Standard Method of Test for

Sampling Procedure for Impact Testing of Structural Steel

AASHTO Designation: T 243M/T 243-19 (2023)[1]

Technically Revised: 2019 **Reviewed but Not Updated: 2023**

Technical Subcommittee: 4f, Metals

ASTM Designation: A673/A673M-17

AASHTO

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1. SCOPE

1.1. This specification establishes the procedure for 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 that 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 SI units or inch-pound units are to be regarded as standard. Within the text, the inch-pound 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 the specification.

1.6. *The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of R 18 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with R 18 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of R 18 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
- T 244, Mechanical Testing of Steel Products

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2.2. *ASTM Standard*:

< A6/A6M, Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

3. ORDERING INFORMATION

3.1. *The inquiry and order shall indicate the following*:

3.1.1. The frequency of testing: (P) or (H);

3.1.2. The test temperature to be used (Sections 4.5 and 4.6);

3.1.3. Minimum average absorbed energy value (see Sections 4.1 and 4.6);

3.1.4. Transverse impact test orientation for plate widths greater than 600 mm [24 in.], if desired (see Section 4.2.2);

3.1.5. Alternate core location (see Section 4.3), if applicable; and

3.1.6. 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 in T 244. An impact test shall consist of testing three specimens taken from a single test coupon or test location, the average result of which is to be not less than the minimum average absorbed energy specified in the purchase order, which in no case shall be less than 10 J [7 ft-lbf] for full-size specimens.

4.2. Except as allowed by Section 4.3, the specimen for plates and bars shall be taken from a location adjacent to the location specified for the tension test specimen and the specimen for shapes shall be taken from a location at an end of a 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 Figures 1 and 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 ASTM A6/A6M), and a third test coupon shall be obtained immediately after the last plate produced to the qualifying specification. If during decoiling of each coil or qualifying coil, the amount of material decoiled is less than that required to reach the approximate center lap, additional test coupons for impact tests shall be obtained adjacent to the location for the additional required tension tests (see ASTM A6/A6M) corresponding to the end of the innermost portion decoiled until the approximate center lap of the coil is reached for which a test coupon for impact test shall be obtained. Upon further decoiling beyond the approximate center lap, additional test coupons for impact tests shall be obtained from locations immediately after the last plate produced to the qualifying specification during the decoiling operation.

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