

**SAFETY DATA SHEET**

**1. SUBSTANCE AND SOURCE IDENTIFICATION**

**Product Identifier**

**SRM Number:** 3150  
**SRM Name:** Silicon (Si) Standard Solution  
**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 a primary calibration standard for the quantitative determination of silicon. A unit of SRM 3150 consists of 50 mL of aqueous solution in a high-density polyethylene bottle sealed in an aluminized bag. The solution is prepared gravimetrically from sodium metasilicate nonahydrate to contain a known mass fraction of silicon in water.

**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**

**Classification**

**Physical Hazard:** Not classified.  
**Health Hazard:** Skin Corrosion/Irritation Category 2  
 Serious Eye Damage/Eye Irritation Category 1

**Label Elements**  
**Symbol**



**Signal Word**  
 DANGER

**Hazard Statement(s)**

H315 Causes skin irritation.  
 H318 Causes serious eye damage.

**Precautionary Statement(s)**

P264 Wash hands thoroughly after handling.  
 P280 Wear protective gloves, protective clothing, and eye protection.  
 P302+P352 If on skin: Wash with plenty of water.  
 P332+P313 If skin irritation occurs: Get medical attention.  
 P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P310 Immediately call a doctor.  
 P362+P364 Take off contaminated clothing and wash it before reuse.

**Hazards Not Otherwise Classified:** Not applicable.

**Ingredients(s) with Unknown Acute Toxicity:** Not applicable.

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### 3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

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**Substance:** Aqueous solution of sodium metasilicate

**Other Designations:** Silicic acid, disodium salt; disodium metasilicate; sodium silicate; Na<sub>2</sub>SiO<sub>3</sub>

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

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Sodium metasilicate	6834-92-0	229-912-2	5
Non-Hazardous Component(s)			
Water	7732-18-5	231-791-2	>95

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### 4. FIRST AID MEASURES

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**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 while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing before reuse. Destroy contaminated shoes.

**Eye Contact:** Immediately flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

**Ingestion:** Contact a poison control center immediately for instructions. Do not induce vomiting. Give water to rinse out mouth. Never give liquids to a person with reduced awareness or becoming unconscious. If vomiting occurs, keep head lower than hips to prevent aspiration. If not breathing, give artificial respiration by qualified personnel. Seek immediate medical attention.

**Most Important Symptoms/Effects, Acute and Delayed:** Severe skin irritation and burns are possible; eye damage.

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

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### 5. FIRE FIGHTING MEASURES

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**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:** Thermal decomposition will produce miscellaneous decomposition products.

**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

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### 6. ACCIDENTAL RELEASE MEASURES

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**Personal Precautions, Protective Equipment and Emergency Procedures:** Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

**Methods and Materials for Containment and Clean up:** Do not touch spilled material. Notify safety personnel of spills. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

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## 7. HANDLING AND STORAGE

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

**Storage:** Store and handling in accordance with all current regulations and standards. Keep separated from incompatible substances (see Section 10, “Stability and Reactivity”).

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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**Exposure Limits:** No occupational limits established.

**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 eyewash station should be readily available near areas of use.

**Skin and Body Protection:** Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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**NOTE:** No physical or chemical data are available for this solution. The actual behavior of the solution may differ from the individual components.

### Descriptive Properties

	<b>Sodium metasilicate (5 % of this SRM)</b>
<b>Appearance (physical state, color, etc.):</b>	colorless crystals, amorphous beads
<b>Molecular Formula:</b>	Na <sub>2</sub> SiO <sub>3</sub>
<b>Molar Mass (g/mol):</b>	122.06
<b>Odor:</b>	not available
<b>Odor threshold:</b>	not available
<b>pH<sup>(a)</sup>:</b>	12 (5 % solution)
<b>Evaporation rate:</b>	not available
<b>Melting point/freezing point:</b>	1088 °C (1990.4 °F)
<b>Relative Density as specific gravity(water = 1):</b>	2.4
<b>Vapor Pressure:</b>	not available
<b>Vapor Density (air = 1):</b>	not available
<b>Viscosity (cP):</b>	not available
<b>Solubility(ies):</b>	soluble in water; insoluble in alcohol and acids
<b>Partition coefficient:</b>	not available

### Thermal Stability Properties

<b>Autoignition Temperature:</b>	not available
<b>Thermal Decomposition:</b>	not available
<b>Initial boiling point and boiling range (°C):</b>	not available
<b>Explosive Limits, LEL (Volume %):</b>	not applicable
<b>Explosive Limits, UEL (Volume %):</b>	not applicable
<b>Flash Point:</b>	not available
<b>Flammability (solid, gas):</b>	not available

<sup>(a)</sup> pH tested at NIST to determine health and safety hazards. Value is not certified.

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## 10. STABILITY AND REACTIVITY

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**Reactivity:** Stable at normal temperatures and pressure.

**Stability:**  X  Stable   Unstable

**Possible Hazardous Reactions:** None listed.

**Conditions to Avoid:** None listed.

**Incompatible Materials:** Acids, metals, halogens.

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

**Hazardous Decomposition:** Thermal decomposition will produce miscellaneous decomposition products.

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

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## 11. TOXICOLOGICAL INFORMATION

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**Route of Exposure:**  X  Inhalation  X  Skin  X  Ingestion

**Symptoms Related to the Physical, Chemical and Toxicological Characteristics:** Severe skin irritation and burns are possible; eye damage.

**Potential Health Effects (Acute, Chronic and Delayed):**

**Inhalation:** Inhalation of vapors may cause irritation of the upper respiratory tract with sore throat, coughing and shortness of breath.

**Skin Contact:** Contact may result in mild to severe skin irritation. At higher concentration, irritation may progress to burns, dermatitis, and skin corrosion.

**Eye Contact:** Accidental splashes in the eye followed promptly by washing with water have been observed to damage the corneal epithelium.

**Ingestion:** Ingestion of this material is unlikely under normal conditions of use. If ingested, mild irritation or superficial hyperemia and edema burns of the oropharynx, esophagus or stomach; acute or chronic complications are unlikely.

**Numerical Measures of Toxicity:**

**Acute Toxicity:** Not classified.

Sodium metasilicate (anhydrous): Rat, Oral LD50: 600 mg/kg

**Skin Corrosion/Irritation:** Category 2

Sodium metasilicate may be corrosive to the skin at higher concentrations (>13 %).

Sodium metasilicate (anhydrous): Human, Skin: 250 mg (24 h) severe; Rabbit, Skin: 250 mg (24 h) severe; Skin2 ZK 1350 cultures, (corrosive); Rabbit, Skin: Application of a commercial product containing 5% sodium metasilicate caused necrosis and edema.

Solutions of sodium metasilicate <13 % caused mild irritation.

Mouse, Skin: 4 %.

Rabbit, Skin: Application of 0.5 mL of 10 % sodium metasilicate for 4 h caused mild irritation (primary irritation score: erythema 1.11/4; oedema 0.11/4; number of test animal: 3)

**Serious Eye damage/Eye irritation:** Category 1

Sodium metasilicate/water solutions may cause chemical burns to the eyes.

**Respiratory Sensitization:** Not classified; no data available.

**Skin Sensitization:** Not classified; no data available.

**Germ Cell Mutagenicity:** Not classified; no data available.

**Carcinogenicity:** Not classified.

**Listed as a Carcinogen/Potential Carcinogen**   Yes  X  No  
Sodium metasilicate is not listed by NTP, IARC or OSHA as a carcinogen/potential carcinogen.

**Reproductive Toxicity:** Not classified.

Sodium metasilicate (nonahydrate): Rat, Intratesticular TDLo: 9766 ug/kg (1 d)

Rat, Oral TDLo: 15 gm/kg (14 week, prior to copulation 14 week, 3 week, continuous)

Rat Subcutaneous TDLo: 9766 ug/kg (1 d)

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

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

**Aspiration Hazard:** No data available.

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## 12. ECOLOGICAL INFORMATION

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**Ecotoxicity Data:** (sodium metasilicate, anhydrous)

Fish Toxicity: Zebrafish (*Brachydanio rerio*) LC50: 210 mg/L [semi-static] (96 h)

**Persistence and Degradability:** No data available.

**Bioaccumulative Potential:** No data available.

**Mobility in Soil:** No data available.

**Other Adverse effects:** No data available.

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal:** Dispose of waste in accordance with all applicable federal, state, and local regulations.

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## 14. TRANSPORTATION INFORMATION

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**U.S. DOT and IATA:** This material is not regulated by DOT or IATA.

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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: Not listed.

**U.S. TSCA Inventory:** Listed.

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

**Canadian Regulations:**

WHMIS Information: Not provided for this material.

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## 16. OTHER INFORMATION

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**Issue Date:** 08 July 2014

**Sources:** ChemAdvisor, Inc., MSDS *Sodium Metasilicate, Anhydrous*, 21 March 2014.

Hazardous Substances Data Bank (HSDB), National Library of Medicine's TOXNET system, *Sodium Metasilicate*, CAS No. 6834-92-0; available at <http://toxnet.nlm.nih.gov> (accessed July 2014).

U.S. Department of Health and Human Services (HHS), National Institute of Health (NIH), National Toxicology Program; *Sodium Metasilicate, Anhydrous [6834-92-0]*, *Sodium Metasilicate Pentahydrate [10213-79-3]*, and *Sodium Metasilicate Nonahydrate [13517-24-3]*, *Review of Toxicological Literature*; Jan 2002; available at [http://ntp.niehs.nih.gov/ntp/htdocs/chem\\_background/exsumpdf/sodiummetasilicate\\_508.pdf](http://ntp.niehs.nih.gov/ntp/htdocs/chem_background/exsumpdf/sodiummetasilicate_508.pdf) (accessed July 2014).

HHS, U.S. National Library of Medicine (NLM), NIH, Haz-Map; *Sodium Metasilicate CAS No. 6834-92-0*, *Reference Link: OECD SIDS: Soluble Silicates - 2004*; available at <http://hazmap.nlm.nih.gov/index.php> (accessed July 2014).

*Final Report on the Safety Assessment of Potassium Silicate, Sodium Metasilicate, and Sodium Silicate*; Int. J. Toxicol., Vol. 24 (Suppl. 1), pp. 103–117 (2005).

### Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	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
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	STOT	Specific Target Organ Toxicity
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
n.o.s.	Not Otherwise Specified	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 the 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 of Analysis.

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](mailto:srmmsds@nist.gov); or via the Internet at <http://www.nist.gov/srm>.