Safety Data Sheet POTASSIUM SILICATE

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SECTION 1: Identification

GHS Product identifier

Product name	POTASSIUM SILICATE

Recommended use of the chemical and restrictions on use

Potassium silicate can be used as an adhesive; binder, detergent component, general chemical or as a feedstock silica source.

Supplier's details

Name	ChemSupply Australia Pty Ltd
Address	38-50 Bedford Street 5013 Gillman South Australia Australia
Telephone	08 8440 2000
email	www.chemsupply.com.au

Emergency phone number

CHEMCALL 1800 127 406 (Australia) / +64-4-917-9888 (International)

SECTION 2: Hazard identification

General hazard statement

Not classified as dangerous goods according to the Australian Dangerous Goods Code (ADG).

Classified as Hazardous according to the Globally Harmonised System of classification and labelling of Chemicals (GHS) including Work, Health and Safety regulations, Australia.

Classification of the substance or mixture

GHS classification in accordance with: UN GHS revision 7

- Serious eye damage/eye irritation, Cat. 1
- Skin corrosion/irritation, Cat. 2

GHS label elements, including precautionary statements

Pictograms

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/eye protection/face protection.
P302+P352	IF ON SKIN: Wash with plenty of water/soap
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 POISON CENTER/doctor/physcian
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.

SECTION 3: Composition/information on ingredients

Mixtures

Component	Identification	Weight %	Classifications
Potassium silicate	CAS no.: 1312-76-1 EC no.: 215-199-1	30 - <= 60 %	CLASSIFICATIONS: Eye damage/irritation, Cat. 1; Skin corrosion/irritation, Cat. 2. HAZARDS: H315 - Causes skin irritation; H318 - Causes serious eye damage.
Water	CAS no.: 7732-18-5 EC no.: 231-791-2	<= 70 %	CLASSIFICATIONS: No data available. HAZARDS: No data available.

SECTION 4: First-aid measures

Description of necessary first-aid measures

General advice	Advice to Doctor: Treat symptomatically as for strong alkalis.
If inhaled	If inhaled, remove from contaminated area to fresh air immediately. Apply artificial respiration if not breathing. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
In case of skin contact	Wash affected areas with copious quantities of water immediately, for at least 30 minutes. Do not attempt to neutralise with acid solutions.
In case of eye contact	If contact with the eye(s) occurs, wash with copious amounts of water for approximately 15 minutes holding eyelid(s) open. Take care not to rinse contaminated water into the non-affected eye. If persistent irritation occurs, obtain medical attention.
If swallowed	Rinse mouth thoroughly with water immediately, repeat until all traces of product have been removed. DO NOT INDUCE VOMITING. Seek medical advice if effects persist.

Most important symptoms/effects, acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

Indication of immediate medical attention and special treatment needed, if necessary
For advice, contact the National Poisons Information Centre (Phone Australia 13 11 26; New Zealand 0800 764 766) or a doctor.

SECTION 5: Fire-fighting measures

Suitable extinguishing media
Regular foam, dry chemical, water spray, Carbon dioxide fire extinguishing media.

Specific hazards arising from the chemical
Hazards from Combustion Products: Prolonged contact with metals (aluminium, tin, lead and zinc) may produce flammable hydrogen gas.

Material does not burn. Fire or heat will produce irritating, poisonous and/or corrosive gases. Runoff may pollute waterways.

Special protective actions for fire-fighters
Use suitable protective equipment for surrounding fire.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures
Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation. For personal protection see section 8.

Methods and materials for containment and cleaning up
Material is slippery. Water will only evaporate from spilled material. When dry the material forms glass film, which can easily cut skin. Sinks and mixes with water. This material is harmful to aquatic life due to its high pH. Evacuate the area of unnecessary personnel.

Small Spillages: Prevent runoff from entering into storm sewers and ditches which lead to natural waterways. Isolate, dike and store discharged material, if possible. Use sand or earth to contain spilled material. Shovel dried waste into suitable container and dispose of in accordance with Section 13.
Large Spillages: Keep unnecessary people away; isolate hazard area and deny entry. Do not touch or walk through spilled material. Stop leak if you can do so without risk. Prevent runoff from entering into storm sewers and ditches which lead to natural waterways. Isolate, dike and store discharged material using sand or earth. Spilled liquid may be collected using a vacuum truck. If containment is impossible, neutralize contaminated area and flush with large quantities of water. Cover remaining liquid with sand or earth and shovel dried material into suitable container. Dispose of any material collected in accordance with Section 13.

SECTION 7: Handling and storage

Precautions for safe handling
Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Take appropriate precautions when handling bulk product that is transported/shipped whilst hot as it can cause thermal burns. Wear appropriate personal protective equipment as recommended in Section 8. Keep containers closed. Promptly clean residue from closures with cloth. Do not store in aluminum, fiberglass, copper, brass, zinc or galvanized containers. Store away from acids and foodstuffs. Store in clean steel or
plastic containers. Separate from acids, reactive metals, and ammonium salts.

Conditions for safe storage, including any incompatibilities
Store in accordance with all local regulations and codes of practice. Ensure containers are labelled and kept closed when not in. Storage temperature 0-70ºC. Loading temperature 10-50ºC. 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.

SECTION 8: Exposure controls/personal protection

Appropriate engineering controls
Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, gas, etc.) below recommended exposure limits.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection
The use of a face shield, chemical goggles or safety glasses with side shield protection as appropriate. Must comply with Australian Standards AS 1337 and be selected and used in accordance with AS 1336.

Skin protection
Clean impervious clothing should be worn. Clothing for protection against chemicals should comply with AS 3765 Clothing for Protection Against Hazardous Chemicals.

Body protection
Footwear: Safety boots in industrial situations is advisory, foot protection should comply with AS 2210, Occupational protective footwear - Guide to selection, care and use.

Body Protection: Clean clothing or protective clothing should be worn, preferably with and apron. Clothing for protection against chemicals should comply with AS 3765 Clothing for Protection Against Hazardous Chemicals.

Respiratory protection
If engineering controls are not effective in controlling airborne exposure then an approved respirator with a replaceable vapor/ mist filter should be used. Refer to relevant regulations for further information concerning respiratory protective requirements. Reference should be made to Australian Standards AS/ NZS 1715, Selection, Use and Maintenance of Respiratory Protective Devices; and AS/ NZS 1716, Respiratory Protective Devices, in order to make any necessary changes for individual circumstances.

SECTION 9: Physical and chemical properties

Basic physical and chemical properties

Physical state	Liquid
Appearance	Thick, clear to hazy, colourless liquid.
Color	No data available.
Odor	Odourless.
Odor threshold	No data available.
Melting point/freezing point	0°C
Boiling point or initial boiling point and boiling range	105 - 108°C
Flammability	No data available.
Lower and upper explosion limit/flammability limit	No data available.
Flash point	No data available.
Explosive properties	No data available.
Auto-ignition temperature	No data available.
Decomposition temperature	Water boils off at 105 - 108°C
Oxidizing properties	No data available.
pH	11 - 13 (Concentrate)
Kinematic viscosity	No data available.
Solubility	Solubility in Water: Soluble
Partition coefficient n-octanol/water (log value)	No data available.
Vapor pressure	No data available.
Evaporation rate	No data available.
Density and/or relative density	Specific Gravity: 1.2 - 1.7
Relative vapor density	No data available.
Particle characteristics	No data available.

Supplemental information regarding physical hazard classes
Physical and Chemical Properties: Proportion of potassium oxide, silica and water varies, depending on the grade. The mean ratio for SiO2/K2O is from 1.5 - 3.5

Further safety characteristics (supplemental)
No data available.

SECTION 10: Stability and reactivity

Reactivity
Stable under normal conditions of storage and handling.

Chemical stability
Stable in sealed containers. Absorbs carbon dioxide on exposure to air, resulting in the deposition of insoluble silica.

Possibility of hazardous reactions
Will form flammable hydrogen gas on reaction with aluminium, copper, zinc, etc. Gels and generates heat when mixed with acid. May react with ammonium salts resulting in the formation of ammonia gas.

Unsuitable container materials: Potassium silicate solutions are strongly alkaline and not compatible with aluminium, copper, brass, bronze, zinc, tin and lead. May etch Glass if not properly removed.

Conditions to avoid
Avoid leaving solutions exposed to carbon dioxide in the air.

Incompatible materials
Strong acids.

Hazardous decomposition products
Overheating will cause the solution to boil and irritating Potassium Silicate containing mists will be released.

Water: In the event of fire: see section 5

SECTION 11: Toxicological information

Information on toxicological effects

Acute toxicity
Acute Toxicity - Oral: LD50, rat: Not determined.
The acute oral toxicity of this product has not been tested. When chemically similar Sodium Silicates were tested on a 100% solid basis, their single dose acute oral LD50 in rats ranged from 1280 mg/kg to 3400 mg/kg. The acute oral lethality resulted from nonspecific causes. These products contain 30-60% Potassium Silicate thus each product is estimated to have an Acute Oral Toxicity LD50, rat: >3000 mg/kg. Supplier's SDS.

Skin corrosion/irritation
When tested for primary skin irritation potential, this material produced irritation with a primary irritation index of 3 to abraded skin and 0 to intact skin. Human experience confirms that irritation occurs when this material gets on clothes at the collar, cuffs or other areas where abrasion may occur. Sodium silicates can be irritating to corrosive to the skin of rabbits, depending on theirmolar ratio and concentration. Irrespective of the counterion (Na+ or K+), silicates were found to be corrosive at molar ratios up to 1.6 and concentrations >50%. At molar ratios >1.6, silicates are irritating to the skin, while molar ratios >3.2 and concentrations <40% did not lead to irritative effects.

Serious eye damage/irritation
At concentrations of 35 % and 29 % (highest tested concentrations) potassium silicates with molar ratios of 3.4 was only slightly irritating to the eyes of rabbits. Results from non-validated in vitro assays with sodium silicates indicate that the severity of eye effects is inversely correlated with the molar ratio.

Respiratory or skin sensitization
Not classified based on available information.

Germ cell mutagenicity
In vitro, soluble silicates did not induce gene mutations in bacteria. Chemically similar sodium silicate was negative in an E. coli reverse mutation. In a modern guideline study that was performed in accordance with OECD TG 473, an aqueous sodium silicate solution (36% active ingredient, WR 3.3) induced no chromosomal aberrations in Chinese hamster V79 cells. From the available evidence it can be concluded that there is no evidence of a genotoxic potential for soluble silicates.

Carcinogenicity

The information available does not indicate any potential for carcinogenicity. Frequent ingestion over extended periods of time of gram quantities of silicates is associated with the formation kidney stones and other siliceous urinary calculi in humans. Sodium Silicate is not listed by IARC, NTP or OSHA as a carcinogen.

Reproductive toxicity
In a developmental toxicity study, pregnant mice were administered chemically similar 12.5, 50 or 200 mg/kg bw/d sodium metasilicate in aqueous solution from day 0 until 17/18 of gestation by daily gavage. Litter size and fertility index were unaffected at concentrations up to and including 200 mg/kg bw/d. Furthermore, no developmental effects were observed up to and including 200 mg/kg bw/d. Also, in repeat dose toxicity studies with rats, mice and dogs the macroscopic and microscopic examination of reproductive organs did not reveal related effects. In summary, no indications of roductive effects for silicates have been reported.

Specific target organ toxicity (STOT) - single exposure
Not classified based on available information.

Specific target organ toxicity (STOT) - repeated exposure
Not classified based on available information.

Aspiration hazard
Not classified based on available information.

Additional information
Chronic Effects: Prolonged or repeated skin contact may cause dry skin. Defatting of the skin can result in irritation and dermantitis.

SECTION 12: Ecological information

Toxicity
Ecotoxicity: Acute toxicity testing in fish, invertebrates and algae indicate a low order of toxicity: the soluble silicates exhibit aquatic toxicities in excess of 100 mg/l irrespective of molar ratio or metal cation.

Acute Toxicity - Fish: Danio rerio, LC50 (96h) = 210mg/l (Molar Ratio Na MR 1.0)
Oncorhynchus mykiss, LC50 (96h) = 260-310mg/l (Molar Ratio Na MR 3.1)

Acute Toxicity - Daphnia: Daphnia magna, EC50 (48h) = 1700mg/l (Molar Ratio Na MR 3.2)

Acute Toxicity - Algae: Pseudomonas putida, EC0 (18h) = 348mg/l (Molar Ratio Na MR 3.46)
Pseudomonas putida, EC0 (30min) = 1000mg/l (Molar Ratio Na MR 1.0)

Persistence and degradability
This material is not persistent in aquatic systems, but its high pH when undiluted or unneutralized is acutely harmful to aquatic life. Diluted material rapidly depolymerizes to yield dissolved silica in a form that is indistinguishable from natural dissolved silica. It does not contribute to BOD. This material does not bioaccumulate except in species that use silica as a structural material such as diatoms and siliceous sponges. Neither silica nor sodium will appreciably bioconcentrate up the food chain.

Mobility in soil
Expected to be mobile in soil. Diluted material rapidly depolymerises to yield dissolved silica in a form that is indistinguishable from natural dissolved silica.

Other adverse effects
Do not allow to enter waters, waste water, or soil!

SECTION 13: Disposal considerations

Disposal methods

Product disposal
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers.

Other disposal recommendations

Do not discharge this material into waterways, drains and sewers.

SECTION 14: Transport information

ADG (Road and Rail)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

Australia SUSMP
Poison Schedule: S5

SECTION 16: Other information

There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods.
If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

Further information/disclaimer
ChemSupply Australia Pty Ltd does not warrant that this product is suitable for any use or purpose. The user must ascertain the suitability of the product before use or application intended purpose. Preliminary testing of the product before use or application is recommended. Any reliance or purported reliance upon ChemSupply Australia Pty Ltd with respect to any skill or judgement or advice in relation to the suitability of this product of any purpose is disclaimed. Except to the extent prohibited at law, any condition implied by any statute as to the merchantable quality of this product or fitness for any purpose is hereby excluded. This product is not sold by description. Where the provisions of Part V, Division 2 of the Trade Practices Act apply, the liability of ChemSupply Australia Pty Ltd is limited to the replacement of supply of equivalent goods or payment of the cost of replacing the goods or acquiring equivalent goods.

Preparation information
All information provided in this data sheet or by our technical representatives is compiled from the best knowledge available to us. However,since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse, are beyond our control, we make no warranty either expressed or implied, with respect to the completeness or accuracy to the information contained herein. ChemSupply Australia Pty Ltd accepts no responsibility whatsoever for its accuracy or for any results that may be obtained by customers from using the data and disclaims all liability for reliance on information provided in this data sheet or by our technical representatives.

Standard for the Uniform Scheduling of Medicines and Poisons, Commonwealth of Australia
National Road Transport Commission, 'Australian Code for the Transport of Dangerous Goods by Road and Rail 7th. Ed.'
Safe Work Australia, 'National Code of Practice fot the Preparation of Safety Data Sheets for Hazardous Chemicals', July 2020.
Safe Work Australia, 'National Guide for Classifying Hazardous Chemicals', July 2020.
Safe Work Australia, Workplace Exposure Standards for Airbourne Contaminants, December 2019
Safe Work Australia, Hazardous Chemical Information System (HCIS), hcis.safeworkaustralia.gov.au
IATA, Dangerous Goods Regulations (DGR)
IMO, International Maritime Dangerous Goods Code (IMDG)