NIST National Institute of Standards and Technology U.S. Department of Commerce

SRM SPOTLIGHT

March 2011

Editor: Regina R. Montgomery

Inside:

New and Renewal NIST SRMs/RMs

NIST SRM 1728 Tin Alloy (Sn-3Cu-0.5Ag) Supports Testing of Lead-Free Solder

Standard Reference Material (SRM) 1728 Tin Alloy (Sn-3Cu-0.5Ag) is the first lead-free solder composition issued by the National Institute of Standards and Technology. The SRM provides certified and reference values for bulk composition of the restricted elements Cr, Cd, Hg, and Pb, plus elements As and Sb, which are elements of concern. Also provided are values for the alloying elements Cu and Ag, plus other elements that may be found in scrap and may have deleterious effects on solder alloy performance, including S, Fe, Co, Ni, In, and Bi. Information values are provided for the elements Al, P, Si, and Zn.

Solder alloys are tested using methods based on X-ray fluorescence spectrometry, inductively-coupled plasma optical emission spectrometry, and other common instrumental elemental analysis techniques. Committees of ASTM International and the International Electrotechnical Congress are developing standard test methods that will use NIST SRM 1728 and several other NIST tin alloy SRMs for validation. The other SRMs are SRMs 1727 Anode Tin and SRM 1729 Tin Alloy (97Sn-3Pb).

SRM 1728, issued in disk form, was developed in collaboration with MBH Analytical commercial supplier of certified reference materials, and Universal Scientific Laboratory Pty. Ltd., Milperra, Australia, which created the alloy using a semi-chill casting process to ensure homogeneity of the disks to a depth of at least 10 mm.

Semi-chill cast disks of SRM 1728 showing various stages in manufacturing and testing.

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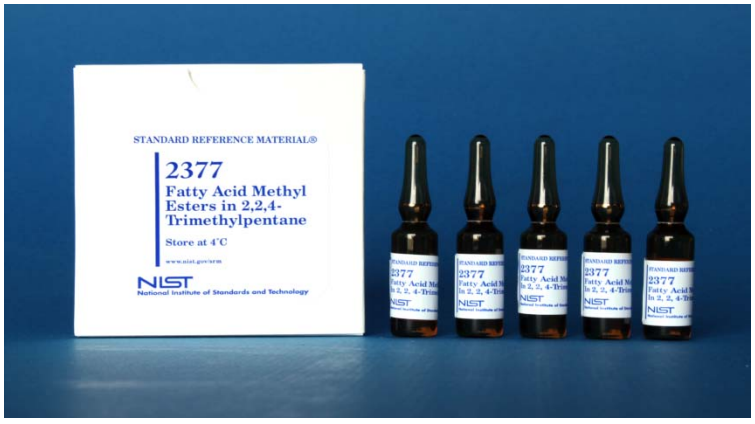
NIST SRM 2377 Fatty Acid Methyl Esters in 2,2,4-Trimethylpentane

NIST has released Standard Reference Material 2377 Fatty Acid Methyl Esters in 2,2,4-Trimethylpentane. This SRM is intended primarily for use in the calibration of chromatographic instrumentation, but it can also be used in spiking solutions for fortification of samples, in studying extraction recoveries, for developing chromatographic separations, and as authentic standards for identifying constituents in unknown samples.

Efforts at NIST to provide SRMs to support the measurement of fatty acids began in the mid-1990s after the U.S. Congress passed the Nutrition Labeling and Education Act, which mandated specifications for the labeling of processed foods. This law requires (in part) that saturated and unsaturated fatty acid content be reported on nutrition labels. Reference materials with fatty acid data are needed to underpin the measurements of chemical composition upon which the labeling is based. NIST provides nearly thirty complex-matrix SRMs that are characterized for fatty acid composition. These materials are intended primarily for use as control materials and for the development of new analytical methods. The use of complex-matrix reference materials for instrument calibration is not recommended; solution calibrants are better suited to this task.

To fill the need for a solution-based reference material, SRM 2377 consists of five 2 mL ampoules, each containing approximately 1.2 mL of a solution containing 26 individual fatty acid methyl esters (FAMEs). The SRM was formulated using FAMEs,rather than the underivatized fatty acids, for user convenience and to enhance solution stability. These compounds include short- and long-chain length and saturated- and unsaturated-FAMEs. Omega-3 and omega-6 FAMEs were included to support characterization of functional foods, such as botanical and fish oils, that are high in levels of the corresponding fatty acids. SRM 2377 is relevant to a broad spectrum of applications including compliance with and accuracy of nutritional labeling, food manufacturing tolerances (e.g., infant formulas), traceability of measurements for food exports, clinical nutritional measurements, and characterization of alternative energy sources (e.g., biodiesel).



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NIST SRM 2906 Trace Explosives Calibration Solutions and ASTM E 2520-07: NIST/ASTM Land a One-Two Punch to Fight Explosives Terrorism

NIST is now offering SRM 2906 Trace Explosives Calibration Solutions so that the performance and reliability of trace-explosives detectors (TEDs) can be independently evaluated. TEDs are an increasingly common sight at airports and loading docks and are carried by firefighters and police to evaluate suspicious packages.

SRM 2906 provides the materials required by a consensus standard protocol for testing TEDs from ASTM International. ASTM E 2520-07, Standard Practice for Verifying Minimum Acceptable Performance of Trace Explosive Detectors, uses calibration solutions of three high explosives: RDX (an ingredient in Composition C-4), PETN (Semtex), and TNT (a military explosive). NIST researchers determined the concentrations of these solutions so they provide an alarm response in well-functioning TEDs. The specified solutions are near, but above, the detection limit of commercial swipe-type detectors, commonly based on ion mobility spectrometry (IMS). In the ASTM protocol, a single drop of explosive solution and a solvent blank are sequentially applied to swipes, the solvents are allowed to evaporate, and the instrument is tested. A simple "yes-no" alarm checklist determines TED performance. Four ampoules of each of the three explosives and blank are provided along with a dropper bottle for each.

This SRM provides independent test materials with low uncertainties in concentration for reliable TED evaluation. Equipment vendors may use the SRM to optimize their designs and demonstrate detector functions to customers. Buyers may use the SRM to make informed equipment selection. The combination of a validated standard practice from ASTM and an SRM provides TED users with a reliable means of verifying initial and continuing field performance of their equipment and contribute to the fight against explosives terrorism. This SRM was produced with partial support from the Office of Standards at the Department of Homeland Security.

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Development and Certification of Green Tea-Containing SRMs

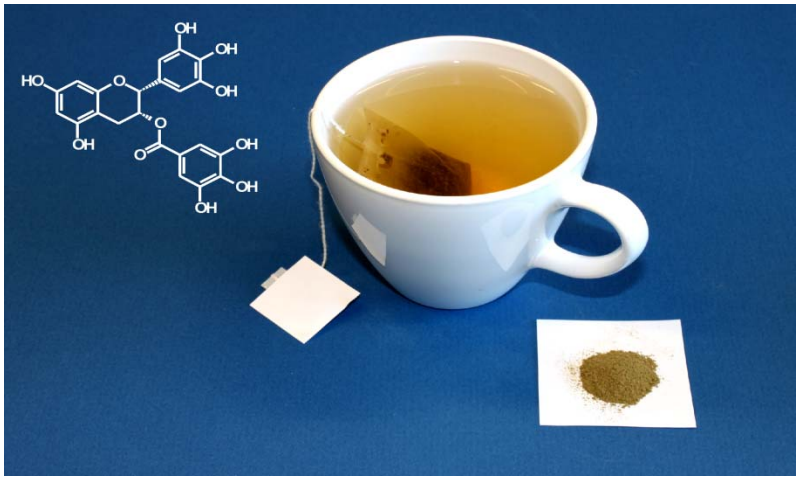
NIST SRM 3254 *Camellia sinensis* (Green Tea) Leaves
NIST SRM 3255 *Camellia sinensis* (Green Tea) Extract
NIST SRM 3256 Green Tea-Containing Solid Oral Dosage Form

A suite of three green tea-containing Standard Reference Materials (SRMs) has been issued as part of a multi-agency effort to support the chemical analysis of dietary supplements. NIST collaborated with the National Institutes of Health, Office of Dietary Supplements and the Food and Drug Administration to develop SRM 3254 *Camellia sinensis* (Green Tea) Leaves, SRM 3255 *Camellia sinensis* (Green Tea) Extract, and SRM 3256 Green Tea-Containing Solid Oral Dosage Form. These SRMs are the first certified reference materials specifically designed to support the measurement of catechins and alkaloids in green tea.

Tea (*Camellia sinensis* L.) has been consumed in some cultures for centuries. Increased interest in this beverage has resulted from perceived health benefits that may be associated with its consumption, and it is now commonly used in dietary supplement formulations. The latter materials are typically marketed as aids for weight loss and as stimulants to promote energy; they are also advertised as exhibiting antioxidant properties. A class of compounds known as catechins are present at high levels (approximately 10% to 15% by mass) in green tea leaves and dietary supplement formulations, and at even higher levels in commercial extracts (75% by mass). Extracts of *C. sinensis* are typically used in the manufacture of dietary supplements to achieve product consistency and greater potency.

A unit of each of the SRMs consists of five single-use packets that contain approximately 1 g to 3 g of powdered material that is characterized for catechins, caffeine and other xanthine alkaloids, theanine, and toxic elements. The materials are intended primarily for use in validating analytical methods and for quality assurance when assigning values to in-house control materials.

These materials were developed as suites to provide a close match for different types of sample matrices. The SRMs are not intended to be archetypes for new product formulations, but instead may provide analytical challenges similar to those encountered by the analyst. By providing SRMs with known composition, a major source of measurement uncertainty is eliminated, leading to improved measurement accuracy.



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RELEASE OF RENEWAL SRM 968e FAT-SOLUBLE VITAMINS, CAROTENOIDS, AND CHOLESTEROL IN HUMAN SERUM

SRM 968e Fat-Soluble Vitamins, Carotenoids, and Cholesterol in Human Serum replaces SRM 968d, which consisted of a single serum pool. This SRM consists of three sera pools that contain natural levels of fat-soluble vitamins, carotenoids and cholesterol in a human serum matrix. The value assignment of the analytes in this SRM supports measurement accuracy and traceability for laboratories performing health-related measurements in the clinical and nutritional communities.

Certified values are provided for total retinol, gamma-tocopherol, alpha-tocopherol, lutein, zeaxanthin, beta-crytoxanthin, total beta-carotene and cholesterol. Reference values are provided for *trans*- and total lycopene, total alpha-carotene and *trans*-beta-carotene. For the production of SRM 968e, retinol, gamma- and alpha-tocopherol, and carotenoids were measured at NIST over a period of several months in tubes of plasma obtained from more than 100 individual units at the time of plasmapheresis. Blending protocols were then specified to result in three sera pools containing target concentration levels. To ensure the homogeneity of all levels in SRM 968e and to address issues of commutability, SRM 968e was produced without supplementing (spiking) any analyte. SRM 968e is used extensively by laboratories worldwide primarily to validate methods for determining these analytes in human serum and plasma and for assigning values to in-house control materials.

The Certificate of Analysis for SRM 968e can be viewed at:
https://www-s.nist.gov/srmors/view_detail.cfm?srm=968E

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NIST Speakers at PITTCON 2011 Atlanta, GA March 13-18 201
Atlanta World Congress Center

DATE	NIST STAFF	EVENT TITLE	TIME	LOCATION
3/13/2011	Gary W. Kramer	Workshop arranged by Gary W. Kramer - Implementing AnIML 1.0	1:00pm	Rm 408
3/13/2011	Gary W. Kramer	What AnIML is Not	1:30pm	Rm 408
3/14/2011	Karen W. Phinney	Workshop arranged by Karen W. Phinney - Analytical Chemistry and the Population:Ensuring the Quality of Biomarker Data in Long-Term Population Studies	8:00am	Rm 409
3/14/2011	Karen W. Phinney, Lane C. Sander, Michele M. Schantz, Katherine E. Sharpless, Stephen A. Wise	Challenges in the Development of Nutritional Reference Materials	9:15am	Rm 409
3/14/2011	Catherine A. Rimmer	Reference Materials in Everyday Measurements	10:40am	Rm 409
3/15/2011	Paul C. DeRose, Neeti Goel, Sandra Da Silva	POSTER Identification and Quantitation of Bacillus Spores Using Fluorescence Detection	10:00am	Red Area, Hall B, Aisle 400
3/16/2011	Elisabeth Mansfield, Stephanie Hooker, Aparna Kar	Microscale Thermogravimetric Analysis of Carbon Nanotube Purity	8:20am	Rm 408
3/16/2011	Karl Selby	Monitoring Nanoparticle Stability in Biological Conditions Using Time Dependent Dynamic Light Scattering	10:15am	Rm 405
3/16/2011	Gas Metrology Group	NTRM Producers Meeting	1:30-4:00p	Hilton Garden Inn Atlanta Downtown 275 Baker St
3/16/2010	Rachel A. Lieberman, Catherine A. Rimmer, Melissa M. Phillips, Lane C Sander	Challenges in the Characterization of St. John's Wort Standard Reference Materials	2:20pm	Rm 316
3/16/2011	Adrian Verwolf	Design and Optimization of a Permeation Testing System for Biocompatible Polymer Films	10:00am	Red Area, Hall B Aisle 400
3/17/2011	William MacCrehan	Workshop arranged by Jose R Amirall and William MacCrehan - New Developments in Forensic Science:Analytical Chemistry Comes to the Crime Scene	8:00am	Rm309
3/17/2011	Greg Gillen	Optimized Sampling and Analysis Strategies for Trace Contraband Detection - Explosives and Norcotics	10:35am	Rm309
3/17/2011	Ashley Beasley, David Bunk, Karen W. Phinney	POSTER Development of a Reference Measurement Procedure to Quantify Urinary Albumin	10:00am	Red Area, Hall B Aisle 400

NIST Speakers at PITTCON 2011 Atlanta, GA March 13-18 2011
Atlanta World Congress Center (continued)

DATE	NIST STAFF	EVENT TITLE	TIME	LOCATION
3/17/2011	Eric Windsor, Greg Gillen, Marcela Najarro	POSTER Use of Inkjet Printing Technology to Produce Test Materials for Trace Explosive Analysis	10:00am	Red Area, Hall B Aisle 400
3/17/2011	Melissa M. Phillips, Ryan G. Brennan, Thomas P. Moffat	POSTER Analytical Characterization of Commercial SPS and MPS by Ion Chromatography and Mass Spectrometry	10:00am	Red Area, Hall B Aisle 400
3/17/2011	Samuel Martin Stavis	Three-dimensional Nanofluidic Metrology	3:50pm	Rm309
3/17/2011	Gerald D. Mitchell, Stephen E. Long, Jeff Ryan	Si Traceability of the Output Concentration of Mercury Vapor Generators	3:55pm	Rm405
3/17/2011	Melissa M. Phillips, Lane C. Sander, Katherine E. Sharpless, Stephen A. Wise	Determination of Water-Soluble Vitamins in Food-Matrix SRMs	2:20pm	Rm218
3/17/2011	Thomas W. Vetter, Savelas A. Rabb, Ryan G. Brennan, Karen E. Murphy, Stephen E. Long	Determination of Electrolytes in Human Serum:Comparison of Results for Ion-exchange Separated Samples and Non-separated Samples	3:00pm	Rm404
3/17/2011	Jennifer Carney, George Rhoderick, Walter Miller	The NIST Atmospheric Methane Gas Standard Scale	3:00pm	Rm408

Renewals

SRM 909c Human Serum

SRM 968e Fat Soluble Vitamins, Carotenoids, and Cholesterol in Human Serum

SRM 2092 Low-Energy Charpy

SRM 2096 High-Energy Charpy

SRM 2692c Bituminous Coal (Sulfur, Mercury and Chlorine)

SRM 2771 Sulfur in Diesel Fuel Blend Stock

SRM 4288b Technetium-99 Radioactivity Standard

Revisions

Certificate Revisions: Are You Using These Materials?

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

Phone: 301-975-2200 **Fax:** 301-926-4751 **Email**: srminfo@nist.gov

SRM 154c Titanium Dioxide
New expiration date: 31 December 2020
Editorial changes

SRM 1007b Smoke Density Chamber Standard
Technical changes

SRM 1566b Oyster Tissue
Editorial changes

SRM 1621e Sulfur in Residual Fuel Oil (1 %)
New expiration date: 01 July 2016
Editorial changes

SRM 1661a Sulfur Dioxide in Nitrogen (Nominal 500 µmol/mol)
New expiration date: 15 January 2017
Editorial changes

Revisions (continued)

SRM 1686b Nitric Oxide in Nitrogen (Nominal 500 µmol/mol)
New expiration date: 07 January 2018

SRM 1917 Mercury Porosimetry Standard
New expiration date: 01 October 2020
Editorial changes

SRM 1955 Homocysteine and Folate in Human Serum
New expiration date: 31 December 2013
Editorial changes

SRM 1984 Thermal Spray Powder – Particle Size Distribution Tungsten Carbide/Cobalt (Acicular)
New expiration date: 08 August 2015
Editorial changes

SRM 2241 Relative Intensity Correction Standard for Raman Spectroscopy : 785 nm Excitation
New expiration date: 30 November 2015
Editorial changes
Recertification

SRM 2583 Trace Elements in Indoor Dust Nominal 90 mg/kg Lead
New expiration date: 31 December 2015
Editorial changes

SRM 2584 Trace Elements in Indoor Dust (Nominal 1 % Lead)
New expiration date: 31 December 2015
Editorial changes

SRM 2687 Portland Cement Clinker
Editorial changes

SRM 2745 Carbon Dioxide in Nitrogen (Nominal Amount-of-Substance Fraction – 16 % mol/mol)
Lot #9-C-XX
New expiration date: 02 June 2017
Editorial changes

SRM 3118a Gadolinium (Gd) Standard Solution
Lot #992004
New expiration date: 12 May 2016
Editorial changes

SRM 3191 Aqueous Electrolytic Conductivity
New expiration date: 05 June 2011

Revisions (continued)

SRM 4926e Hydrogen 3 Radioactivity Standard
Editorial changes

RM 8506a Water in Transformer Oil
New expiration date: 31 December 2018
Editorial changes

RM 8642 FDA Saxitoxin Dihydrochloride Solution
New expiration date: 01 July 2013
Editorial changes

ORDER NIST SRMs ONLINE

You can now order NIST SRMs through our new online ordering system, which is continually 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 function finds keywords on SRM detail pages as well as words in titles.

Also note that we are placing many historical archive certificates online for your convenience.

https://srmors.nist.gov

Please Register Your Certificate Online!

Registering will ensure that you have the most recent certificates.

http://tsapps.nist.gov/msdsurvey/register/default.aspx?ID=2

January 2011 Standard Reference Materials® Catalog/CD

If you would like a copy of our new January 2011 SRM Marketing Catalog or a CD, please call, fax, or email us at:

Ph: 301-975-2200
Fax: 301-948-3730
Email: srminfo@nist.gov

NIST SRM 2011 Exhibit Schedule

Electronic Materials and Applications (EMA)
January 19-21, 2011
Royal Plaza Walt Disney World Resort
Orlando, FL

Energy & Environment Conference (EUEC)
January 31 – February 2, 2011
Phoenix Convention Center
Phoenix, Arizona

American Academy for Forensic Science (AAFS)
February 23 – 25, 2011
Hyatt Regency
Chicago, IL

The Minerals, Metals, and Material Society (TMS)
February 27 – March 3, 2011
San Diego Convention Center
San Diego, CA

Pittsburgh Conference (PITTCON)
March 13 – 18, 2011
Georgia World Congress Center
Atlanta, GA

American Chemical Society (ACS)
March 27 – 31, 2011
Anaheim Convention Center
Anaheim, CA

Materials Research Society Spring Meeting (MRS)
April 25 – 29, 2011
Moscone West
San Francisco, CA

Clearwater Clean Coal Conference
June 5-9, 2011
Sheraton Sand Key
Clearwater, FL

IFT – Food Expo
June 12- 14, 2011
New Orleans Morial Convention Center
New Orleans, LA

ISO/REMCO 34th Meeting
July 11-15, 2011
Delft, Netherlands

AACC Clinical Lab Expo
July 26-28, 2011
Georgia World Congress Center
Atlanta, GA

NCSL Symposium
August 21-25, 2011
Gaylord Natl. Convention Center
National Harbor, MD

Dioxin 2011
August 21-25, 2011
Brussels, Belgium

American Chemical Society (ACS)
August 28-September1, 2011
Denver Convention Center
Denver, CO

AOAC International
September 18-21, 2011
Sheraton New Orleans
New Orleans, LA

MS&T Show
October 16-20, 2011
Greater Columbus Convention Center
Columbus, OH

Air Quality VIII
October 24-27, 2011
Marriott Crystal Gateway
Arlington, VA

ChemShow
November 1-3, 2011
Jacob Javits Convention Center
New York City, NY

Material Research Society Fall Meeting (MRS)
November 28-December 2, 2011
Hynes Convention Center
Boston, MA

IMPORTANT MESSAGE when accessing the SRM website at http://www.nist.gov/srm

PLEASE NOTE: New security settings to protect your private information have been mandated by the U.S. government. The following are instructions to upgrade your browser settings so you can view SRM documents, perform searches, and order online.

For Mozilla Firefox

1) You must have version 3.0.5 or later
2) Enable SSL 3.0
3) Enable TLS 1.0

To enable SSL 3.0 and TLS 1.0

1) Go to Tools > Options
2) Click on the Advanced icon
3) Click the Encryption tab
4) Under Protocols, make sure both boxes are checked

For Internet Explorer

1) You must have version 6.0 or later
2) Enable SSL 3.0
3) Enable TLS 1.0

To enable SSL 3.0 and TLS 1.0

1) Go to Tools > Internet Options
2) Click on the Advanced tab
3) Scroll down to Security

3) Make sure that both SSL 3.0 and TLS 1.0 are checked

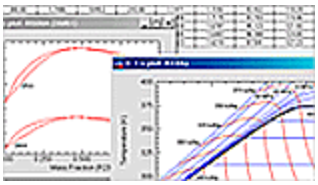
Other NIST Measurement Services Websites of Interest

Standard Reference Materials

Standard Reference Materials
www.nist.gov/srm

Historical Archived Certificates/Reports of Investigation
https://www-s.nist.gov/srmors/certArchive.cfm

Standard Reference Data



NIST Scientific and Technical Databases
http://www.nist.gov/srd

NIST Data Gateway
http://srdata.nist.gov/gateway

Calibrations

Calibrations Services
http://www.nist.gov/calibrations

Please take the time to rate our products:
http://tsapps.nist.gov/msdsurvey/Default.aspx

We appreciate your feedback!