



National Institute of Standards & Technology

Certificate

Standard Reference Material 3202

Secondary Standard 12.65 mm (0.5 in) Magnetic Tape Cartridge

This Standard Reference Material (SRM) is intended for use in the calibration of typical field, average signal amplitude, resolution, and overwrite for magnetic tape cartridges. These cartridges employ 18-track, parallel recording on 12.65 mm (0.5 in) wide magnetic tape at a data density of 1491 cpmm (37871 cpi). This SRM consists of a cartridge container holding a single supply reel of not less than 165 m (541 ft) of 12.65 mm (0.5 in) wide unrecorded magnetic tape with an attached leader block at the BOT end. The SRM 3202 tape consists of a base material (oriented polyethylene terephthalate film or its equivalent) coated on one side with a strong, yet flexible, layer of ferromagnetic material dispersed in a suitable binder.

This SRM is certified to support specific requirements contained in the following standards: American National Standards Institute (ANSI) X3.180; European Computer Manufacturers Association (ECMA) 120 Second Edition, December 1987, and International Standards Organization (ISO) 9661 First Edition 1988-04-15.

The National Institute of Standards and Technology (NIST) maintains an SRM 3202 master standard reference tape cartridge in repository that is used to calibrate selected working standard reference tape cartridges. These selected tapes, in turn are used to calibrate the NIST SRM 3202 System for measuring and documenting the performance of the NIST Secondary Standard Magnetic Tape Cartridge, SRM 3202.

The NIST SRM 3202 System uses track #9. Each SRM 3202 is calibrated with respect to the master standard reference tape cartridge over the middle third of the tape on a read-after-write pass.

The certified parameter values and associated uncertainties for this tape relative to the Master Standard Reference tape are:

	<u>Certified Value</u>	<u>Uncertainty*</u>
Amplitude		± 0.043
Typical Field		± 0.015
Resolution		± 0.047
Overwrite		± 0.039

*(See Table 1, Components of Uncertainty.)

The above uncertainties were calculated according to NIST Technical Note 1297, Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results. Technical Note 1297 is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

No characteristics other than the preceding parameters are implied or ascribed to this SRM.

Gaithersburg, MD 20899
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(Revision of certificate dated 12-08-93)

Thomas E. Gills, Chief
Standard Reference Materials Program

(over)

Certification of Secondary Magnetic Tape Cartridges was performed in the Advanced Systems Division of the Computer Systems Laboratory. The system was designed by M.P. Williamson. The SRM 3202 calibration was performed by L.D. Gilmore. The development program for SRM 3202 was supervised by D.S. Grubb, Manager, Data Storage Group. Statistical consultation was provided by L.M. Oakley of the NIST Statistical Engineering Division.

The support aspects involved in the issuance and revision of this certificate were coordinated through the Standard Reference Materials Program by N.M. Trahey.

The following documents accompany each SRM 3202:

- (1) Two (2) saturation curves showing the average signal amplitude in terms of Amplitude Units (A.U.) versus the recording current.
 - (a) The first curve is produced from the NIST master standard reference tape cartridge.
 - (b) The other curve is produced within the certified region of SRM 3202, Serial No. _____.
- (2) A guideline that describes the procedure for the use of a magnetic tape SRM.

Application Notes:

- (1) Measurements should be performed on SRM 3202 at the ambient condition of 23 ± 2 °C (74 ± 4 °F) and 40% to 60% relative humidity after 24 hours of acclimatization.
- (2) SRM 3202 must always be given at least one (1) full forward and rewind pass before it is used for calibration purposes.
- (3) SRM 3202 should always be run at normal operating transport speeds with a tape tension of 2.2 ± 0.3 N (7.9 ± 1.1 ozf).
- (4) SRM 3202 should be ac bulk-erased before each use and should be used sparingly. It is suggested that tertiary reference tape cartridges be calibrated and used for day-to-day operations.
- (5) All measurements on the SRM 3202 should be made on a read-after-write pass.

Table 1. Components of Uncertainty

<u>Source</u>	<u>Type</u>	<u>Signal Ampl.</u>	<u>Typical Field</u>	<u>Resolution</u>	<u>Overwrite</u>
Within-day median ¹	"A" ²	0.0078	0.0043	0.022	0.019
Between-day ¹	"A" ²	0.020	0.0059	0.0092	0
Expanded uncertainty ³	"U"	0.043	0.015	0.047	0.039

¹Uncertainty based on historical data.

²Type "A" denotes evaluation of uncertainty by statistical methods.

³The expanded uncertainty, $U = ku_c$, is determined by the coverage factor, $k = 2$, and the combined standard uncertainty, u_c , which is the root sum of squares of within-day and between-day standard uncertainties.