

# MATERIAL SAFETY DATA SHEET

## 1. SUBSTANCE AND SOURCE IDENTIFICATION

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

SRM Number: 934  
MSDS Number: 934  
SRM Name: Clinical Laboratory  
Thermometer

Date of Issue: 01 May 2007

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**Description:** This Standard Reference Material (SRM) is intended for use in clinical laboratories as a primary calibrant, particularly in the area of clinical enzymology. The thermometer is a solid-stem, mercury-in-glass, 300 mm  $\pm$  5 mm in length, and marked with a 95-mm immersion line. The stem is plain front, enameled back, made of lead-glass thermometric tubing 7 mm in diameter. Nitrogen gas fills the space above the mercury.

**Substance:** Clinical Laboratory Thermometer

## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS<sup>(a)</sup>

<b>Component:</b>	Mercury
<b>Other Designations:</b>	Mercury (metallic mercury; colloidal mercury; inorganic mercury; elemental mercury; quicksilver; hydrargyrum)
<b>CAS Number:</b>	7439-97-6
<b>EC Number (EINECS):</b>	231-106-7
<b>Nominal Concentration (%):</b>	100
<b>EC Classification:</b>	T, N
<b>EC Risk:</b>	R23, R33, R50/53
<b>EC Safety:</b>	S1/2, S45, S60, S61
<b>EC Risk/Safety Phrases:</b>	See Section 15, "Regulatory Information".

<sup>(a)</sup> Hazardous components 1 % or greater; carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

## 3. HAZARDS IDENTIFICATION

**NFPA Ratings (Scale 0–4):** Health = 2      Fire = 0      Reactivity = 0

**Major Health Hazards:** Allergic reactions.

**Medical Conditions Aggravated by Exposure:** Kidney disorders. Nervous system disorders. Respiratory disorders.

**Target Organs:** Immune system. Nervous system. Kidneys.

**Potential Health Effects**

**Inhalation:** Inhalation of high levels of mercury vapor can lead to respiratory irritation and may include symptoms such as chest pains, coughing and breathing difficulties. Symptoms may progress to bronchiolitis, pneumonitis, pulmonary edema, pneumothorax, interstitial bronchiolitis, and death. Allergic reactions that may occur in previously exposed persons include dermatitis, encephalitis, and death. Kidney damage may also occur. Chronic exposure to vapor fumes may cause mercurialism.

**Skin Contact:** Direct contact with mercury liquid may cause irritation and redness. Small amounts of mercury may be absorbed through intact skin. Allergic reactions may occur in previously exposed persons. Symptoms may include dermatitis, encephalitis, and death. Handling broken thermometers may cause subcutaneous introduction of mercury. This may result in local inflammation, reactions, and slight signs of mercury poisoning. Mercury poisoning may cause digestive disorders, metallic thirst in the mouth, and neuropsychic disorders.

**Eye Contact:** Direct contact with mercury liquid may cause irritation and redness.

**Ingestion:** Ingestion may cause burning of the mouth and throat, thirst, nausea, and vomiting. Metallic mercury is not usually absorbed sufficiently from the gastrointestinal tract to induce an acute toxic response. Rarely, a large single dose may result in signs and symptoms of chronic inhalation if sufficient amounts of mercury are retained in the body. Repeated ingestion of small amounts of mercury may result in absorption of sufficient amounts to produce toxic effects as detailed above in chronic inhalation exposure.

**Listed as a Carcinogen/  
Potential Carcinogen:**

Yes	No	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	In the National Toxicology Program (NTP) Report on Carcinogens.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	In the International Agency for Research on Cancer (IARC) Monographs.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	By the Occupational Safety and Health Administration (OSHA).

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#### 4. FIRST AID MEASURES

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**Inhalation:** If adverse effects occur, immediately move the person to fresh air. If person is not breathing, give artificial respiration by qualified personnel. If breathing is difficult, administer oxygen by qualified personnel. Get immediate medical attention.

**Skin Contact:** Wash affected skin with soap and water for at least 15 minutes. Get medical attention if needed.

**Eye Contact:** Flush eyes with running water for at least 15 minutes, keeping eyelids open and raising lids to remove all chemical. Get immediate medical attention.

**Ingestion:** If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Immediately get medical attention.

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#### 5. FIRE FIGHTING MEASURES

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**Fire and Explosion Hazards:** This material is a negligible fire hazard.

**Extinguishing Media:** Use regular dry chemical, carbon dioxide, water, or regular foam.

**Fire Fighting:** Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**Flash Point:** Not applicable.

**Method Used:** Not applicable.

**Autoignition Temperature:** Not applicable.

**Flammability Limits in Air**

**Upper (Volume %):** Not applicable.

**Lower (Volume %):** Not applicable.

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## 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:** Do NOT touch spilled material. Use appropriate respiratory protection if exposure exceeds limit. For spills less than or equal to the amount in a thermometer: Put on rubber or latex gloves. If there are any broken pieces of glass, pick them up with care. Place and fold in a paper towel and secure in a zip lock bag. Label it as directed by your local health or fire department. Locate visible mercury beads. Inspect the spill area with a bright light to help illuminate any hidden droplets. Clean up any beads of mercury by using an index card and plastic dustpan, gently push the mercury droplets toward other droplets to combine them into larger droplets. Slide droplets onto a sheet of rigid paper like an index card or use an eyedropper to collect or draw-up the mercury beads. *Never use a broom or a vacuum on a mercury spill because it will only scatter the mercury droplets, making them harder to find and pick up.* Carefully squeeze mercury onto a damp paper towel. Place the paper towel in a zip lock bag and secure. Use duct tape to collect smaller hard-to-see beads. Place the duct tape in a zip lock bag and secure. Make sure to label the bag as directed by your local health or fire department and keep sealed for disposal. It is OPTIONAL to use powdered sulfur to absorb the beads that are too small to see. The sulfur makes the mercury easier to see (there may be a color change from yellow to brown), binds the mercury so that it can be easily removed, and suppresses the vapor of any missing mercury. Collect the powder as was done with mercury beads.

**Disposal:** See Section 13, "Disposal Considerations".

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## 7. HANDLING AND STORAGE

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**Storage:** Handle and store thermometer with proper care. Store and handle in accordance with all current regulations and standards.

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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**Exposure Limits:** **Mercury**  
OSHA (PEL): 0.1 mg/m<sup>3</sup> ceiling  
ACGIH (TLV): 0.10 mg/m<sup>3</sup> (aryl) (skin) TWA  
ACGIH (TLV): 0.025 mg/m<sup>3</sup> (metal and inorganic compounds) (skin) TWA  
NIOSH: 0.05 mg/m<sup>3</sup> recommended TWA (10 h) (vapor) (skin)  
NIOSH: 0.1 mg/m<sup>3</sup> recommended ceiling (skin)

**Ventilation:** Use local or general exhaust.

**Respirator:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed if workplace conditions warrant a respirator. Refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.

**Eye Protection:** Wear safety goggles. An eye wash station should be readily available near areas of use.

**Personal Protections:** Wear appropriate chemical-resistant clothing and gloves to prevent skin exposure.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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**Component:** **Mercury**  
**Appearance and Odor:** Liquid. Gray metallic. Mobile. Odorless.  
**Relative Molecular Weight:** 200.59  
**Molecular Formula:** Hg  
**Density:** 13.59 g/cm<sup>3</sup>  
**Vapor Pressure:** 0.002 mm Hg @ 25 °C

**Solvent Solubility:** Soluble in hot sulfuric acid, nitric acid, and lipids. Insoluble in alcohol, ether, hydrochloric acid, hydrogen bromide, hydrogen iodide.  
**Water Solubility:** Insoluble.  
**Freezing Point:** -39 °C (-38 °F)

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## 10. STABILITY AND REACTIVITY

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**Stability:**  Stable  Unstable  
Stable at normal temperatures and pressure.

**Conditions to Avoid:** Avoid heat, flames, sparks, and other sources of ignition.

**Incompatible Materials:** Combustible materials. Metals. Amines. Halogens. Oxidizing materials. Acids. Metal carbide.

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

**Hazardous Decomposition:** Thermal decomposition may produce mercury and oxides of mercury.

**Hazardous Polymerization:**  Will Occur  Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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**Route of Entry:**  Inhalation  Skin  Ingestion

**Toxicity Data:** Man (oral), TD<sub>LO</sub>: 43 mg/kg  
Man (inhalation) TC<sub>LO</sub>: 44 300 µg/m<sup>3</sup> (8 h)  
Woman (inhalation) TC<sub>LO</sub>: 150 µg/m<sup>3</sup> (46 days)  
Man (subcutaneous) TD<sub>LO</sub>: 714 µL/kg

**Reproductive, Tumorigenic, Mutagenic Data:** Mercury has been investigated as a tumorigenic, mutagenic, and reproductive effector.

**Health Effects (Acute and Chronic):** See Section 3, "Hazards Identification".

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## 12. ECOLOGICAL INFORMATION

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**Ecotoxicity:** **Fish Toxicity:** Carp, common, mirror, colored (*Cyprinus carpio*) LC<sub>50</sub> (mortality): 180 µg/L (96 h)

**Invertebrate Toxicity:** Calanoid copepod (*Eurytemora affinis*) LC<sub>50</sub> (mortality): 158 µg/L (96 h)

**Phototoxicity:** Water-milfoil (*Myriophyllum spicatum*) EC<sub>50</sub> (growth): 1 200 µg/L (32 weeks)

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal:** Remove mercury and materials that have come in contact with mercury to proper disposal area. Do NOT put in garbage, flush in sewer, or incinerate. Dispose of in accordance with federal, state, and local regulations. Many states and local agencies have developed collection/exchange programs for mercury-containing devices. Mercury is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Number U151 and D009. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the regulatory level of 0.2 mg/L.

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## 14. TRANSPORTATION INFORMATION

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**U.S. DOT and IATA:** Mercury in Manufactured Articles; UN2809; Hazard Class 8; Packing Group III; (This article is excepted from the regulations per DOT 173.164 and IATA Packing Instructions 805 and Special Provisions A48 and A69.)

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## 15. REGULATORY INFORMATION

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**U.S. Regulations:** CERCLA Sections 102a/103 (40 CFR 302.4): Mercury 0.454 kg (1 lbs) Reportable Quantity (RQ).  
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): Mercury and mercury compounds.  
OSHA Process Safety (29 CFR 1910.119): Not regulated.  
California Proposition 65: Mercury and mercury compounds: Developmental toxicity (Jul, 1990).  
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):  
    ACUTE: Yes.  
    CHRONIC: Yes.  
    FIRE: No.  
    REACTIVE: No.  
    SUDDEN RELEASE: No.

**CANADIAN Regulations:** WHMIS Classification: Not provided for this material.

**National Inventory Status:** U.S. Inventory (TSCA): Listed on inventory.  
TSCA 12b Export Notification: Not listed.

**EC Classification:** T Toxic  
N Dangerous for the environment.

**EC Risk and Safety Phrases:** R23 Toxic by inhalation.  
R33 Danger of cumulative effects.  
R50/53 Very toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.  
S1/2 Keep locked up and out of the reach of children.  
S45 In case of accident, seek medical advice immediately.  
S60 This material and its container must be disposed of as hazardous waste.  
S61 Avoid release to the environment.

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## 16. OTHER INFORMATION

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**Sources:** MDL Information Systems, Inc., MSDS *Mercury*, 07 December 2006.

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