



National Institute of Standards & Technology

Certificate

Standard Reference Material 3204

Secondary Standard for 6.30 mm (0.25 in), 44 000 A/m (550 Oe) Magnetic Tape Cartridge

This Standard Reference Material (SRM) is intended for use in the calibration of the typical field, average signal amplitude and resolution of 6.30 mm (0.25 in), 492 flux transitions per millimeter (ftpm) [(12 500 flux transitions per inch (ftpi))], 44 000 A/m (550 Oe) serial serpentine unrecorded magnetic tape. The 3204 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 standard: American National Standards Institute (ANSI) X3.325 and other forthcoming ANSI standards.

The National Institute of Standards and Technology (NIST) maintains an SRM 3204 Master Standard Reference Tape in a repository that is used to calibrate selected working tapes. These working tapes are then used to calibrate the NIST test system used for measuring and documenting the performance of SRM 3204 tapes.

Each unit of SRM 3204 is conditioned with at least 100 forward and 100 rewind passes prior to calibration. The NIST test system uses logical track 0, which is near the middle of the tape. Calibration is done on a read-while-write pass. The first 61 m (200 ft) of tape are skipped over. Calibration is performed on the approximately 61 m (200 ft) that follows the skipped over length. The nominal tape speed used is 2.29 m/s (90 ips).

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>
Signal Amplitude		± 0.022
Typical Field		± 0.018
Resolution		± 0.027

*(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 03-05-93)

Thomas E. Gills, Acting Chief
Standard Reference Materials Program

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Certification of Secondary Magnetic Tape Cartridges was performed in the Advanced Systems Division of the Computer Systems Laboratory. The system was designed by R.J. Onyshczak. The SRM 3204 calibration was performed by L.D. Gilmore. 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 3204:

- (1) Two saturation curves showing the average signal amplitude in terms of Amplitude Units (A.U.) versus the recording current.
 - (a) One of the curves is produced by the NIST master standard reference tape on a read-while-write pass.
 - (b) The other curve is produced within the certified region of SRM 3204, Serial No. _____ on a read-while-write pass.
- (2) Step-by-step procedure for use of the SRM.

Application Notes:

- (1) SRM 3204 measurements should be made with ambient conditions of 20 ± 4 °C (68 ± 7 °F) and relative humidity $50 \pm 10\%$. SRM 3204 should be given at least 8 h of acclimatization before testing.
- (2) SRM 3204 should be ac bulk-erased before each use.
- (3) At least one full forward and one rewind pass must always be made before using SRM 3204 for calibration purposes.
- (4) A partial pass should never be made on SRM 3204.
- (5) All measurements on SRM 3204 should be made on a read-while-write pass.

Table 1. Components of Uncertainty

<u>Source</u>	<u>Type</u>	<u>Signal Ampl.</u>	<u>Typical Field</u>	<u>Resolution</u>
Within-day median ¹	"A" ²	0.0072	0.0058	0.01
Between-day ¹	"A" ²	0.0082	0.0066	0.0092
Expanded uncertainty ³	"U"	0.022	0.018	0.027

¹Uncertainty based on historical data.

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

³The expanded uncertainty, $U = k u_c$, 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.