

SAFETY DATA SHEET

POTASSIUM SILICATE

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SYNONYMS: Potassium silicate solution; Silicic Acid, Potassium salt solution; Potash water glass solution; Soluble potash glass.

PROPER SHIPPING NAME : Not regulated
CAS NUMBER : 1312-76-1
UN NUMBER : Not regulated
ALKALI

PRODUCT USE: May be used as a detergent ingredient, adhesive, binder, feedstock silica source, general chemical.

24 Hr Emergency Contact: 0800 243 622
International Emergency Number: +64 4 917 9888

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

Considered a Hazardous Substance according to the criteria of the New Zealand Hazardous Substances New Organisms legislation. EPA Approval Code: HSR004658

HAZARD LABELLING
WARNING



HAZARD CLASSIFICATION AND STATEMENTS

HSNO Classifications: 6.1D (oral), 6.3A, 6.4A, 9.3C

Harmful if swallowed.
Causes skin irritation.
Causes serious eye irritation.
Harmful to terrestrial vertebrates.

24 HOUR EMERGENCY CONTACT TELEPHONE 0800 CHEMCALL 0800 243 622

PRECAUTIONARY STATEMENTS**Prevention**

Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves, and eye/face protection.
Avoid release to the environment.

Response

If medical advice is needed, have product container or label at hand.
IF SWALLOWED: Call a POISON CENTRE or doctor/physician if you feel unwell.
Rinse mouth.
IF ON SKIN: Wash with plenty of soap and water.
Specific treatment refer to label.
If skin irritation occurs: Get medical advice/attention.
Take off contaminated clothing and wash before re-use.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.

Disposal

Dispose of contents and container in accordance with relevant legislation.
See Section 13 of this SDS Document for more information.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%	HAZARDOUS
Potassium silicate	1312-76-1	30-60	Yes
Water	7732-48-5	30-60	No

Section 4 - FIRST AID MEASURES

If in doubt, call the POISON CENTRE or doctor.

SWALLOWED

Immediately rinse mouth with water. Repeat until product is thoroughly removed. Give water to drink: DO NOT induce vomiting. If vomiting occurs give water to drink to further dilute the product. If the person is not breathing or has no pulse, call an ambulance/apply cardio-pulmonary resuscitation (CPR). Never give anything by mouth to an unconscious person.

EYE

Immediately flush eyes with plenty of water for at least 15 minutes. Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. Get medical attention.

SKIN

Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing and shoes thoroughly before re-use. If the Skin Looks Burned: Clean with cool water and apply ice or a cold compress. Do not apply ice to hands or feet. Get medical attention.

INHALED

If inhaled, remove to fresh air. If not breathing, give artificial respiration. Keep warm. If breathing is difficult, give oxygen and keep at rest in a position comfortable for breathing. Get medical attention. Emergency shower and/or eyewash station required.

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PPE required for first aiders: see Section 8.

NOTES TO PHYSICIAN

Treat symptomatically as for strong alkalis.

NOTE: In an emergency dial 111, for advice, contact a Poison Centre (0800-764-766).

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Use extinguishing media suitable for surrounding area; water spray, dry chemical, foam or carbon dioxide.

FIRE FIGHTING

Alert Fire Brigade, and tell them location and nature of hazard.

Clear fire area of all non-emergency personnel.

Stay upwind. Eliminate ignition sources.

Wear full body protective clothing with self-contained, positive pressure breathing apparatus.

Prevent, by any means available, spillage from entering drains or water course.

Use firefighting procedures suitable for surrounding area.

DO NOT approach containers suspected to be hot.

Cool fire exposed containers with water spray from a protected location.

If safe to do so, remove containers from path of fire.

If safe, switch off electrical equipment until vapour fire hazard removed.

Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

Non-flammable under normal conditions of use. Flammable hydrogen gas may be produced on prolonged contact with metals such as aluminium, tin, lead and zinc.

HAZARDS FROM COMBUSTION PRODUCTS

Thermal decomposition products are toxic and may include oxides of carbon, potassium, silicon, and irritating gases.

Personal Protective Equipment

Fire fighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots and gloves).

HAZCHEM CODE

Not applicable.

Section 6 - ACCIDENTAL RELEASE MEASURES

Only fully trained personnel should be involved in handling chemicals.

Spilled material is very slippery. Dries to form a glass film which can easily cut skin.

MINOR SPILLS

Clean up all spills immediately. Remove all ignition sources.

Wear protective clothing, impervious gloves and safety glasses.

Avoid contact with skin and eyes.

Wipe up and absorb small quantities with vermiculite or other absorbent material. Place in a suitable container.

Refer to major spills.

MAJOR SPILLS

Personnel involved in the clean-up should wear full protective clothing.

Evacuate all unnecessary personnel. Eliminate all sources of ignition.

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Increase ventilation. Avoid generating mist/spray.

Stop leak if safe to do so.

Cover drains with a drain mat.

Remove with vacuum trucks or pump to a specific container for later disposal.

Absorb liquid with an inert material such as dry sand, earth, vermiculite and place in a suitable container.

Do NOT let product reach drains or waterways. If product does enter a waterway advise emergency services or your local waste authority.

Collect in a labelled chemical waste container and seal for disposal.

Use spark-proof tools and equipment.

Wash spill area with plenty of water after removal of contaminant.

Decontamination run-off should be prevented from entering drains and watercourses.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

EMERGENCY RESPONSE PLANNING GUIDELINES (AIHA 2014)

No ERPGs have been set for this substance by the American Industrial Hygiene Association.

PROTECTIVE ACTION CRITERIA (PAC) - SCAPA, 2015

Chemical (CAS Number)	PAC-1	PAC-2	PAC-3	Units
Potassium silicate (1312-76-1)	30	330	2000	mg/m ³

(1312-76-1)

PAC-1: Mild, transient health effects.

PAC-2: Irreversible or other serious health effects that could impair the ability to take protective action.

PAC-3: Life-threatening health effects.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

Operators should be trained in procedures for safe use of this material.

Read the label and observe all precautions listed for the product.

Use good occupational work practice.

Avoid contact with skin and eyes.

Avoid incompatible materials.

Avoid all ignition sources. Avoid sources of heat.

Avoid physical damage to containers.

Handle and open container with care. Use in a well-ventilated area.

Always wash hands with soap and water after handling or if accidental exposure occurs. Work clothes should be laundered separately.

Promptly clean residue from closures with a cloth.

Dried silicate can present physical hazards including cuts and abrasions. Wear cut resistant gloves if handling dried silicate.

Ensure an eye bath and safety shower are available and ready for use.

Observe good personal hygiene practices.

Take precautionary measures against static discharges by bonding and grounding equipment.

Recommended loading temperature is between 10°C - 50°C.

SUITABLE PACKAGING

Original packaging.

Check all packaging are clearly labelled and free from leaks.

Mild steel is the most suitable material of construction for drums, tanks, valves, pipework, etc.

Concrete storage tanks can be used but must be strong enough to hold the weight of Potassium silicate solution to be stored and thick enough to prevent seepage of water.

STORAGE INCOMPATIBILITY

Do not store in aluminium, fiberglass, copper, brass, zinc, or galvanized containers.

Avoid storage with incompatible materials including acids, reactive metals, and ammonium salts.

STORAGE REQUIREMENTS

Store in original packaging.

Keep packaging securely sealed.

No smoking, naked lights, heat, or ignition sources.

Store at temperatures between 0°C - 70°C, in dry, well-ventilated area, and out of direct sunlight.

Store away from incompatible materials and foodstuffs.

Protect packaging against physical damage and check regularly for leaks.

Keep storage area free of debris, waste and combustibles.

Protect from static discharges.

Section 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC
Manufacturer's standard	Potassium silicate solutions		5		5			

A peak limitation of 2 mg/m³ is recommended by the analogy of potassium hydroxide.

No exposure limits set for Potassium silicate solution by WorkSafe New Zealand, Safe Work Australia, Health and Safety Executive (HSE) in Great Britain, American Conference of Governmental Industrial Hygienists (ACGIH) or the German MAK.

ENGINEERING CONTROLS**VENTILATION SYSTEM**

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Refer to 'A simple guide to local exhaust ventilation' found on the WorkSafe New Zealand website.

PERSONAL PROTECTION EQUIPMENT (PPE)**PERSONAL RESPIRATORS**

For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator.

WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

SKIN PROTECTION

Wear impervious protective clothing, including boots, chemical resistant gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Refer to AS/NZS 2161.1:2000 Occupational Protective Gloves - Selection, use and maintenance. Dispose of contaminated gloves after use.

EYE PROTECTION

Use approved chemical safety goggles and a full face shield where splashing is possible. Refer to Personal eye protection Part 1: Eye and face protectors for occupational applications, Australian/New Zealand Standard: AS/NZS 1337.1:2010. Maintain eye wash fountain in work area and quick-drench facilities in work area.

OTHER

Cotton washable overalls buttoned to the neck and wrist and washable hat and PVC apron.

Ensure there is ready access to an emergency shower.

Ensure that there is ready access to eye wash unit

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Clear to hazy, colourless, odourless, thick liquid.

PHYSICAL PROPERTIES

PROPERTY	VALUE
State:	Liquid
Molecular Weight:	154.28
Melting Range (°C):	0
Boiling Range (°C):	105-108
Solubility in water (g/L):	Approx. 360
pH (1% solution):	11-13
pH (as supplied):	Not available
Specific Gravity (water=1):	1.2 - 1.6
Density (g/ml, 20°C):	1.38-1.40
Volatile Component (%vol):	30 - 60
Relative Vapour Density (air=1):	Not applicable
Vapour Pressure (kPa):	Not applicable
Autoignition Temp (°C):	Not applicable
Flash Point (°C):	Not applicable
Lower Explosive Limit (%):	Not applicable
Upper Explosive Limit (%):	Not applicable
Decomposition Temp (°C):	Water boils off at 105-108
Viscosity (cps):	20 - 5000
Evaporation Rate:	Not available
Alcohol:	Insoluble
Ratio %SiO ₂ O ₂ /K ₂ O	2.6 - 3.2

Section 10 - CHEMICAL STABILITY AND REACTIVITY

CHEMICAL STABILITY

Product is stable under normal conditions of use, storage and temperature.

CONDITIONS TO AVOID

Absorbs carbon dioxide on exposure to air, which results in the deposition of insoluble silica.

Avoid excessive heat, direct sunlight, static discharges, moisture, and temperature extremes (prolonged storage above 50°C or below 10°C).

INCOMPATIBLE MATERIALS

Potassium silicate solutions are strongly alkaline and are not compatible with aluminium, copper, brass, bronze, zinc, tin, and lead. Can etch glass if not promptly removed.

Incompatible with strong acids, oxidizing agents and sources of ignition. Keep containers dry and tightly closed to avoid moisture absorption and contamination.

HAZARDOUS DECOMPOSITION PRODUCTS

Thermal decomposition can lead to release of carbon oxides.

If overheated the solution will boil and irritating Potassium silicate containing mists will be released.

HAZARDOUS REACTIONS

Flammable hydrogen gas will form on reaction with aluminium, tin, lead and zinc.

Gels and generates heat when mixed with acid.

May react with ammonium salts resulting in evolution of ammonia gas.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL ACUTE HEALTH EFFECTS

Material is harmful if swallowed and causes skin and severe eye irritation.

ACUTE HEALTH EFFECTS

SWALLOWED

Can result in nausea, vomiting, abdominal pain, and diarrhoea. May cause severe irritation to the mouth, throat, and stomach.

EYE

Causes serious eye irritation, and may cause conjunctivitis (eye inflammation), corneal burns, and ulceration.

SKIN

Causes serious skin irritation. May cause itching and skin rash.

INHALED

Pray mist will cause respiratory irritation and may result in coughing as well as inflammation of nose, throat, and windpipe.

CHRONIC HEALTH EFFECTS

Prolonged or repeated skin contact may cause dry skin. Defatting of the skin can result in irritation and dermatitis (skin inflammation). Frequent ingestion over extended periods of time of gram quantities of silicates is associated with the formation of kidney stones and other siliceous urinary calculi in humans.

TOXICITY AND IRRITATION DATA

TOXICITY

Acute Oral Toxicity, Rat, LD₅₀: 1600 mg/kg
Acute Dermal Toxicity, LD₅₀: Not available.
Acute Inhalation Toxicity, LC₅₀: Not available.

IRRITATION/ CORROSION

Skin: Produced irritation with primary irritation index of 3 to abraded skin and 0 to intact skin.
Eyes: At concentrations of 35% and 29%, potassium silicates with molar ratios of 3.4 was only slightly irritating to rabbits.

Carcinogenic effects: Not classified or listed by NOHSC, IARC, NTP, OSHA, EU and ACGIH.

Mutagenic effects: Not available, however, no evidence of genotoxic effects caused by sodium silicates.

Reproductive or developmental effects: No indications of reproductive effects for silicates have been reported [Manufacturer's SDS].

Aspiration hazard: Not available.

Specific target organ toxicity: Not available.

Sensitisation (respiratory/contact): Not available.

Section 12 - ECOLOGICAL INFORMATION

ECOTOXICITY

Harmful to terrestrial vertebrates.

The high pH of this substance may be harmful to aquatic life.

ECOTOXICITY DATA

Fish, (*Oncorhynchus mykiss*), 96h LC₅₀: 260-310 mg/L [Sodium silicate, MR 3.1]

Crustacean, (*Daphnia magna*), 48h EC₅₀: 1700 mg/L [Sodium silicate, MR3.2]

Algae, 72, EC₅₀: No data available.

CHRONIC

No data available.

Persistence and Degradability: Not expected to be persistent in aquatic systems, however undiluted or unneutralised product is acutely harmful to aquatic life due to its high pH.

Mobility: Not expected to be mobile in soil.

Bioaccumulation: No bioaccumulation potential, except in species that use silica as a structural material such as diatoms and siliceous sponges.

BOD and COD: Not applicable. Diluted material rapidly depolymerises to produce dissolved silica, and does not contribute to BOD.

Products of Biodegradation: Not applicable.

Toxicity of the Products of Biodegradation: Not applicable. Diluted material rapidly depolymerizes to yield dissolved silica in a form that is indistinguishable from natural dissolved silica.

DO NOT discharge into sewer or waterways.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal of Hazardous Substances is subject to the Resource Management Act and Council By-Laws in addition to HSNO requirements.

PRODUCT

Recycle wherever possible. Special hazard may exist - specialist advice may be required.

The product may be treated so that it is no longer hazardous by a means other than dilution. This includes burial in a landfill in such a manner that it will not lead to any adverse health effects to any person or exceed any TEL (tolerable exposure limit) set by the Authority for this substance. Not suitable for incineration.

Treatment in a biological wastewater treatment system with prior approval and arrangement is also permissible providing that the substance is diluted or neutralised, rendered non-hazardous, and does not pose any adverse effects to human health or the environment. Alternatively consult an approved Waste Management company for disposal options.

Do not dispose with household rubbish.

Class 6 or 8 or 9 substance may be discharged into the environment without having to comply with this requirement if the substance is rapidly degradable and the products of degradation are not hazardous.

PACKAGING

Recycle wherever possible. Special hazard may exist - specialist advice may be required.

Packaging should be rendered incapable of containing any material.

Puncture containers to prevent re-use and bury at an authorised landfill.

Empty containers may be decontaminated. The residual contents of the package must be diluted to below the thresholds for the respective hazard and the diluted residue is 1% or less of the volume of the package. Alternatively, consult an approved Waste Management company for disposal options or dispose of at an approved waste disposal facility.

Observe all label safeguards until containers are cleaned and destroyed.

Where possible retain label warnings and SDS and observe all notices pertaining to the product.

Must not be disposed of in household rubbish.

Section 14 - TRANSPORT INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: UN, IATA, IMDG

Not classified as a Dangerous Good under NZS 5433:2012 Transport of Dangerous Goods on Land.

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Section 15 - REGULATORY INFORMATION

REGULATIONS

Classified as hazardous according to the criteria of the New Zealand Hazardous Substances and New Organisms Act.

EPA Approval Code: HSR004658

HSNO Classification: 6.1D (oral), 6.3A, 6.4A, 9.3C

Transfer notice: 28 June 2006 Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2006, *New Zealand Gazette*, 26 June 2006 - Issue No.72
 Transferred As: Potassium silicate, >25% in a non-hazardous diluent.

Controls applying to this substance are:

1. Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001
T1 (R11-27), T2 (R29, 30), T4 (R7), T5 (R8), T7 (R10), E2 (R46-48), E6 (R7).
2. Hazardous Substances (Packaging) Regulations 2001
P1 (R5, 6, 7(1), 8), P3 (R9), P13* (R19), PG4 (Schedule 4).
3. Hazardous Substances (Disposal) Regulations 2001
D4 (R8), D5 (R9), D6 (R10), D7 (R11, 12), D8 (R13,14).
4. Hazardous Substances (Emergency Management) Regulations 2001
EM1 (R6,7,9-11), EM6 (R8e), EM7 (R8f), EM8 (R12-16, R18-20), EM11 (R25-34), EM12* (R35-41), EM13 (R42).
5. Hazardous Substances (Identification) Regulations 2001
I1 (R6, 7,32-35, R36.1-36.7), I8 (R14), I9 (R18), I11 (R20), I16 (R25), I17 (R26), I18 (R27), I19 (R29-31), I20 (R36.8), I21 (R37-39, R47-50), I28 (R46), I29 (R51,52), I30 (R53).
6. Hazardous Substances (Tank Wagon and Transportable Containers) Regulations 2004
R4-43 as applicable
7. Hazardous Substances (Dangerous Goods And Scheduled Toxic Substances) Transfer Notice 2004
Schedule 8
8. Controls added under section 77A
No person may use this substance as a pesticide, or veterinary medicine; however, this substance may be used in the formulation of a pesticide or veterinary medicine.

Approved Handler, Tracking and Premises Test Certification regulations do not apply.

Secondary containment is required. Refer to the EPA HSNO Code of Practice (HSNOCOP 47) for Secondary Containment Systems. April 2012.

Potassium silicate (CAS 1312-76-1) is found on the following regulatory lists;

New Zealand Transferred List of Single Component Substances

OECD Representative List of High Production Volume (HPV) Chemicals

TSCA Inventory

DSL Inventory

Section 16 - OTHER INFORMATION

NEW ZEALAND POISON CENTRE 0800 POISON (0800 764 766)

NZ EMERGENCY SERVICES: 111

Interpretation and Abbreviations

Controls applying to a substance:

- * denotes that changes have been made to these controls, further information on these changes is located in the transfer notice for that substance,
- (R) abbreviation for the term Regulation of the Hazardous Substances regulations

ACGIH - American Conference of Governmental Industrial Hygienists.

ACVM - Agricultural Chemicals and Veterinary Medicines

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ΔICS - Australian Inventory of Chemical Substances.
AOX - Absorbable organic halogens.
APF - Assigned Protection Factor.
BOD - Biochemical Oxygen Demand
China IECSC - Inventory of Existing Chemical Substances Produced or Imported in China.
COD - Chemical Oxygen Demand
DSL - Canadian Domestic Substances List.
EINECS - European Inventory of Existing Commercial Chemical Substances.
ENCS - Japanese Existing and New Chemical substances.
IDLH - Immediately Dangerous to Life or Health Concentrations.
IARC - International Agency for Research on Cancer.
ISHL - Japanese Industrial Safety and Health Law List of Chemicals.
LOEL - Lowest Observed Effect Level.
LD_{Lo} - Lethal Dose Low (the lowest dosage per unit of bodyweight of a substance known to have resulted in fatality in a particular animal species).
MAK - Maximum workplace concentration in the workplace air that generally does not have known adverse effects on the health of the employee nor cause unreasonable annoyance when a person is repeatedly exposed during long periods, usually 8 hours daily, 40hour working week).
NOAA - National Oceanic and Atmospheric Administration.
NOEC - No Observed Effect Concentration.
NTP - National Toxicology Program.
NZ CCID - New Zealand Chemical Classification and Information Database.
NZIoC - New Zealand Inventory of Chemicals.
OECD HPV - The Organisation for Economic Co-operation and Development High Product Volume Chemicals.
PEL - Permissible exposure limit.
PPE - Personal Protective Equipment.
Prop 65 - California Proposition 65 List of Chemicals.
RTECS - Registry of Toxic Effects of Chemical substances
SCAPA - Subcommittee on Consequence Assessment and Protective Actions
STEL - Short term exposure limit.
TOC - Total Organic Carbon.
TSCA - US Toxic Substances Control Act Existing Chemicals.
TWA - The time-weighted average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.
VOC - Volatile Organic Compounds.

Sources of key data used to compile the datasheet:

Manufacturer's SDS

Date of Preparation/Review: 2016.07.19

Amendments: Mandatory 5 year update, and formatting changes.

DISCLAIMER: *The information contained in this safety data sheet was obtained from current and reliable sources. This data is supplied without warranty, expressed or implied, regarding its correctness and accuracy. It is the user's responsibility to determine safe conditions for use of this product and to assume liability for loss, injury, damage or expense resulting from improper use of this product.*

End of SDS