

# MATERIAL SAFETY DATA SHEET

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## 1. SUBSTANCE AND SOURCE IDENTIFICATION

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

SRM Number: 4949c  
MSDS Number: 4949c  
SRM Name: Iodine-129 Radioactivity  
Standard

Date of Issue: 11 April 2013

Telephone: 301-975-2200  
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1-800-424-9300 (North America)  
+1-703-527-3887 (International)

**Description:** This Standard Reference Material (SRM) consists of radioactive Iodine-129 as sodium iodide, sodium hydroxide, and sodium sulphite dissolved in 5 mL of distilled water. This SRM is intended for the calibration of beta-particle instruments and for the monitoring of radiochemical procedures.

**Substance:** Iodine-129/sodium hydroxide/sodium iodide/sodium sulphite, solution

**Other Designations:**

**Water/sodium hydroxide/sodium iodide/sodium sulphite solution:** Not applicable.

**Iodine-129:** Not applicable.

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## 2. HAZARDS IDENTIFICATION

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**NFPA Ratings (Scale 0-4):** Health = 3      Fire = 0      Reactivity = 0

**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 4949c is a radioactive material, Iodine-129, with a massic activity of 3451 Bq•g<sup>-1</sup> in a sodium hydroxide and sodium sulphite solution. Iodine-129 decays by beta-particle emission. During the decay process X-rays and gamma rays, with energies from 4 keV to 40 keV are emitted.**

**Major Health Hazards:** There are no major chemical health hazards associated with this sodium hydroxide/sodium iodide/sodium sulphite solution due to the extremely low concentrations of each chemical.

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

**Potential Health Effects**

**Inhalation:** Not applicable.

**Skin Contact:** Sodium hydroxide in concentrations  $\geq 0.5\%$  and  $\leq 2.0\%$  are classified as irritant. Sodium iodide and sodium sulphite in their pure forms are classified as irritants. The low concentrations in this solution are not expected to pose an irritation hazard.

**Eye Contact:** Sodium hydroxide in concentrations between 0.5 and 2.0 % are classified as an irritant. Sodium iodide and sodium sulphite in their pure forms are classified as irritants. The low concentrations in this solution are not expected to pose an irritation hazard.

**Ingestion:** Ingestion of this material is unlikely under normal conditions of use. If ingested seek immediate medical attention.

### Listed as a Carcinogen/ Potential Carcinogen:

Component: Water/sodium hydroxide/sodium iodide/sodium sulphite solution	<u>Yes</u>	<u>No</u>
In the National Toxicology Program (NTP) Report on Carcinogens	<u>      </u>	<u>X</u>
In the International Agency for Research on Cancer (IARC) Monographs	<u>      </u>	<u>X</u>
By the Occupational Safety and Health Administration (OSHA)	<u>      </u>	<u>X</u>

### Radiological Hazard: I-129

Ionizing radiation is a known carcinogen.

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## 3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

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Component	CAS Registry	EC Number (EINECS)	Nominal Mass Concentration (%)
Sodium hydroxide	1310-73-2	215-185-5	0.04
Sodium sulphite	7757-83-7	231-821-4	0.08
Sodium iodide	7681-82-5	231-679-3	0.06
Iodine-129	Not applicable	Not applicable	0.06
Water, distilled (non-hazardous)	7732-18-5	231-791-2	> 99.8

**Component:** Water/sodium hydroxide/sodium iodide/sodium sulphite solution.

**EC Classification:** Not classified.

**EC Risk (R No.):** Not assigned.

**EC Safety (S No.):** Not assigned.

**Component:** Iodine-129

**EC Classification:** No classification assigned.

**EC Risk (R No.):** Not assigned.

**EC Safety (S No.):** Not assigned.

**EC Classification, R/S Phrases:** Refer to Section 15, "Regulatory Information".

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## 4. FIRST AID MEASURES

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**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:** Rinse affected area with copious amounts of water followed by washing with soap and water for at least 15 minutes while removing contaminated clothing. Seek medical attention, if needed.

**Eye Contact:** Immediately flush eyes, including under the eyelids with copious amounts of water for at least 30 minutes. Seek immediate medical attention.

**Ingestion:** Contact a poison control center immediately for instructions. Wash out mouth with water, but do not induce vomiting. Seek medical aid at once, and bring the container or label.

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## 5. FIRE FIGHTING MEASURES

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**Fire and Explosion Hazards:** Negligible fire hazard.

**Extinguishing Media:** Use extinguishing media appropriate to the surrounding fire.

**Fire Fighting:** Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**Flash Point (°C):** Not applicable.

**Autoignition (°C):** 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:** This material is radioactive. **DO NOT touch spilled material.** Immediately notify safety personnel of a spill.

## 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 or spilled material. Handle as a radioactive material spill. In addition to those actions described below, the guidelines in the 2012 Emergency Response Guidebook (ERG) provide more specific measures that should be followed.

### Spill and Leak Control

- Alert and clear everyone from the area affected by the spill.
- Take actions to limit the spread of contamination.
- Summon Aid.

### 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)

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## 7. HANDLING AND STORAGE

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**Storage:** This material is radioactive. Store and handle in accordance with all current regulations and standards. See NRC 10 CFR 20 or state regulations.

**Safe Handling Precautions:** See Section 8, "Exposure Controls and Personal Protection".

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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### Exposure Limits:

#### Iodine-129:

ALI<sub>inh</sub>: 9 µCi or 333 kBq(Thyroid) (See NRC 10 CFR 20 Appendix B)

ALI<sub>ing</sub>: 5 µCi or 185 kBq(Thyroid)

OSHA: See OSHA 29 CFR and NRC 10 CFR 20.

ACGIH: See International Commission on Radiological Protection guidelines

**Water/sodium hydroxide/sodium iodide/sodium sulphite solution:** No established exposure limits for this solution.

**Ventilation:** Use a local exhaust ventilation system. Ensure compliance with applicable exposure limits.

**Respirator:** A respiratory protection program that meets OSHA 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 splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

**Personal Protection:** Wear appropriate gloves and protective clothing to prevent contact with skin.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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**Component:** Water/sodium hydroxide/sodium iodide/sodium sulphite solution.

**Physical State:** Liquid

**Appearance and Odor:** Colorless liquid, odorless.

**Chemical Formula:** Not applicable.

**Molar Mass:** Not applicable.

**Specific Gravity (water = 1):** 1.003 at 21.2 °C (70.16 °F)

**Water Solubility:** Not applicable.

**Solvent Solubility:** Not applicable.

**pH:** Not available.

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## 10. STABILITY AND REACTIVITY

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**Stability**              X   Stable                                   Unstable

Stable at normal temperatures and pressure.

**Conditions to Avoid:** Not applicable.

**Incompatible Materials:** Not applicable.

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

**Hazardous Decomposition:** Not applicable.

**Hazardous Polymerization**                   Will Occur                              X   Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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**Route of Entry**              X   Inhalation                              X   Skin                              X   Ingestion

### Toxicity Data

**Solution:** Water/sodium hydroxide/sodium iodide/sodium sulphite solution Iodine-129  
No toxicity data listed.

**Component:** I-129

No toxicity data listed.

**Health Effects:** See Section 2, "Hazards Identification" for potential health effects.

### Target Organ(s):

**Component:** Water/sodium hydroxide/sodium iodide/sodium sulphite solution  
No information listed.

**Component:** I-129

No information listed.

**Mutagen/Teratogen:** Not applicable.

**Medical Conditions Aggravated by Exposure:** No information listed.

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## 12. ECOLOGICAL INFORMATION

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### Ecotoxicity Data

**Solution:** Water/sodium hydroxide/sodium iodide/sodium sulphite /Iodine-129 solution.  
No ecotoxicity data listed.

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## 13. DISPOSAL CONSIDERATIONS

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**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.

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## 14. TRANSPORTATION INFORMATION

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**U.S. DOT and IATA:** UN2910, Radioactive Material, Limited Quantity, Excepted Package.

Subsidiary Risk: None.

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## 15. REGULATORY INFORMATION

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### U.S. REGULATIONS:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

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): Not regulated.

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: No.

FIRE: No.

REACTIVE: No.

PRESSURE: No.

### STATE REGULATIONS

California Proposition 65: No components are regulated.

### CANADIAN REGULATIONS

WHMIS Classification: Not provided for this material.

### EUROPEAN REGULATIONS

**Component:** Water/sodium hydroxide/sodium iodide/sodium sulphite solution

**EC Classification (assigned):** Not classification assigned.

**EC Risk Phrases:** Not assigned.

**EC Safety Phrases:** Not assigned.

**Component:** I-129

**EC Classification (assigned):** No classification assigned.

**EC Risk Phrases:** Not assigned.

**EC Safety Phrases:** Not assigned.

### NATIONAL INVENTORY STATUS

**U.S. Inventory (TSCA):** Components are listed.

**TSCA 12(b), Export Notification:** No components are listed.

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## 16. OTHER INFORMATION

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**Sources:** ChemAdvisor, Inc., MSDS, *Regenerant Cation Solution*, 03 December 2012.

ChemAdvisor, Inc., MSDS, *Sodium Sulfite*, 03 December 2012.

ChemAdvisor, Inc., MSDS, *Sodium Iodide*, 03 December 2012.

ChemAdvisor, Inc., MSDS, *Water*, 03 December 2012.

EC; European Chemical Substance Information System (ESIS), *Sodium Hydroxide*, CAS No. 1310-73-2; available at <http://esis.jrc.ec.europa.eu/index.php?PGM=cla> (accessed Mar 2013).

EC; European Chemical Substance Information System (ESIS), *Sodium Sulfite*, CAS No. 7757-83-7; available at <http://esis.jrc.ec.europa.eu/index.php?PGM=cla> (accessed Mar 2013).

EC; European Chemical Substance Information System (ESIS), *Sodium Iodide*, CAS No. 7681-82-5; available at <http://esis.jrc.ec.europa.eu/index.php?PGM=cla> (accessed Mar 2013).

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.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use 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.