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The identification of any commercial product or trade name does not imply endorsement or recommendation by the National Institute of Standards and Technology.

## New NIST RMs/SRMs

### NIST SRM 967 Creatinine in Frozen Human Serum

Chronic kidney disease is a growing problem in the U.S., and current estimates suggest that more than 20 million Americans are affected by this disease. Chronic kidney disease can be caused by high blood pressure, diabetes, and other disorders. If left untreated, kidney disease can eventually lead to kidney failure, resulting in the need for dialysis or kidney transplant. Measurement of serum creatinine is a common test to assess kidney function. When the kidneys are working properly, creatinine levels remain low, while elevated levels of creatinine are indicative of kidney disorders. Therefore, accurate determination of serum creatinine is essential for accurate diagnosis of kidney dysfunction.



SRM 967 Creatinine in Fresh-Frozen Human Serum

NIST has developed SRM 967 Creatinine in Frozen Human Serum for use in evaluating the accuracy of procedures for the determination of creatinine in human serum. This SRM was developed in collaboration with the National Kidney Disease Education Program (NKDEP) and the College of American Pathologists (CAP). The SRM consists of frozen human serum with two different levels of creatinine. One level corresponds to the normal range of serum creatinine levels, and the second level is intended to correspond to levels found in chronic kidney disease. The new SRM will provide a mechanism for in-vitro diagnostic (IVD) manufacturers and clinical laboratories to identify and address inter-laboratory variations in creatinine measurements.

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## NIST SRM 1964 Nominal 60 nm Diameter Polystyrene Spheres

NIST has issued Standard Reference Material 1964, polystyrene spheres with a nominal diameter of 60 nm. The SRM comprises monosize polystyrene spheres suspended in water at a mass fraction of approximately 0.5 %. A unit of SRM 1964 consists of 5 mL of polystyrene spheres in deionized filtered water. The particle suspension contains primary spheres (monomers) with very few agglomerates. The suspension is supplied in a dispensing vial, and a sample of the spheres may be obtained by squeezing a drop from the vial.

SRM 1964 was developed in response to a need for accurately sized reference materials with diameters smaller than the 100 nm particles, which were previously the smallest polystyrene SRMs available from NIST. They can be used for the calibration and validation of a variety of particle sizing equipment including light scattering instruments, electron microscopes, and differential mobility analyzers. They are particularly critical for calibrating surface scanning inspection systems, which are used to detect and characterize defects on silicon wafers. Accurate reference particles are needed to develop and advance the scanning systems for high throughput, cost-effective wafer production that is crucial for device miniaturization. The reference particles may also be used for supplying monosize particles for testing aerosol instruments and are useful for examining aerosol kinetics and evaluating particle detector response.

The certified value for the modal diameter of the polystyrene spheres is 60.39 nm, with an expanded uncertainty of  $\pm 0.63$  nm. Measurements were performed using differential mobility analysis and are traceable to the He-Ne laser wavelength in air, 632.807 nm, which has been determined with respect to the fundamental standard for length.



*Nominal 60 nm Diameter Polystyrene Spheres*

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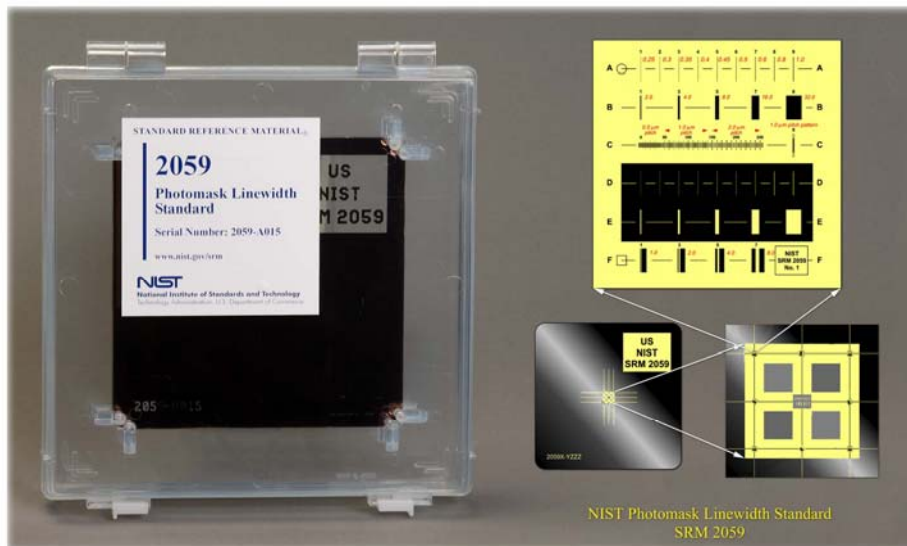
## NIST SRM 2059 Photomask Linewidth Calibration Standard

New SRM for calibration of feature widths on integrated circuit (IC) photomasks

For many years, the National Institute of Standards and Technology (NIST) has offered integrated circuit photomasks with certified linewidths and spacewidths for calibrating photomask feature measurement devices. The previous version, NIST SRM 473, is out of stock and has been replaced with this new version.

SRM 2059 is an antireflecting etched chrome binary photomask on a nominal 152.4 mm x 152.4 mm x 6.35 mm (the industry standard 6.0 in. x 6.0 in. x 0.25 in.) quartz substrate. It consists of patterns of clear and opaque isolated lines with nominal dimensions ranging from 0.25  $\mu\text{m}$  to 32  $\mu\text{m}$  and line-spacing (pitch) patterns ranging from 0.5  $\mu\text{m}$  to 250  $\mu\text{m}$ . Each mask is individually calibrated, with certified values given for isolated linewidths (both clear and opaque) and center-to-center line spacings for one of the eight repeated patterns on the SRM. All measurements are averaged over the central 2  $\mu\text{m}$  of each feature to reduce the influence of line edge roughness. The certified values are traceable to the definition of the meter with an expanded ( $k=2$ ) uncertainty less than 25 nm for linewidths and spacewidths and less than 9 nm for pitch.

Other small objects of interest, such as features on IC wafers, magnetic read/write head gaps, biological materials, phase shift photomasks, etc., will image differently in a microscope. Consequently, this SRM is intended for measurements on binary photomasks only, which represent more than 85 % of all photomasks manufactured worldwide in the most recent survey, 2005-2006.



*SRM 2059 Photomask Linewidth Standard*

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## NIST SRM 2460 Standard Bullet

The SRM 2460 standard bullet is used for forensic laboratories to verify that their bullet signature acquisitions and correlations are under control and traceable to the National Laboratory Center of the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF). It can also be used to verify that their profile measurements of bullet signatures are traceable to NIST's virtual standard for bullet profile signatures.

The SRM bullet is designed as both a virtual and a physical bullet signature standard. The virtual standard is a set of six digitized bullet profile signatures obtained from profile measurements traced on six master bullets fired at ATF and the Federal Bureau of Investigation (FBI). By using the virtual standard to control the tool path of a numerically controlled diamond turning machine, the physical standard SRM 2460 bullets were produced. The virtual standard also provides the reference profiles for the measurements of bullet profiles of the SRM bullets. Measured profiles of 240 land engraved areas (LEAs) on 40 bullets (six LEAs each) have shown very high reproducibility.

At the National Laboratory Center of ATF, the SRM bullets were imaged using an Integrated Ballistics Identification System (IBIS)\* under standardized imaging conditions. A set of images for six LEAs were developed as a reference image standard of SRM bullets. By imaging a SRM bullet at a local forensic laboratory, and correlating the image with the ATF's reference image, one can ensure that the bullet signature acquisitions and correlations are under control and traceable to the National Laboratory Center of ATF.

At a NIST workshop of SRM 2460 standard bullet held on August 16, 2006 in Largo, FL, 22 ballistics experts tested eight SRM bullets using eight IBIS systems. Test results demonstrated the high quality and unique function of the SRM bullets for quality control and measurement unification of the nationwide ballistics identifications.

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*SRM 2460 mounted on a blue stub*

\* Certain commercial equipment, instruments, or materials are identified in this document to specify adequately the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.

## NIST SRMs 2950-2958 Respirable Alpha Quartz on Filter Media and NIST SRMs 2960-2967 Respirable Cristobalite on Filter Media

NIST has issued SRMs 2950-2958, Respirable Alpha Quartz on Filter Media, and SRMs 2960-2967, Respirable Cristobalite on Filter Media that are intended to improve the measurement accuracy of respirable crystalline silica in the work environment.

Occupational exposures to respirable crystalline silica are associated with the development of silicosis, lung cancer, pulmonary tuberculosis, and other airway diseases. To help safeguard the health of industrial workers in, for example, mining, quarrying, and sandblasting operations against this deadly yet preventable occupational exposure, the Occupational Safety and Health Administration (OSHA) enforces strict regulatory limits on the emission of respirable crystalline silica in the workplace. For testing, air particulate matter is collected on filters and measured for crystalline silica. Unfortunately, accurate determinations are difficult due to complexities in the calibration of the principal analysis technique: X-ray diffraction (XRD). NIST developed SRMs 2951 through SRM 2958 and SRM 2961 through SRM 2967 with distinct alpha quartz and respirable cristobalite loading, respectively, to cover the typical range of quartz and cristobalite on field filter samples. These SRMs are intended for calibration of XRD after ashing for redeposition, and for calibration of infrared absorption spectrometry. Laboratories performing measurements of airborne, crystalline silica can use these SRMs to validate the accuracy of measurements around the regulatory limits. The effectiveness of these SRMs has been shown in the field tests, and the SRMs are recommended calibration materials for National Institute for Occupational Health and Safety (NIOSH) Methods 7500 (using SAMPLE PREPARATION 5 a-b), 7602, and 7603. It is anticipated that the advent of these SRMs will improve the comparability of results among laboratories.

The SRMs 2951 through 2958 and SRMs 2961 through SRM 2967 were produced by depositing known amounts of SRM 1878a Respirable Alpha Quartz and SRM 1879a Respirable Cristobalite, respectively, in slurry on 25 mm diameter polyvinyl chloride (PVC) filters. Each unit of SRMs 2951, 2952, 2953, 2954, 2956, 2957, and 2958 consists of five filters each containing a nominal mass of 5  $\mu\text{g}$ , 10  $\mu\text{g}$ , 20  $\mu\text{g}$ , 50  $\mu\text{g}$ , 100  $\mu\text{g}$ , 250  $\mu\text{g}$ , 500  $\mu\text{g}$ , and 900  $\mu\text{g}$  of respirable alpha quartz, respectively. Each unit of SRMs 2961, 2962, 2963, 2964, 2966, and 2967, consists of five filters each containing a nominal mass 5  $\mu\text{g}$ , 10  $\mu\text{g}$ , 20  $\mu\text{g}$ , 50  $\mu\text{g}$ , 100  $\mu\text{g}$ , 250  $\mu\text{g}$ , and 500  $\mu\text{g}$  of respirable cristobalite, respectively. Each SRM is packaged with five blank PVC filters containing no crystalline silica. Blank filters and loaded filters are stored in separate, clear plastic Petri dishes with blue spacer sheets separating the individual filters. A unit of SRM 2950 comprises one unit each of SRM 2952, 2953, 2954, 2955, 2956, and 2957. A unit of SRM 2960 comprises one unit each of SRM 2961, 2962, 2963, 2964, 2965, and 2966.



*The loaded PVC filters and blue spacers in SRM 2955.*

More information on SRMs 2950 through 2958 and SRMs 2960 through 2967 is available from the NIST Standard Reference Materials catalog website at [www.nist.gov/srm](http://www.nist.gov/srm).

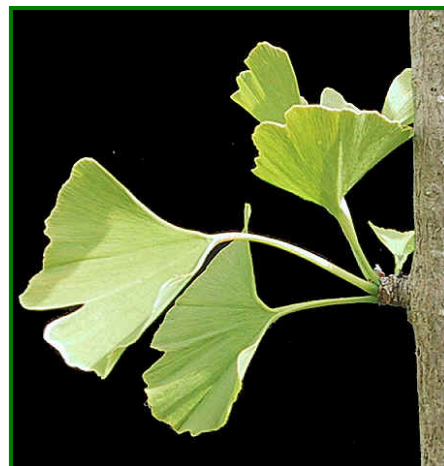
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## NIST SRM 3246 *Ginkgo biloba* Dietary Supplement Standard Reference Materials

NIST is working in collaboration with the National Institutes of Health Office of Dietary Supplements (NIH-ODS), and Food and Drug Administration (FDA), Center for Drug Evaluation and Research (CDER) and Center for Food Safety and Applied Nutrition (CFSAN) to develop Standard Reference Materials (SRMs) to support the development of analytical methods and to provide quality assurance for constituents in dietary supplements. Reference materials are needed for use in method validation and as controls to support the analysis of dietary supplements and related botanical materials. Potential applications include: 1) verification of product label claims; 2) quality assurance in product manufacturing; and 3) support of measurements associated with clinical trials. A suite of three ginkgo-containing reference materials will be the next SRMs to be issued as part of this program.

*Ginkgo biloba* is one of the most popular dietary supplements in the marketplace, with annual worldwide sales estimated at \$1 billion. In traditional Chinese medicine, the fruits/seeds of the female plant are used for a variety of medicinal purposes. In the West, the use of ginkgo leaves and standardized leaf extracts is more common, with applications to the treatment of asthma, fatigue, and tinnitus; for memory improvement; and for Alzheimer's treatment/prevention. *Ginkgo biloba* contains a family of chemical constituents known as ginkgolides, which have been associated with reduced platelet aggregation.



*Ginkgo biloba* Leaves

photo credit:

<http://perso.orange.fr/ginkgo.dm/GINKGO/GbPictures.htm>

A suite of three ginkgo-containing dietary supplement Standard Reference Materials (SRMs) has been developed by NIST with certified values for flavonoid aglycones, ginkgolides, bilobalide, and selected toxic trace elements: SRM 3246 *Ginkgo biloba* (Leaves), SRM 3247 *Ginkgo biloba* Extract, and SRM 3248 Ginkgo-Containing Tablets. These materials represent a variety of natural, extracted, and processed sample matrices that provide different analytical challenges. In addition to the three individual SRMs, all three ginkgo-containing SRMs will be available packaged together, two bottles of each, as SRM 3249.

The Certificates of Analysis for these materials provide certified values for five terpene lactones, three flavonoid aglycones, and four potentially toxic trace elements (arsenic, cadmium, lead, and mercury). The concentrations of the ginkgolides and bilobalide range from approximately 0.2 mg/g to 28 mg/g (sum of total terpene lactones range from 3.3 mg/g to 62.4 mg/g), and the concentrations of the flavonoid aglycones range from approximately 0.5 mg/g to 45 mg/g (sum of total aglycones range from 6 mg/g to 97 mg/g). Levels of arsenic, cadmium, lead, and mercury range from 56 ng/g to 314 ng/g (arsenic), 1.6 ng/g to 21 ng/g (cadmium), 1 ng/g to 4300 ng/g (lead), and 0.3 ng/g to 23 ng/g (mercury).

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## NIST SRM 4359 Seaweed

Biological organisms, including seaweed, are routinely used as indicators of the radionuclide levels in the marine environment important for environmental monitoring, oceanography and biological uptake studies. This is because of their capacity for accumulation of radionuclides from seawater. A seaweed standard reference material for use by the oceanography, marine radioecology, environmental radiochemistry and radioactivity monitoring communities is needed to allow method validation, quality control, and data comparability for low-level radionuclide measurements for this matrix.

The NIST Seaweed SRM is a composite of material containing three species of brown seaweed from the White Sea (*Fucus vesiculosus* and *Laminaria saccharina*) and the west coast of Ireland (*Ascophyllum nodosum*).



*Fucus vesiculosus*



*Laminaria saccharina*



*Ascophyllum nodosum*

The NIST seaweed SRM was developed through an interlaboratory comparison with 24 participants from 16 countries. The certified reference values were provided for 13 radionuclides and information values were given for 15 more radionuclides.

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SRM 4359 Seaweed

# Renewals

- SRM 57b** Silicon Metal
- SRM 634a** Portland Cement
- SRM 764a** Magnetic Susceptibility Standard – Platinum Cylinder
- SRM 1680b** Carbon Monoxide in Nitrogen Lot # 2-I-XX
- SRM 1866b** Common Commercial Asbestos
- SRM 1963a** Nominal 100 nm Diameter Polystyrene Spheres
- SRM 2617** Carbon Dioxide in Nitrogen Lot #26-A-xx
- SRM 2635a** Carbon Monoxide in Nitrogen Lot #58-D-XX
- SRM 2639a** Carbon Monoxide in Nitrogen Lot #54-E-XX
- SRM 3101a** Aluminum Standard Solution Lot #060502
- SRM 3108** Cadmium Standard Solution Lot #060531
- SRM 3141a** Potassium Standard Solution Lot #051220
- SRM 3162a** Titanium Standard Solution Lot #060808
- SRM 3182** Chloride Anion Standard Solution Lot #990506
- SRM 4274** Holmium-166m Gamma-ray Emission Rate Standard
- SRM 4337** Lead-210 Radioactivity Standard



# Revisions

## *Certificate Revisions—Are You Using These Materials?*

This is a list of our most recent certificate revisions. Users of NIST SRMs should ensure that they have the most recent certificates. NIST updates certificates for a variety of reasons, such as to extend the expiration date or to include additional information gained from stability testing. If you do not have the most recent certificate for your material, you can print or view a copy from the website at:

<http://www.nist.gov/srm> or contact SRM at:

**Phone:** 301-975-6776 / 301-975-2200 **Fax:** 301-926-4751 **Email:** [srminfo@nist.gov](mailto:srminfo@nist.gov)

**SRM 661 AISI 4340 Steel**

Corrections to the niobium value and its uncertainty

**SRM 674b X-Ray Powder Diffraction Intensity Set for Quantitative Analysis by X-Ray Powder Diffraction**

Technical and editorial changes

**SRM 699 Alumina (Reduction Grade)**

Update Be value to certified status

**SRM 1264a High-Carbon Steel (Modified)** Correction of certified values for S, Si, and V**SRM 1804c Toxic Volatile Organic Compounds in Nitrogen**

Editorial change

**SRM 2296 Reformulated Gasoline (13 % ETBE)**

Values for 3-methylthiophene and Benzo[b]thiophene were corrected

**SRM 2387 Peanut Butter**

Editorial change

**SRM 2394 Heteroplasmic Mitochondrial DNA Mutation Detection**

Editorial changes

**SRM 2515 Wavelength Calibration Reference for 1595 nm to 1630 nm**

Editorial changes

**SRM 2637a Carbon Monoxide in Nitrogen**

**Lot #56-E-XX**

New Expiration Date:  
01 October 2012

**SRM 2806 Medium Test Dust (MTD) in Hydraulic Fluid**

Update of expiration date and editorial changes

**SRM 3105a Beryllium Standard Solution**

**Lot # 892707**

Update of expiration date and editorial changes

**SRM 3115a Dysprosium Standard Solution**

**Lot # 990504**

Update of expiration date and editorial changes

**SRM 3118a Gadolinium Standard Solution**

**Lot #992004**

Update of expiration date and editorial changes

**SRM 3121 Gold Standard Solution**

**Lot # 991806**

Update of expiration date and editorial changes

**SRM 3138 Palladium Standard Solution**

**Lot #990207**

Update of expiration date and editorial changes

**SRM 3147a Samarium Standard Solution**

**Lot #892911**

Update of expiration date and editorial changes

**SRM 3149 Selenium Standard Solution**

**Lot #992106**

Update of expiration date and editorial changes

**SRM 3165 Vanadium Standard Solution**

**Lot # 992706**

Update of expiration date and editorial changes

**SRM 3192 Aqueous Electrolytic Conductivity**

**Lot #031121**

Clarifies the temperature of measurement

# Order NIST SRMs Online

You can now order NIST SRMs through our new online ordering system, which is constantly being updated. **PLEASE NOTE:** Purchase orders and credit cards may be used when ordering an SRM online. This system is efficient, user-friendly, and secure. Our improved search picks up keywords on the detail page along with the words in the title of each SRM.

In addition, we are in the midst of a project to add numerous certificate references for each SRM online. Please also note we are adding many historical archive certificates online for your convenience.

<https://srmors.nist.gov>

## Please Register Your Certificate Online!

Users of NIST SRMs should ensure that they have the most recent certificates.

<http://www.nist.gov/srd/srmregform.htm>

## SRM 2007 MARKETING CATALOG/CD

If you would like a copy of our new January 2007 SRM Marketing Catalog, Price List or a CD, please call, fax, or email us at:

Ph: 301-975-6776/2200

Fax: 301-948-3730

Email: [srminfo@nist.gov](mailto:srminfo@nist.gov)

These CDs are helpful to SRM users who do not have access to our online catalog on the Internet.



# NIST SRM 2007 Exhibit Schedule

**American Academy for Forensic Science (AAFS)**

*February 20-25, 2007*

Henry B. Gonzalez Convention Center  
San Antonio, TX

**Pittsburgh Conference (PITTCON)**

*February 25- March 2, 2007*

McCormick Place  
Chicago, IL

**American Chemical Society (ACS)**

*March 26-28, 2007*

McCormick Place  
Chicago, IL

**CBD-IAI Forensics**

*March 30-31, 2007*

Rocky Gap Resort  
Cumberland, MD

**NOBCCChE**

*April 1-7, 2007*

J.W. Marriott Resort  
Orlando, FL

**AACC-Clinical Lab Expo (AACC)**

*July 15-19, 2007*

San Diego Convention Center  
San Diego, CA

**IFT-Food Expo**

*July 26-30, 2007*

McCormick Place  
Chicago, IL

**NCSL Symposium**

*July 29-August 2, 2007*

St. Paul River Centre  
Minneapolis, MN

**American Chemical Society (ACS)**

*August 20-22, 2007*

Boston Convention Center  
Boston, MA

**AOAC Annual Meeting (AOAC)**

*September 16-20, 2007*

Hyatt Regency Orange County  
Anaheim, CA

**MS&T-Materials Science & Technology**

*September 17-20, 2007*

COBO Hall  
Detroit, MI

**Chem Show**

*October 30-November 1, 2007*

Javits Convention Center  
New York, NY