



National Institute of Standards & Technology

Certificate

Standard Reference Material 2098

Super High Energy Specimens for Charpy V-Notch Testing Machines

Standard Reference Material (SRM) 2098 is intended primarily for checking the accuracy of large capacity Charpy V-Notch (CVN) testing machines in accordance with ASTM Standard E-23. This higher energy extends the range over which the machine performance can be evaluated and will eventually join the approximately 11 and 70 foot pound-force (ft.lbf) (approximately 15 and 95 J) specimens now used to certify the machine performance. Each SRM consists of five 10 x 10 x 54 mm bars of a high strength maraging steel. The bars were fabricated from vacuum melted, vacuum arc remelted steel rods. The bars were cut to finished lengths, machined, and heat treated in SRM "lots" of 1200 specimens.

A random sampling of the specimens was taken from each SRM lot and tested on a number of Charpy V-Notch test machines at NIST's Boulder, Colorado laboratory. These machines were chosen to represent the wide variety of Charpy V-Notch testing machines available in today's market. The data were statistically evaluated to assure the quality of the lot and a nominal energy value for the lot was derived.

For SRM 2098 (Super High Energy):

Hardness is 29 ± 1 HRC

CVN Impact Energy will range between 155 and 165 (ft.lbf) (210 to 224 J)
when tested between 32 and +122 °F (0 and +50 °C).

Note: Each bar is identified by a Series number (two letters followed by two digits) identifying the lot from which the bar came and an identification number (three or four digits) representing the location of the bar within the lot. These numbers are stamped on one end of each bar.

Use:

Prior to testing a Charpy V-Notch testing machine, the machine should be checked to assure compliance with Sections 4 and 5 of ASTM Standard E-23. These super high energy specimens are designed to be tested at room temperature, but may be tested at temperatures between 32 to +122 °F (0 to +50 °C). **THE EXACT TESTING TEMPERATURE MUST BE RECORDED ON THE COMPLETED QUESTIONNAIRE, SO THAT WE CAN TAKE THE VARIATION IN ENERGY VALUES WITH TEMPERATURE INTO ACCOUNT WHEN EVALUATING TO YOUR ENERGY DATA.** The specimens must also be tested in accordance with Sections 11.2.1 and 11.2.3.1 of E-23. An accurate machine will produce values within 5 percent of the nominal energy value developed by tests at NIST.

Notice to User:

Each SRM will consist of samples with identical Series numbers. If you mix samples from various lots when you test, we will not be able to properly assess your data.

Because the source(s) of erroneous energy values may be different at different energy levels, calibration curves should not be used when you record your data.

Technical and support aspects concerning the preparation and issuance of this Standard Reference Material were coordinated through the Standard Reference Materials Program by P. Lundberg.

Gaithersburg, MD 20899
January 25, 1991

William P. Reed, Acting Chief
Standard Reference Materials Program

Until ASTM Standard E-23 is modified to include the use of super high energy specimens for machine certification, these specimens can only be used as reference materials; they cannot be used for certification of Charpy V-Notch testing machines. Incorporation of the super high energy specimens into the above standard is currently being balloted by ASTM. Meanwhile, you should send the fractured specimens and completed questionnaire to the National Institute of Standards & Technology (NIST), who will review the data and issue a report of its findings to your facility. If your machine produces acceptable values, this report will document the conformance (acceptable operation) of your machine. If your machine produces values outside the acceptable tolerance of the nominal energy value, this report will suggest changes (machine design, repair or replacement of worn parts, changes in testing procedures, etc.) to bring your machine into conformance. Fractured specimens and the completed questionnaire should be returned to the Charpy Program Coordinator, NIST Code 430, 325 Broadway, Boulder, CO 80303. A plastic, self-locking bag is provided for the return of the broken specimens. Tape broken pieces together as described in the wrapping instructions (last page of the questionnaire).

General Information:

This SRM is anticipated to have an indefinite shelf life under normal storage conditions. The SRM is coated with oil, wrapped in a corrosion inhibiting paper, and sealed in a plastic envelope. We recommend that the SRM be retained in this package to protect it from moisture until it is used. The protective oil coating should be wiped from the SRM just prior to testing.

The overall direction and coordination of the technical measurements of the test specimens and machines, evaluation of test results and issuance of the report on machine conformance are under the direction of D.A. Shepherd, Materials Reliability Division, NIST. Questions concerning these topics should be directed to D.A. Shepherd, Telephone: (303) 497-3211, Telefax: (303) 497-5030.