Date of Issue:
18 June 2015

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 983
SRM Name: Radiogenic Lead Isotopic Standard
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended for use as an isotopic standard. A unit of SRM 983 consists of 1 g of wire that was prepared from radiogenic lead.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: http://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. Hazards Identification

Radiological Hazard

Warning: THIS MATERIAL SHOULD ONLY BE USED BY PERSONS QUALIFIED TO HANDLE RADIOACTIVE MATERIAL!

This product contains licensed radioactive material and is therefore subject to the requirements of 10 CFR Part 20 (e.g., public and occupational exposure limits, waste disposal). At a minimum, the basic radiation safety principles of time, distance, and shielding, and appropriate radiation contamination control should be practiced to avoid/minimize any external and/or internal exposure. Consult with your Radiation Safety office for your facility's radiation safety requirements/precautions specific to the radionuclide(s) (including its activity and chemical/physical form) in this Radioactive SRM.

SRM 983 is a radioactive material containing lead-210 of natural origin, with massic activity of approximately 16 kBq•g^{-1}. Lead-210 decays by beta-particle emission to bismuth-210, which also decays by beta-particle emission to polonium-210 that decays by alpha-particle emission. During the decay process x-rays and gamma rays with energies from 10 keV to 47 keV are produced.

Classification

Physical Hazard: There are no known physical hazards associated with this material.

Health Hazard:		
	Acute Toxicity, Oral	Category 4
	Acute Toxicity, Inhalation	Category 4
	Carcinogenicity	Category 1B
	Reproductive Toxicity	Category 1A
	STOT, Repeated Exposure	Category 2

Label Elements

Symbol:

Signal Word: DANGER

Hazard Statement(s):

H302	Harmful if swallowed.
H332	Harmful if inhaled.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

Precautionary Statement(s):

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear eye protection, protective gloves and clothing.
P301 + P312	If swallowed: Call a doctor if you feel unwell.
P330	Rinse mouth.
P304 + P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P308 + P313	If exposed of concerned: Get medical attention.
P405	Store locked up.
P501	Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: None.

Ingredients(s) with Unknown Acute Toxicity: None.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Lead

Other Designations: Lead metal; plumbum.

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the NIST Certificate.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Lead	7439-92-1	231-100-4	100

4. FIRST AID MEASURES

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes. If necessary, seek medical attention.

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If a large amount is swallowed, seek medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Nausea, vomiting, metallic taste, thirst, a burning sensation in the mouth and throat, salivation, abdominal pain with severe colic. Delayed effects include cancer, birth defects, and reproductive effects.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek immediate medical attention.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Use extinguishing media appropriate to the surrounding fire.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: Oxides of lead.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings: (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1 Fire = 0 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

This material is radioactive. DO NOT touch released material. Immediately notify safety personnel of a release.

Personal Precautions, Protective Equipment, Methods and Materials for Containment and Clean up:

Radiological Emergency Procedures:
*The following is a guide for first responders. The following actions, including remediation, should be carried out by qualified individuals. In cases where a life-threatening injury occurs concurrent with personal contamination, treat the injury **first.***
Do not touch damaged packages. In addition to those actions described below, the guidelines in the 2012 Emergency Response Guidebook (ERG) provide more specific measures that should be followed.

Damage to the Radioactive Source:
Evacuate the immediate vicinity around the source.
Place a barrier at a safe distance from the source.
Identify area as a radiation hazard.

Suggested Emergency Protective Equipment:
Gloves
Footwear Covers
Outer layer or easily removed protective clothing (as situation requires)

7. HANDLING AND STORAGE

Safe Handling Precautions and Storage: This material is radioactive. Store and handle in accordance with all current regulations and standards. See NRC 10 CFR 20 or state regulations. See Section 8, "Exposure Controls and Personal Protection".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Pb-210

ALI_{inh}: 0.2 µCi or 7.4 kBq (bone surface) See NRC 10 CFR 20 Appendix B.
ALI_{ing}: 0.6 µCi or 22.2 kBq (bone surface).
OSHA: See OSHA 29 CFR and NRC 10 CFR 20.
ACGIH: See International Commission on Radiological Protection guidelines.

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Wear protective clothing to prevent contact with skin. Wear appropriate gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties	**Lead**
Appearance (physical state, color, etc.)	white to grey wire
Molecular Formula	Pb
Molar Mass (g/mol)	207.20
Odor	not available
Odor threshold	not available
pH	not available
Evaporation rate	not available
Melting point/freezing point	328 ºC (622 ºF)
Relative Density (g/L) as specific gravity (water = 1)	11.3
Vapor Pressure	1.3 mmHg at 970 °C
Vapor Density (air = 1)	not available
Viscosity (cP)	not available
Solubility(ies)	almost insoluble in water; soluble in nitric acid and hot concentrated sulfuric acid
Partition coefficient (n-octanol/water)	not available
Thermal Stability Properties	not applicable
Autoignition Temperature	not applicable
Thermal Decomposition	not applicable
Initial boiling point and boiling range	1740 ºC (3164 ºF)
Explosive Limits, LEL (Volume %)	not applicable
Explosive Limits, UEL (Volume %)	not applicable
Flash Point	not applicable
Flammability (solid, gas)	not applicable

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: None reported.

Incompatible Materials: Oxidizing materials, halogens, combustible materials, peroxides, metals, metal carbide, and acids.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Oxides of lead.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Fatigue, weakness, anorexia, anemia, jaundice, encephalopathy.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Short term inhalation of lead may cause irritation, nausea, vomiting, kidney damage, liver damage. Prolonged exposure to lead may result in an accumulation in body tissues and exert adverse effects on the blood, nervous system, heart, endocrine and immune systems, kidneys, and reproduction.

Skin Contact: Prolonged or repeated exposure to lead may cause irritation; exposure to lead powder may cause dermatitis.

Eye Contact: Contact with lead may cause eye irritation.

Ingestion: Ingestion of this material is unlikely under normal conditions of use. Ingestion of lead may cause kidney damage or liver damage; chronic ingestion may result in accumulation in body tissues and may also cause cancer.

Numerical Measures of Toxicity:

Acute Toxicity: Category 4, oral and inhalation.

Skin Corrosion/Irritation: Not classified; no data available.

Serious Eye damage/Irritation: Not classified; no data available.

Respiratory Sensitization: Not classified; no data available.

Skin Sensitization: Not classified; no data available.

Germ Cell Mutagenicity: Not classified; no data available.

Carcinogenicity: Category 1B

Listed as a Carcinogen/Potential Carcinogen X Yes _____ No
Lead is listed as reasonably anticipated to be a human carcinogen per NTP.
IARC lists inorganic lead in Group 2A (probably carcinogenic to humans).

Radiological Hazard: Lead-210
Ionizing radiation is a known carcinogen.

Reproductive Toxicity: Category 1A; lead crosses the placenta and may affect the fetus causing birth defects, mental retardation, behavioral disorders, and death during the first year of childhood.

Specific Target Organ Toxicity, Single Exposure: Not classified; no data available.

Specific Target Organ Toxicity, Repeated Exposure: Category 2; lead can accumulate in body tissues.

Aspiration Hazard: No data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: Carp (*Cyprinus carpio*), LC50: 0.44 mg/L (96 h, semi-static)
Trout (*Oncorhynchus mykiss*), LC50: 1.17 mg/L (96 h, flow-through)

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse Effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: This material is radioactive. Dispose in accordance with all applicable federal, state, and local regulations for **RADIOACTIVE** materials. See NRC 10 CFR 20 subpart K.

Dispose of waste in accordance with all applicable federal, state, and local regulations. Lead Hazardous Waste Number(s): D008. Lead subject to U.S. EPA 40 CFR 262 for concentrations at or above the regulatory level of 5.0 mg/L.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA:
Primary Risk: UN2910, Radioactive Material Excepted Package, Hazard Class 7.
Subsidiary Risk: Not applicable.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): 10 lbs (4.54 kg) final RQ – no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 μm.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): 0.1 % Supplier notification limit; 0.1 % de minimis concentration (when contained in stainless steel, brass, or bronze).

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	Yes.
CHRONIC HEALTH:	Yes.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:

WARNING! This product contains chemicals (lead) known to the state of California to cause cancer and reproductive/developmental effects.

U.S. TSCA Inventory: Lead is listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations: WHMIS Information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 18 June 2015

Sources: ChemAdvisor, Inc., SDS *Lead,* 20 March 2015.

OSHA 29 CFR, Subpart Z, Ionizing radiation, 1910.1096.

NRC 10 CFR 20, Standards for Protection Against Radiation.

DOT 49 CFR 173, Shippers General Requirements for Shipments and Packages.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NIOSH	National Institute for Occupational Safety and Health
ALI	Annual Limit on Intake	NIST	National Institute of Standards and Technology
CAS	Chemical Abstracts Service	NRC	Nuclear Regulatory Commission
CEN	European Committee for Standardization	NTP	National Toxicology Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	OSHA	Occupational Safety and Health Administration
CFR	Code of Federal Regulations	PEL	Permissible Exposure Limit
CPSU	Coal Mine Dust Personal Sample Unit	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
ISO	International Organization for Standardization	STEL	Short Term Exposure Limit
LC50	Lethal Concentration, 50 %	TDLo	Toxic Dose Low
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
MSHA	Mine Safety and Health Administration	UEL	Upper Explosive Limit
		WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of this material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at http://www.nist.gov/srm.