Date of Issue:
18 October 2023

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 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 high-purity 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
E-mail: SRMMSDS@nist.gov
Website: https://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.

3. Composition and Information on Hazardous Ingredients

Substance: Aqueous solution of sodium metasilicate

Other Designations: Silicic acid, disodium salt; disodium metasilicate; sodium silicate; Na_2SiO_3

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

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 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.

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: 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).

6. Accidental Release Measures

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.

7. Handling and Storage

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").

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties

Appearance (physical state, color, etc.):	liquid
Molecular Formula:	not available
Molar Mass (g/mol):	not available
Odor:	not available
Odor threshold:	not available
pH[(a)]:	acidic
Evaporation rate:	not available
Melting point/freezing point:	not available
Relative Density as specific gravity(water = 1):	not available
Vapor Pressure:	not available
Vapor Density (air = 1):	not available
Viscosity (cP):	not available
Solubility(ies):	soluble in water; insoluble in alcohol and acids
Partition coefficient:	not available

Thermal Stability Properties

Autoignition Temperature:	not available
Thermal Decomposition:	not available
Initial boiling point and boiling range (ºC):	not available
Explosive Limits, LEL (Volume %):	not applicable
Explosive Limits, UEL (Volume %):	not applicable
Flash Point:	not available
Flammability (solid, gas):	not available

[(a)] pH tested at NIST to determine health and safety hazards. Value is not certified.

10. STABILITY AND REACTIVITY

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

11. TOXICOLOGICAL INFORMATION

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.

12. ECOLOGICAL INFORMATION

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.

13. DISPOSAL CONSIDERATIONS

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

14. TRANSPORTATION INFORMATION

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

15. REGULATORY INFORMATION

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.

16. OTHER INFORMATION

Issue Date: 18 October 2023

Sources: ChemAdvisor, Inc., MSDS *Sodium Metasilicate, Anhydrous*, 09 December 2015.

PubChem, National Library of Medicine, *Sodium Metasilicate, CAS No. 6834-92-0*; available at https://pubchem.ncbi.nlm.nih.gov/compound/23266 (accessed Oct 2023).

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 https://ntp.niehs.nih.gov/sites/default/files/ntp/htdocs/chem_background/exsumpdf/sodiummetasilicate_508.pdf (accessed Oct 2023).

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 https://haz-map.com/ (accessed Oct 2023).

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
NIOSH	National Institute for Occupational Safety and Health	TSCA	Toxic Substances Control Act
NIST	National Institute of Standards and Technology	TWA	Time Weighted Average
n.o.s.	Not Otherwise Specified	UEL	Upper Explosive Limit
		WHMIS	Workplace Hazardous Materials Information System