National Institute of Standards & Technology

Certificate

Standard Reference Materials®

2092 - Low-Energy
2096 - High-Energy
2098 - Super High-Energy

Verification Specimens for Charpy V-Notch Impact Machines

Lot No.:

Standard Reference Materials (SRMs) 2092, 2096, and 2098 are intended primarily for the verification of Charpy V-Notch machines in accordance with the current ASTM Standard E 23 [1]. Each SRM consists of a set of individual 10 mm x 10 mm x 55 mm specimens needed to perform one verification. These SRMs comply with both ASTM Standard E 23 and International Organization for Standardization ISO/DIS 12736 dimensional requirements [2].

Material Description: SRMs 2092 and 2096 are made from 4340 alloy steel. SRM 2098 is made from a high strength maraging steel. The bars are finished to length, stamped, heat-treated, and machined in SRM specimen lots of approximately 1200. Each specimen has a lot number and an identification number (three or four digits) stamped on one end of the specimen. Additional information can be found in References [3-5].

SRM Certification Procedure: Specimens taken at random from each SRM lot are tested by the NIST Materials Reliability Division on Charpy V-Notch reference machines. The specimen data generated are then statistically evaluated to assure the homogeneity of the lot, establish the certified value, and determine the number of SRM specimens required for a user to perform a valid test. See Table 1 for a list of the approximate energy ranges within which the individual certified values should fall.

If certified values are required immediately after testing, contact the NIST Charpy Program Coordinator as follows: telephone (303) 497-3351; fax (303) 497-5939; or e-mail vigliotti@boulder.nist.gov. The lot number and energy results of the tested specimens must be provided in order to obtain certified values by telephone or fax.

Expiration of Verification: The verification report issued on an acceptable machine is valid for one year from the date that the SRM was tested. If a user's machine is moved or undergoes any major repairs or adjustments, the current verification will be invalidated and the machine must be retested and reverified.

The overall direction and coordination of the technical measurements leading to verification of test specimens and machines, evaluation of test results, and issuance of the report on machine conformance are under the direction of the NIST Materials Reliability Division, Boulder, CO.

The support aspects involved in the original preparation, certification, and issuance of these SRMs were coordinated through the NIST Standard Reference Materials Program by R.J. Gettings. Revision of this certificate was coordinated through the NIST Standard Reference Materials Program by C.R. Beauchamp.

Fred R. Fickett, Chief
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Gaithersburg, MD 20899
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See Certificate Revision History on Last Page

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Standard Reference Materials Program

NOTE: THESE ARE NOT CERTIFIED VALUES. THESE ARE THE APPROXIMATE RANGES FOR EACH ENERGY LEVEL.

Table 1. Approximate Charpy SRM Energy Ranges

SRM No.	(J)	(ft-lbf)
2092	13 - 20	10 - 15
2096	88 - 136	65 - 100
2098	176 - 244	130 - 180

Storage: The SRMs are comprised of specimens anticipated to have an indefinite shelf life under normal storage conditions. Each specimen is coated with oil, wrapped in a corrosion inhibiting paper, and sealed in a plastic envelope. It is recommended that the specimen be retained in this package to protect them from moisture until used. The protective oil coating should be wiped from each specimen just prior to testing.

Use: Prior to testing a Charpy V-Notch machine, the machine should be checked to assure compliance with the appropriate sections of the current ASTM Standard E 23 [1]. To comply with the testing procedures specified in the standard, SRM 2092 and SRM 2096 shall be tested at -40 °C ± 1 °C (-40 °F ± 2 °F). SRM 2098 shall be tested at 21 °C ± 1 °C (70 °F ± 2 °F). All SRM specimens are to be tested in accordance with the testing procedures of the appropriate sections of the current ASTM Standard E 23. All SRMs shall be tested at the same time. An acceptable machine will produce an average value within 1.4 J (1.0 ft-lbf) or 5 % of the certified energy value, whichever is greater, providing the specimens appear to have normal markings. Because the source(s) and magnitude of error for energy values at one energy level may not be the same at different energy levels, calibration or correction curves shall not be used.

Verification of User's Machine: The NIST Charpy Program Coordinator will issue a report of findings to the user's facility upon receipt of the fractured specimens and completed questionnaire. If the machine to be verified produces acceptable values and the specimens appear to have normal markings, this report will verify its conformance. If the machine produces values outside the allowable tolerance of the certified energy values or the specimens have abnormal markings, the report may suggest repair or replacement of machine parts, changes in testing techniques, or other appropriate corrective actions. Fractured specimens and completed questionnaires should be returned to the NIST Charpy Program Coordinator, Mail Code 853.07, 325 Broadway, Boulder, CO 80305-3328. A plastic, self-locking bag is provided for the return of broken specimens. The broken specimens shall be taped together as described in the wrapping instructions included with the questionnaire.

Important Information: Shipping charges for the return of broken specimens are the responsibility of the user. The mailing label provided with each SRM must be used to expedite shipping and, for overseas shipments, clearance by U.S. Customs.

Note to International Customers: Regular overseas shipments of broken specimens should be sent airmail so that after they are cleared by U.S. Customs, they can be forwarded directly to NIST-Boulder. If a more rapid shipping mode is necessary, choose an overnight delivery service that will handle U.S. Customs clearance **AND** will deliver directly to NIST-Boulder. Unless such delivery is assured, air freight packages may be returned to the customer by U.S. Customs.

REFERENCES

[1] ASTM E 23, Standard Test Methods for Notched Bar Impact Testing of Metallic Materials, Annual Book of ASTM Standards, **03.01**, ASTM, West Conshohocken, PA.

[2] ISO/DIS 12736, Metallic Materials - Impact Testing - Preparation and Characterization of Charpy V Reference Test Pieces for Verification of Pendulum Impact Testing Machines, ISO, Geneva, Switzerland.

[3] Siewert, T.A. and Schmieder, A.K., "Pendulum Impact Machines: Procedures and Specimens for Verification," ASTM STP 1248, ASTM, West Conshohocken, PA, (1995).

[4] Shepherd, D.A. and Siewert, T.A., "Interlaboratory Test Study for the Determination of Precision and Bias in Charpy V-Notch Impact Testing," ASTM Research Report E 28-1014, ASTM, Philadelphia, PA, (1991).

[5] Holt, J.M., "Charpy Impact Test - Factors and Variables," ASTM STP 1072, ASTM, Philadelphia, PA, (1990).

Certificate Revision History: 14 May 2001 (updated email address for Boulder contact); 09 August 2000 (updated mail and zip codes for Boulder facility); 22 March 2000 (editorial revision); 26 July 99 (editorial revision); 20 February 97 (original certificate date).

Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-6776; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet http://www.nist.gov/srm.