will be identical in toughness with the product tested. Normalizing or quenching and tempering the product will reduce the degree of variation.

1.2 This specification is intended to supplement specifications for structural steel when so specified.

1.3 This specification does not necessarily apply to all product specifications; therefore, the manufacturer or processor should be consulted for energy absorption levels and minimum testing temperatures that can be expected or supplied.

1.4 Two frequencies of testing (P and H) are prescribed.

1.5 The values stated in either inch-pound units or SI units are to be regarded as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with this specification.

2. Referenced Documents

2.1 ASTM Standards:

A 6/A6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling²

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products³

3. Ordering Information

3.1 The inquiry and order shall indicate the following:

3.1.1 Frequency of testing, (P) or (H),

3.1.2 Test temperature (see 4.5 and 4.6),

3.1.3 Minimum average absorbed energy value (see 4.1 and 4.6),

3.1.4 Alternate core location (see 4.3), if applicable, and

3.1.5 Condition (as-rolled, stress relieved, normalized, normalized and stress relieved, or quenched and tempered).

4. Tests

4.1 Impact testing shall be in accordance with Test Methods and Definitions A 370. An impact test shall consist of testing three specimens taken from a single test coupon or test location, the average result of which shall be not less than the minimum average absorbed energy specified in the purchase order, which in no case shall be less than 7 ft-lbf [10 J] for full size specimens.

4.2 Except as allowed by 4.3, specimens for plates and bars shall be taken from a location adjacent to the location specified for the tension test specimen, and specimens for shapes shall be taken from a location at an end of the shape at a point one third the distance from the outer edge of the flange or leg to the web or heel of the shape (see Fig. 1 and Fig. 2). For plates produced from coils, three impact tests shall be taken from the product of each coil or qualifying coil (see Section 5); one test coupon shall be obtained from a location adjacent to the location specified for each of the two required tension tests (see Specification A 6/A 6M) and the third test coupon shall be obtained from a location immediately after the last plate produced to the qualifying specification.

4.2.1 The longitudinal axis of each specimen shall be parallel to the final direction of rolling of the plate or parallel to the major axis of the shape.

4.2.2 The longitudinal axis of each specimen shall be located midway between the surface and the center of the product thickness, and the length of the notch shall be perpendicular to the rolled surface of the product.

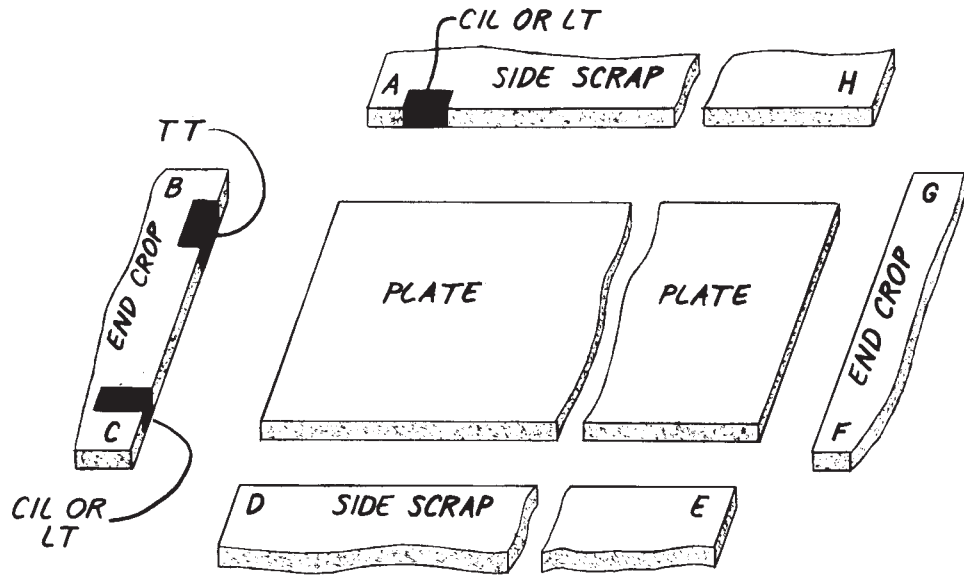
4.3 For Group 3 shapes with a flange thickness equal to or greater than 1 1/2 in. [38.1 mm], Group 4 shapes, and Group 5 shapes, where alternate core location testing is specified in the purchase order, the longitudinal axis of each specimen shall be located midway between the inner flange surface and the center of the flange thickness at the intersection with the web mid-thickness (see Fig. 3).

¹ This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.02 on Structural Steel for Bridges, Buildings, Rolling Stock, and Ships.

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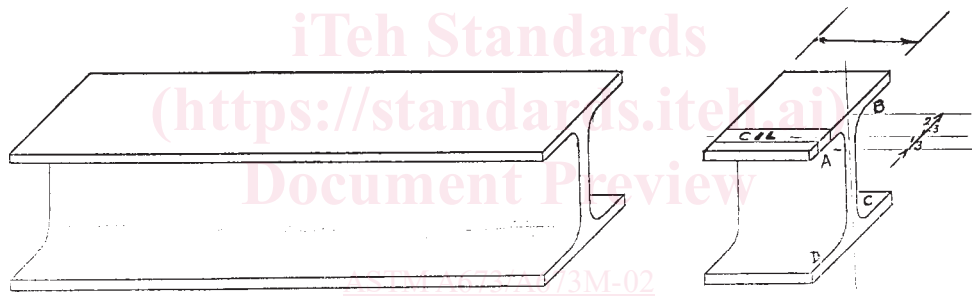
² Annual Book of ASTM Standards, Vol 01.04.

³ Annual Book of ASTM Standards, Vol 01.03.



NOTE 1—LT (Longitudinal tensile test) For widths through 24 in. [600 mm], may be taken at any location, A through H.
 NOTE 2—TT (Transverse tensile test) For widths over 24 in. [600], may be taken at locations B, C, F, or G.
 NOTE 3—CIL (Charpy impact longitudinal) May be taken at any location, A through H.

FIG. 1 Plate Test Location



NOTE 1—CIL = Charpy impact longitudinal.
 NOTE 2—Test coupon for impact specimens may be taken from locations A, B, C, or D as shown laid out at location A.

FIG. 2 Shape Test Location

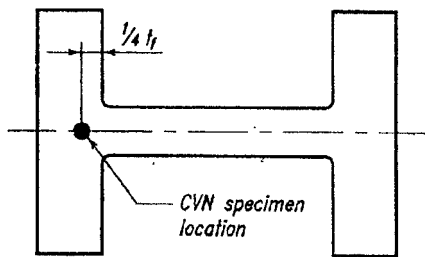


FIG. 3 Alternate Core Location for CVN Specimens

4.4 The absorbed energy values obtained for subsize specimens shall not be less than the applicable values given in Table 1, which are proportional to the absorbed energy values required for full-size specimens.

4.5 Except as allowed by 4.6, the test temperature shall be as specified in the purchase order.

4.6 The manufacturer shall have the option of using a lower test temperature than is specified in the purchase order,

provided that the absorbed energy values specified in the purchase order are met.

4.7 The actual test temperature used shall be reported with the test results.

5. Frequency of Testing

5.1 Frequency (H) Heat Testing for Plates, Shapes, and Bars—One impact test (a set of three specimens) shall be made for each 50 tons [45 Mg] of the same type of product subject to the requirements of this specification produced on the same mill from the same heat of steel. The impact test(s) shall be taken from different as-rolled or heat-treated pieces. Impact specimens shall be selected from the thickest material rolled subject to the following modifications: When material rolled up to 2 in. [50 mm] inclusive in thickness differs $\frac{3}{8}$ in. [10 mm] or more in thickness, one impact test shall be made from both the thickest and thinnest material rolled. When material rolled over 2 in. [50 mm] in thickness differs 1 in. [25 mm] or more in thickness, one impact test shall be made from both the thickest and thinnest material rolled that is more than 2 in. [50