

Rowe Scientific Chloroform

ROWE SCIENTIFIC

Chemwatch: 20-3711

Version No: 8.1

Safety Data Sheet according to WHS Regulations (Hazardous Chemicals) Amendment 2020 and ADG requirements

Chemwatch Hazard Alert Code: 3

Issue Date: 13/07/2023

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SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	Rowe Scientific Chloroform
Chemical Name	chloroform
Synonyms	CC3144; CC3146; CC3155; CC3157; CC3163; CC3166; CC3220; CC3222; CC3260; CC3262
Proper shipping name	CHLOROFORM
Chemical formula	Not Applicable
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Laboratory chemical.
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Details of the manufacturer or supplier of the safety data sheet

Registered company name	ROWE SCIENTIFIC
Address	11 Challenge Boulevard Wangara WA 6065 Australia
Telephone	+61 8 9302 1911
Fax	+61 8 9302 1905
Website	http://rowe.com.au/
Email	rowewa@rowe.com.au

Emergency telephone number

Association / Organisation	ROWE SCIENTIFIC
Emergency telephone numbers	+61 8 9302 1911 (24 Hrs)
Other emergency telephone numbers	Not Available

SECTION 2 Hazards identification

Classification of the substance or mixture

Poisons Schedule	S6
Classification [1]	Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2B, Acute Toxicity (Inhalation) Category 3, Carcinogenicity Category 2, Specific Target Organ Toxicity - Repeated Exposure Category 2
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

Label elements

Hazard pictogram(s)	 
Signal word	Danger

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H320	Causes eye irritation.
H331	Toxic if inhaled.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
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P260	Do not breathe mist/vapours/spray.
P271	Use only a well-ventilated area.
P280	Wear protective gloves and protective clothing.
P264	Wash all exposed external body areas thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/ attention.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P311	Call a POISON CENTER/doctor/physician/first aider.
P337+P313	If eye irritation persists: Get medical advice/attention.
P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of water and soap.
P330	Rinse mouth.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.

Precautionary statement(s) Storage

P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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SECTION 3 Composition / information on ingredients**Substances**

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
67-66-3	>98	chloroform

Legend: 1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available

SECTION 4 First aid measures**Description of first aid measures**

Eye Contact	If this product comes in contact with the eyes: ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ 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. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor.
Inhalation	▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay.
Ingestion	▶ Avoid giving milk or oils. ▶ Avoid giving alcohol. ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Seek medical advice. NOTE: IN massive chloroform overdose, DO NOT INDUCE EMESIS because of the rapid onset of CNS depression and the risk of aspiration

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

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Treat symptomatically.

for intoxication due to Freons/ Halons;

A: Emergency and Supportive Measures

- ▶ Maintain an open airway and assist ventilation if necessary
- ▶ Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.
- ▶ Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:

- ▶ There is no specific antidote

C: Decontamination

- ▶ Inhalation; remove victim from exposure, and give supplemental oxygen if available.
- ▶ Ingestion; (a) Prehospital: Administer activated charcoal, if available. **DO NOT** induce vomiting because of rapid absorption and the risk of abrupt onset CNS depression. (b) Hospital: Administer activated charcoal, although the efficacy of charcoal is unknown. Perform gastric lavage only if the ingestion was very large and recent (less than 30 minutes)

D: Enhanced elimination:

- ▶ There is no documented efficacy for diuresis, haemodialysis, haemoperfusion, or repeat-dose charcoal.
- POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition*
- ▶ Do not administer sympathomimetic drugs unless absolutely necessary as material may increase myocardial irritability.
- ▶ No specific antidote.
- ▶ Because rapid absorption may occur through lungs if aspirated and cause systematic effects, the decision of whether to induce vomiting or not should be made by an attending physician.
- ▶ If lavage is performed, suggest endotracheal and/or esophageal control.
- ▶ Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.
- ▶ Treatment based on judgment of the physician in response to reactions of the patient

For chloroform intoxications:

Chloroform concentrations may be determined in blood.

Treat irritation symptomatically.

Oral Management:

Chloroform is radiopaque and X-rays confirm ingestion.

DO NOT INDUCE EMESIS because of the rapid onset of CNS depression and the risk of aspiration.

Consider gastric lavage within 1 hour of ingestion because of very rapid absorption of chloroform (use cuffed ET tube to protect airway)

Contact a poisons information service for further guidance on gut decontamination.

Systematic Management.

All patients initially require at least 24 hours observation with ECG monitoring.

Patients should be kept at complete bed rest, the use of stimulants (including adrenaline and noradrenaline) should be avoided because of the risk of sensitisation of the myocardium.

In symptomatic patients the hepatic and renal function should be monitored for at least 3-days post-exposure.

Chest X-rays will be necessary to monitor development of respiratory complications.

Chloroform depletes glutathione stores; N-acetylcysteine (used in the treatment of paracetamol overdose) has been suggested as a possible antidote for hepatotoxic organic solvents (success in carbon tetrachloride intoxications has been reported).

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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Advice for firefighters

Fire Fighting	▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. ▶ Prevent, by any means available, spillage from entering drains or water courses. ▶ Use fire fighting 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. ▶ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	carbon dioxide (CO2) hydrogen chloride phosgene other pyrolysis products typical of burning organic material. May emit poisonous fumes. ▶ Non combustible. ▶ Not considered a significant fire risk, however containers may burn. Decomposition may produce toxic fumes of:
HAZCHEM	22

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes.
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	▶ Control personal contact with the substance, by using protective equipment. ▶ Contain and absorb spill with sand, earth, inert material or vermiculite. ▶ Wipe up. ▶ Place in a suitable, labelled container for waste disposal.				
Major Spills	Chemical Class: aliphatics, halogenated For release onto land: recommended sorbents listed in order of priority.				
	SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS
	SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS
	LAND SPILL - SMALL				
	cross-linked polymer - particulate	1	shovel	shovel	R, W, SS
	cross-linked polymer - pillow	1	throw	pitchfork	R, DGC, RT
	wood fiber - pillow	2	throw	pitchfork	R, P, DGC, RT
	treated wood fibre - particulate	2	shovel	shovel	R, W, DGC
	sorbent clay - particulate	3	shovel	shovel	R, I, P
	foamed glass - pillow	3	throw	pitchfork	R, P, DGC, RT
	LAND SPILL - MEDIUM				
	cross-linked polymer - particulate	1	blower	skiploader	R,W, SS
	cross-linked polymer - pillow	2	throw	skiploader	R, DGC, RT
	sorbent clay - particulate	3	blower	skiploader	R, I, P
	polypropylene - particulate	3	blower	skiploader	W, SS, DGC
	foamed glass - pillow	3	throw	skiploader	R, P, DGC, RT
	expanded mineral - particulate	4	blower	skiploader	R, I, W, P, DGC
	Legend				
	DGC: Not effective where ground cover is dense				
	R; Not reusable				
	I: Not incinerable				
	P: Effectiveness reduced when rainy				
	RT:Not effective where terrain is rugged				
SS: Not for use within environmentally sensitive sites					
W: Effectiveness reduced when windy					
Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control;					
R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988					
Clear area of personnel and move upwind.					
Alert Fire Brigade and tell them location and nature of hazard.					
Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or water courses.					
No smoking, naked lights or ignition sources.					
Increase ventilation. Stop leak if safe to do so.					
Water spray or fog may be used to disperse / absorb vapour.					
Contain or absorb spill with sand, earth or vermiculite.					
Collect recoverable product into labelled containers for recycling.					
Collect solid residues and seal in labelled drums for disposal.					
Wash area and prevent runoff into drains.					
After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.					
If contamination of drains or waterways occurs, advise emergency services.					

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

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▶ DO NOT allow clothing wet with material to stay in contact with skin ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. ▶ Prevent concentration in hollows and sumps. ▶ DO NOT enter confined spaces until atmosphere has been checked. ▶ DO NOT allow material to contact humans, exposed food or food utensils. ▶ Avoid contact with incompatible materials. ▶ When handling, DO NOT eat, drink or smoke. ▶ Keep containers securely sealed when not in use. ▶ Avoid physical damage to containers. ▶ Always wash hands with soap and water after handling. ▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▶ Use good occupational work practice. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS. ▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Other information	▶ Do NOT store halogenated aliphatics in areas containing alkali or alkaline earth metals such as powdered aluminum, zinc, or beryllium ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. ▶ Store away from incompatible materials and foodstuff containers. ▶ Protect containers against physical damage and check regularly for leaks. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS.

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Conditions for safe storage, including any incompatibilities

Suitable container	▶ DO NOT use aluminium or galvanised containers ▶ Glass container is suitable for laboratory quantities ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. ▶ Packing as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks. For low viscosity materials ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.): ▶ Removable head packaging; ▶ Cans with friction closures and ▶ low pressure tubes and cartridges may be used. - Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *. - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.
Storage incompatibility	Chloroform ▶ decomposes in the presence of excess water, high temperature, including hot surfaces, evolving phosgene and hydrogen chloride ▶ on contact with warm water may form hydrogen chloride ▶ decomposes at ordinary temperatures in sunlight, in the absence of air, and in the dark in the presence of air ▶ may form explosive materials when mixed with strong bases, alkali metals, lithium, sodium, potassium, sodium-potassium alloys; these may be heat-, friction-, and/or impact sensitive ▶ reacts violently with light metals, aluminium, magnesium or titanium powder, disilane, potassium tert-butoxide, methylates (methoxides), potassium acetylene-1,2-dioxide, sodium amide, uranium(III) hydride ▶ reacts violently with (acetone + a base), (perchloric acid + phosphorous pentoxide), (KOH + methanol) and (NaOH + methanol). ▶ is incompatible with acetone, beryllium, decaborane, methanol, nitrogen tetroxide, strong oxidisers, fluorine, oxygen, potassium, sodium, strong mineral acids, triisopropylphosphine, chemically active metals (Li, NaK alloy), zinc ▶ attacks many plastics and rubber ▶ attacks iron and other metals in the presence of moisture and elevated temperatures ▶ may generate electrostatic charges due to low conductivity Haloalkanes: ▶ are highly reactive:some of the more lightly substituted lower members are highly flammable; the more highly substituted may be used as fire suppressants, not always with the anticipated results. ▶ may react with the lighter divalent metals to produce more reactive compounds analogous to Grignard reagents. ▶ may produce explosive compounds following prolonged contact with metallic or other azides ▶ may react on contact with potassium or its alloys - although apparently stable on contact with a wide range of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact; severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures . BREThERICK L.: Handbook of Reactive Chemical Hazards ▶ react with metal halides and active metals, eg. sodium (Na), potassium (K), lithium (Li), calcium (Ca), zinc (Zn), powdered aluminium (Al) and aluminium alloys, magnesium (Mg) and magnesium alloys. ▶ may react with brass and steel. ▶ may react explosively with strong oxidisers ▶ may degrade rubber, and plastics such as methacrylate polymers, polyethylene and polystyrene, paint and coatings

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	chloroform	Chloroform	2 ppm / 10 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
chloroform	2 ppm	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
chloroform	500 ppm	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure. Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate
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protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. An approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Individual protection measures, such as personal protective equipment



Eye and face protection

- ▶ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure.
- ▶ Chemical goggles. Whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted. [AS/NZS 1337.1, EN166 or national equivalent]
- ▶ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection.
- ▶ Alternatively a gas mask may replace splash goggles and face shields.
- ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

Skin protection

See Hand protection below

Hands/feet protection

- ▶ Elbow length PVC gloves
 - ▶ Butyl rubber gloves
 - Butyl rubber gloves should be used when handling halogenated aliphatics.
 - Nitrile, PVC-coated nitrile, and PVC protective equipment are not recommended
- The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
- The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
- Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
- frequency and duration of contact,
 - chemical resistance of glove material,
 - glove thickness and
 - dexterity
- Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
 - When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
 - Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
 - Contaminated gloves should be replaced.
- As defined in ASTM F-739-96 in any application, gloves are rated as:
- Excellent when breakthrough time > 480 min
 - Good when breakthrough time > 20 min
 - Fair when breakthrough time < 20 min
 - Poor when glove material degrades
- For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.
- It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.
- Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task.

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	Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: · Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. · Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Body protection	See Other protection below
Other protection	· Halogen-selective detectors use a specialized sensor that allows the monitor to detect compounds containing fluorine, chlorine, bromine, and iodine with-out interference from other species. These detectors are typically easy to use, feature higher sensitivity than the nonselective detectors (detection limits are typically <5 ppm when used as an area monitor and <1.4 gm/yr [<0.05 oz/yr] when used as a leak pinpointer). · Compound-Specific Detectors are typically capable of detecting the presence of a single compound without interference from other compounds. ▶ Overalls. ▶ Eyewash unit. ▶ Barrier cream. ▶ Skin cleansing cream.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

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Material	CPI
PE/EVAL/PE	A
PVA	A
TEFLON	A
VITON	B

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AX-AUS	-	AX-PAPR-AUS / Class 1
up to 50 x ES	-	AX-AUS / Class 1	-
up to 100 x ES	-	AX-2	AX-PAPR-2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- ▶ The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- ▶ Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AX-AUS / Class 1	-
up to 50	1000	-	AX-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	AX-2
up to 100	10000	-	AX-3
100+		-	Airline**

** - Continuous-flow or positive pressure demand.

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 deg C)

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Clear colourless, very volatile liquid with characteristic heavy, "sweetish" ethereal odour and sweet taste. Slightly soluble in water (1:200). Mixes
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Continued...

Rowe Scientific Chloroform

	with alcohol, benzene, ether, petroleum ether, carbon tetrachloride, carbon disulfide, and oils.		
Physical state	Liquid	Relative density (Water = 1)	1.489 @ 20 C
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Applicable	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	-63.5	Viscosity (cSt)	0.56
Initial boiling point and boiling range (°C)	60-62	Molecular weight (g/mol)	119.37
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Fast	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Applicable	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Applicable	Volatile Component (%vol)	100
Vapour pressure (kPa)	21.2 @ 20 C	Gas group	Not Available
Solubility in water	Immiscible	pH as a solution (1%)	Not Applicable
Vapour density (Air = 1)	4.13	VOC g/L	1460.71

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo. Chloroform concentrations of 1000-2000 ppm may cause dizziness, headache, fatigue, salivation and nausea. 4000 ppm may cause vomiting, serious disorientation and a fainting feeling. 14000-16000 ppm may cause anaesthesia and rapid loss of consciousness. More than 20000 ppm may cause respiratory failure, cardiac arrhythmias and death. Fatty changes and centrilobular necrosis of the liver and fatty degenerative changes of the kidney and heart may occur. If death does not occur immediately from respiratory arrest or ventricular fibrillation, it may occur later from liver and kidney damage. 51r39/678
Ingestion	Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
Skin Contact	Strong evidence exists that exposure to the material may produce very serious irreversible damage (other than carcinogenesis, mutagenesis and teratogenesis) following a single exposure by skin contact. The material produces mild skin irritation; evidence exists, or practical experience predicts, that the material either ▶ produces mild inflammation of the skin in a substantial number of individuals following direct contact, and/or ▶ produces significant, but mild, inflammation when applied to the healthy intact skin of animals (for up to four hours), such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. Repeated exposure may cause skin cracking, flaking or drying following normal handling and use. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Limited evidence or practical experience suggests, that the material may cause moderate eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged exposure may cause moderate inflammation (similar to windburn) characterised by a temporary redness of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.
Chronic	On the basis, primarily, of animal experiments, concern has been expressed that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment. Serious damage (clear functional disturbance or morphological change which may have toxicological significance) is likely to be caused by repeated or prolonged exposure. As a rule the material produces, or contains a substance which produces severe lesions. Such damage may become apparent following direct application in subchronic (90 day) toxicity studies or following sub-acute (28 day) or chronic (two-year) toxicity tests.

Continued...

Exposure to the material may cause concerns for humans owing to possible developmental toxic effects, generally on the basis that results in appropriate animal studies provide strong suspicion of developmental toxicity in the absence of signs of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not a secondary non-specific consequence of other toxic effects.

Chronic exposure to chloroform may produce dizziness, fatigue, drowsiness, memory impairment, increased dreams, anorexia and palpitations. Slight liver damage may occur producing higher concentrations of serum prealbumin and transferrin levels. Neurobehavioural testing shows dose-related negative changes and increased scores in passive mood states. Chronic ingestion of 1.6-2.6 g of chloroform daily for 10 years produced hepatitis and nephrosis. Chronic abuse of chloroform may induce psychotic behaviour.

Repeated exposure to 77-237 ppm has caused lassitude, dullness, urinary frequency, and gastrointestinal disturbances. Other symptoms include dry mouth, thirst, malaise, anorexia, headache, depression, confusion, weakness, blurred vision, paraesthesias, loss of sense of balance, memory loss, tremors, anemia, kidney damage, and fatty degeneration of the liver.

Repeated ingestion may cause liver and kidney damage. Chloroform is not strongly teratogenic but is embryotoxic. Exposure by rats to chloroform (7 hours/day on days 6 through to 15 of gestation) caused an apparent decrease in conception rate and high incidence of foetal resorption (300 ppm), retarded foetal development (30 ppm), decreased foetal body measurements (30 ppm), and a low incidence of acaudate (tailless) fetuses with imperforate anuses (100 ppm). When administered by gavage (in corn oil), the chloroform induced hepatocellular carcinomas in mice of both sexes. It also induced increased incidences of kidney epithelial tumors when administered by the same route. When administered orally (in olive oil), chloroform produced hepatomas and cirrhosis in female mice.

When administered orally in drinking water, chloroform induced increased incidences of renal tubular cell adenomas and/or adenocarcinomas in male rats, but no renal or hepatic tumors were induced in male or female mice. A further study reports the development of hepatic adenofibrosis in rats of both sexes and neoplastic nodules in females when chloroform was administered in the drinking water. Several epidemiological and ecological studies indicate that there is an association between cancer of the large intestine, rectum, and/or urinary bladder and the constituents of chlorinated water.

Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.

Rowe Scientific Chloroform	TOXICITY	IRRITATION
	Not Available	Not Available
chloroform	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >3980 mg/kg ^[2]	Eye (rabbit): 148 mg
	Inhalation(Mammal) LC50; 47 mg/L4h ^[2]	Eye (rabbit):20 mg/24h - moderate
	Oral (Rat) LD50: 800 mg/kg ^[2]	Skin (rabbit):10 mg/24h(open)-mild
Legend:	Skin (rabbit):500 mg/24h - mild	
	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

CHLOROFORM	The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. of Health & Human Services 2002]
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Acute Toxicity	✓	Carcinogenicity	✓
Skin Irritation/Corrosion	✓	Reproductivity	✗
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✓
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

Rowe Scientific Chloroform	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
chloroform	Endpoint	Test Duration (hr)	Species	Value	Source
	BCF	1008h	Fish	1.4-4.7	7
	EC50	72h	Algae or other aquatic plants	11-15.77mg/l	4
	EC50	48h	Crustacea	2.57-3.06mg/l	4
	LC50	96h	Fish	3mg/l	1
	NOEC(ECx)	6480h	Fish	0.151mg/l	2
Legend:		Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data			

DO NOT discharge into sewer or waterways.

Continued...

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
chloroform	HIGH (Half-life = 1800 days)	HIGH (Half-life = 259.63 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
chloroform	LOW (BCF = 13)

Mobility in soil

Ingredient	Mobility
chloroform	LOW (KOC = 35.04)

SECTION 13 Disposal considerations**Waste treatment methods**

Product / Packaging disposal	- Containers may still present a chemical hazard/ danger when empty. - Return to supplier for reuse/ recycling if possible. Otherwise: - If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. - Where possible retain label warnings and SDS and observe all notices pertaining to the product. DO NOT allow wash water from cleaning or process equipment to enter drains. - It may be necessary to collect all wash water for treatment before disposal. - In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. - Where in doubt contact the responsible authority. - Recycle wherever possible or consult manufacturer for recycling options. - Consult State Land Waste Authority for disposal. - Bury or incinerate residue at an approved site. - Recycle containers if possible, or dispose of in an authorised landfill.
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SECTION 14 Transport information**Labels Required**

Marine Pollutant	NO
HAZCHEM	2Z

Land transport (ADG)

UN number or ID number	1888				
UN proper shipping name	CHLOROFORM				
Transport hazard class(es)	<table> <tr> <td>Class</td><td>6.1</td></tr> <tr> <td>Subsidiary risk</td><td>Not Applicable</td></tr> </table>	Class	6.1	Subsidiary risk	Not Applicable
Class	6.1				
Subsidiary risk	Not Applicable				
Packing group	III				
Environmental hazard	Not Applicable				
Special precautions for user	<table> <tr> <td>Special provisions</td><td>Not Applicable</td></tr> <tr> <td>Limited quantity</td><td>5 L</td></tr> </table>	Special provisions	Not Applicable	Limited quantity	5 L
Special provisions	Not Applicable				
Limited quantity	5 L				

Air transport (ICAO-IATA / DGR)

UN number	1888						
UN proper shipping name	Chloroform						
Transport hazard class(es)	<table> <tr> <td>ICAO/IATA Class</td><td>6.1</td></tr> <tr> <td>ICAO / IATA Subrisk</td><td>Not Applicable</td></tr> <tr> <td>ERG Code</td><td>6A</td></tr> </table>	ICAO/IATA Class	6.1	ICAO / IATA Subrisk	Not Applicable	ERG Code	6A
ICAO/IATA Class	6.1						
ICAO / IATA Subrisk	Not Applicable						
ERG Code	6A						
Packing group	III						
Environmental hazard	Not Applicable						
Special precautions for user	<table> <tr> <td>Special provisions</td><td>Not Applicable</td></tr> <tr> <td>Cargo Only Packing Instructions</td><td>680</td></tr> <tr> <td>Cargo Only Maximum Qty / Pack</td><td>220 L</td></tr> </table>	Special provisions	Not Applicable	Cargo Only Packing Instructions	680	Cargo Only Maximum Qty / Pack	220 L
Special provisions	Not Applicable						
Cargo Only Packing Instructions	680						
Cargo Only Maximum Qty / Pack	220 L						

	Passenger and Cargo Packing Instructions	680
	Passenger and Cargo Maximum Qty / Pack	60 L
	Passenger and Cargo Limited Quantity Packing Instructions	Y680
	Passenger and Cargo Limited Maximum Qty / Pack	2 L

Sea transport (IMDG-Code / GGVSee)

UN number	1888		
UN proper shipping name	CHLOROFORM		
Transport hazard class(es)	IMDG Class	6.1	
	IMDG Subrisk	Not Applicable	
Packing group	III		
Environmental hazard	Not Applicable		
Special precautions for user	EMS Number	F-A, S-A	
	Special provisions	Not Applicable	
	Limited Quantities	5 L	

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
chloroform	Not Available

Transport in bulk in accordance with the IGC Code

Product name	Ship Type
chloroform	Not Available

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

chloroform is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 2
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
Australian Inventory of Industrial Chemicals (AIIC)

Chemical Footprint Project - Chemicals of High Concern List
FEI Equine Prohibited Substances List - Banned Substances
FEI Equine Prohibited Substances List (EPSL)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (chloroform)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	13/07/2023
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Rowe Scientific Chloroform

Initial Date 05/03/2009**SDS Version Summary**

Version	Date of Update	Sections Updated
7.1	16/09/2021	Hazards identification - Classification, Name
8.1	13/07/2023	Toxicological information - Acute Health (inhaled), Toxicological information - Acute Health (skin), Toxicological information - Acute Health (swallowed), First Aid measures - Advice to Doctor, Toxicological information - Chronic Health, Hazards identification - Classification, Disposal considerations - Disposal, First Aid measures - First Aid (eye), First Aid measures - First Aid (inhaled), First Aid measures - First Aid (skin), Exposure controls / personal protection - Personal Protection (other), Exposure controls / personal protection - Personal Protection (Respirator), Exposure controls / personal protection - Personal Protection (eye), Exposure controls / personal protection - Personal Protection (hands/feet), Accidental release measures - Spills (major), Handling and storage - Storage (storage incompatibility), Handling and storage - Storage (storage requirement), Handling and storage - Storage (suitable container)

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit
IDLH: Immediately Dangerous to Life or Health Concentrations
ES: Exposure Standard
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index
AIC: Australian Inventory of Industrial Chemicals
DSL: Domestic Substances List
NDSL: Non-Domestic Substances List
IECSC: Inventory of Existing Chemical Substance in China
EINECS: European INventory of Existing Commercial chemical Substances
ELINCS: European List of Notified Chemical Substances
NLP: No-Longer Polymers
ENCS: Existing and New Chemical Substances Inventory
KECI: Korea Existing Chemicals Inventory
NZIoC: New Zealand Inventory of Chemicals
PICCS: Philippine Inventory of Chemicals and Chemical Substances
TSCA: Toxic Substances Control Act
TCSI: Taiwan Chemical Substance Inventory
INSQ: Inventario Nacional de Sustancias Químicas
NCI: National Chemical Inventory
FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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