

KWB Buffer

Omega Bio-tek

Version No: 4.10

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: 4

Issue Date: 19/01/2024

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S.GHS.USA.EN

SECTION 1 Identification

Product Identifier

| | |
|-------------------------------|---------------|
| Product name | KWB Buffer |
| Synonyms | Not Available |
| Other means of identification | Not Available |

Recommended use of the chemical and restrictions on use

| | |
|--------------------------|-----------------|
| Relevant identified uses | Laboratory use. |
|--------------------------|-----------------|

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

| | | |
|-------------------------|--|---|
| Registered company name | Omega Bio-tek | Omega Bio-tek |
| Address | 400 Pinnacle Way, Suite 450 Georgia 30071 United States | Siriusdreef, Transpolis Park 17-27 2131 Netherlands |
| Telephone | +1 770 931 8400 | +31 20 809 3697 |
| Fax | Not Available | Not Available |
| Website | www.omegabiotek.com | http://www.omegabiotek.com/ |
| Email | info@omegabiotek.com | info@omegabiotek.com |

Emergency phone number

| | |
|-----------------------------------|--|
| Association / Organisation | CHEMTREC |
| Emergency telephone numbers | North America: +1 800 424 9300 |
| Other emergency telephone numbers | Outside North America: +1 703 527 3887 |

SECTION 2 Hazard(s) identification

Classification of the substance or mixture



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

| | |
|----------------|--|
| Classification | Flammable Liquids Category 3, Oxidizing Liquids Category 1, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2A, Specific Target Organ Toxicity - Repeated Exposure Category 2 |
|----------------|--|

Label elements

| | |
|---------------------|---|
| Hazard pictogram(s) |     |
|---------------------|---|

KWB Buffer

| | |
|-------------|--------|
| Signal word | Danger |
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Hazard statement(s)

| | |
|------|---|
| H226 | Flammable liquid and vapour. |
| H271 | May cause fire or explosion; strong oxidiser. |
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H373 | May cause damage to organs through prolonged or repeated exposure. (Oral, Dermal) |

Hazard(s) not otherwise classified

Not Applicable

Precautionary statement(s) Prevention

| | |
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| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P221 | Take any precaution to avoid mixing with combustibles/organic material. |
| P233 | Keep container tightly closed. |
| P260 | Do not breathe mist/vapours/spray. |
| P220 | Keep/Store away from clothing/organic material/combustible materials. |
| P240 | Ground/bond container and receiving equipment. |
| P241 | Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment. |
| P242 | Use only non-sparking tools. |
| P243 | Take precautionary measures against static discharge. |
| P283 | Wear fire/flame resistant/retardant clothing. |
| P264 | Wash all exposed external body areas thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |

Precautionary statement(s) Response

| | |
|----------------|--|
| P370+P378 | In case of fire: Use water spray/fog to extinguish. |
| P371+P380+P375 | In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion. |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P306+P360 | IF ON CLOTHING: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes. |
| P314 | Get medical advice/attention if you feel unwell. |
| 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. |
| P303+P361+P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. |
| 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

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| P403+P235 | Store in a well-ventilated place. Keep cool. |
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Precautionary statement(s) Disposal

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| 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 |
|---------------|-----------|--------------------------------|
| 50-01-1 | 10-25 | <u>guanidine hydrochloride</u> |
| Not Available | 5-10 | Non-ionic detergent |
| 7601-89-0 | 10-25 | <u>sodium perchlorate</u> |
| 64-17-5 | 25-35 | <u>ethanol</u> |

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

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SECTION 4 First-aid measures

Description of first aid measures

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| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ 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 | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ 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 | <ul style="list-style-type: none"> ▶ 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 | <ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ 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. ▶ Transport to hospital or doctor without delay. |

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

For acute or short term repeated exposures to ethanol:

- ▶ Acute ingestion in non-tolerant patients usually responds to supportive care with special attention to prevention of aspiration, replacement of fluid and correction of nutritional deficiencies (magnesium, thiamine pyridoxine, Vitamins C and K).
- ▶ Give 50% dextrose (50-100 ml) IV to obtunded patients following blood draw for glucose determination.
- ▶ Comatose patients should be treated with initial attention to airway, breathing, circulation and drugs of immediate importance (glucose, thiamine).
- ▶ Decontamination is probably unnecessary more than 1 hour after a single observed ingestion. Cathartics and charcoal may be given but are probably not effective in single ingestions.
- ▶ Fructose administration is contra-indicated due to side effects.

Antithyroid effects produced by the perchlorates may be reversed with iodine. Patients should be warned to report the development of sore throat, fever or rashes since these are indicative of blood abnormalities.

For chlorates:

For severe intoxication: Empty the stomach by lavage and aspiration or by emesis, give demulcents or sweetened drinks and maintain respiration. Pethidine may be given if required. A 1% solution of sodium thiosulfate may be used for lavage and may also be given by intravenous infusion. Haemodialysis, peritoneal dialysis or exchange perfusions may be of value in removing chlorate from the blood. Forced diuresis should not be attempted if there is inadequate urine input.

MARTINDALE: The Extra Pharmacopoeia, 27th Edition

The high sensitivity of glucose-6-phosphate dehydrogenase to denaturation by chlorate explains the inefficacy of methylene blue to reduce methaemoglobin formed, as the antidotal effect of methylene blue depends on NADPH formed mainly by the oxidation of glucose-6-phosphate. The observed changes occur only in the presence of methaemoglobin which forms a destabilising complex with chlorate. Methaemoglobin thus autocatalytically increases methaemoglobin formation and destruction of the erythrocyte.

SECTION 5 Fire-fighting 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

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

Special protective equipment and precautions for fire-fighters

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|---------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. ▶ Use water delivered as a fine spray to control fire and cool adjacent area. ▶ Avoid spraying water onto liquid pools. ▶ DO NOT approach containers suspected to be hot. |
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| | <ul style="list-style-type: none"> ▶ Cool fire exposed containers with water spray from a protected location. ▶ If safe to do so, remove containers from path of fire. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Liquid and vapour are flammable. ▶ Moderate fire hazard when exposed to heat or flame. ▶ Vapour forms an explosive mixture with air. ▶ Moderate explosion hazard when exposed to heat or flame. ▶ Vapour may travel a considerable distance to source of ignition. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. ▶ On combustion, may emit toxic fumes of carbon monoxide (CO). <p>Combustion products include: carbon dioxide (CO₂) hydrogen chloride phosgene nitrogen oxides (NO_x) other pyrolysis products typical of burning organic material. May emit poisonous fumes. May emit corrosive fumes.</p> |

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

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| Minor Spills | <ul style="list-style-type: none"> ▶ Remove all ignition sources. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. ▶ Contain and absorb small quantities with vermiculite or other absorbent material. ▶ Wipe up. ▶ Collect residues in a flammable waste container. |
| Major Spills | <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by all means available, spillage from entering drains or water courses. ▶ Consider evacuation (or protect in place). ▶ 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

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| Safe handling | <ul style="list-style-type: none"> ▶ Overheating of ethoxylates/ alkoxyates in air should be avoided. When some ethoxylates are heated vigorously in the presence of air or oxygen, at temperatures exceeding 160 C, they may undergo exothermic oxidative degeneration resulting in self-heating and autoignition. ▶ Nitrogen blanketing will minimise the potential for ethoxylate oxidation. Prolonged storage in the presence of air or oxygen may cause product degradation. Oxidation is not expected when stored under a nitrogen atmosphere. Inert gas blanket and breathing system needed to maintain color stability. Use dry inert gas having at least -40 C dew point. ▶ Trace quantities of ethylene oxide may be present in the material. Although these may accumulate in the headspace of storage and transport vessels, concentrations are not expected to exceed levels which might produce a flammability or worker exposure hazard. ▶ 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. ▶ Avoid smoking, naked lights or ignition sources. ▶ 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. ▶ 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. ▶ DO NOT allow clothing wet with material to stay in contact with skin |
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Other information

Ethoxylates/ alkoxyates react slowly with air or oxygen and may generate potentially sensitising intermediates (haptens).. Storage under heated conditions in the presence of air or oxygen increases reaction rate. For example, after storing at 95 F/ 35 C for 30 days in the presence of air, there is measurable oxidation of the ethoxylate. Lower temperatures will allow for longer storage time and higher temperatures will shorten the storage time if stored under an air or oxygen atmosphere.

- ▶ Store in original containers.
- ▶ Keep containers securely sealed.
- ▶ No smoking, naked lights or ignition sources.
- ▶ 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.

Conditions for safe storage, including any incompatibilities

Suitable container

For ethoxylates suitable containers include carbon steel coated with baked phenolic. Any moisture may cause rusting of carbon steel.

If product is moisture free, uncoated carbon steel tanks may be used.

- ▶ Glass container is suitable for laboratory quantities
- ▶ Metal can or drum
- ▶ Packaging as recommended by manufacturer.
- ▶ Check all containers are clearly labelled and free from leaks.

Storage incompatibility

- ▶ Avoid oxidising agents, acids, acid chlorides, acid anhydrides, chloroformates.
- ▶ Overheating of ethoxylates/ alkoxyates in air should be avoided. When some ethoxylates are heated vigorously in the presence of air or oxygen, at temperatures exceeding 160 C, they may undergo exothermic oxidative degeneration resulting in self-heating and autoignition.
- ▶ Nitrogen blanketing will minimise the potential for ethoxylate oxidation. Prolonged storage in the presence of air or oxygen may cause product degradation. Oxidation is not expected when stored under a nitrogen atmosphere. Inert gas blanket and breathing system needed to maintain color stability. Use dry inert gas having at least -40 C dew point.
- ▶ Trace quantities of ethylene oxide may be present in the material. Although these may accumulate in the headspace of storage and transport vessels, concentrations are not expected to exceed levels which might produce a flammability or worker exposure hazard.
- ▶ Inorganic peroxy compounds are potent oxidisers that pose fire or explosive hazards when in contact with ordinary combustible materials.
- ▶ Inorganic peroxides react with organic compounds to generate organic peroxide and hydroperoxide products that react violently with reducing agents.
- ▶ Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). The products may themselves be capable of further reactions (such as combustion in the air).
- ▶ Organic compounds in general have some reducing power and can in principle react with compounds in this class. Actual reactivity varies greatly with the identity of the organic compound.
- ▶ Inorganic oxidising agents can react violently with active metals, cyanides, esters, and thiocyanates.
- ▶ Peroxides, in contact with inorganic cobalt and copper compounds, iron and iron compounds, acetone, metal oxide salts and acids and bases can react with rapid, uncontrolled decomposition, leading to fires and explosions.
- ▶ Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.
- ▶ Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.

NOTE: May contain traces of perchloric acid or may, on contact with acids, produce an anhydrous perchloric acid an extremely reactive and explosive species. Many of the reported explosions involving perchlorate may result its ability to form unstable perchlorate esters or salts of the anhydrous acid.

WARNING:

- ▶ On the basis of experience with cobalt(III) perchlorate, attention is drawn to the possibility of stable metal perchlorates being converted by unintentional dehydration to unstable (endothermic) lower hydrates capable of explosive decomposition in the absence of impurities. Great care must be taken to avoid dehydration or desolvation of perchlorates.
- ▶ Metal perchlorates may be explosively reactive with finely divided aluminium, magnesium and zinc and other metals, calcium and strontium hydrides, glycol (on heating), sulfuric acid (with the formation of unstable perchloric acid), and trifluoromethanesulfonic acid.
- ▶ The perchlorate salts of the complexes of divalent cobalt, nickel and particularly iron ([tetramethyl[14]-N8 complexes) are potentially explosive and storage for more than 4 weeks is inadvisable
- ▶ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous
- ▶ Avoid storage with reducing agents.
- ▶ Segregate chlorates from organic matter, acids, poisonous gases, flammables, corrosives, aluminium and ammonium salts and any other combustible material.
- ▶ Mixtures of chlorates with fibrous and absorbent organic materials such as wood, paper, leather, flour, sawdust, sugar, shellac, may be ignited or caused to explode by static sparks, friction or shock.
- ▶ The extreme hazardous nature of mixtures of metal chlorates with phosphorus or sulfur, apart from being powerful explosives, are dangerously sensitive to friction or shock; spontaneous ignition occasionally occurs.
- ▶ Mixtures with sucrose, lactose, chromium, sulfur dioxide, sodium amide, zirconium, germanium and titanium explode on heating.
- ▶ Forms incompatible sometimes explosive mixtures with thorium dicarbide, strontium hydride, hydrogen iodide, fluorine, cyanoguanidine, cyanides, dinickel trioxide, powdered carbon, aqua regia and ruthenium, nitric acid, manganese dioxide and potassium hydroxide or boron.
- ▶ Chlorates should not be allowed to come into contact with ammonium salts, aluminium and other powdered metals, phosphorous, silicon, sulfur, sulfides, sulfuric acid, nitrobenzene, iodides and tartaric acid
- ▶ Mixtures with hydrocarbons, metal phosphides (Zn, Ag, Al, Cu, Hg, Mg, etc), metal thiocyanates, metal sulfides, arsenic, carbon, phosphorous, sulfur, ammonium salts, powdered metals, arsenic trioxide, phosphorous, silicon, sulfur, sulfides, sulfites and hyposulfites are easily ignited (by friction impact or heat) and are potentially explosive.
- ▶ Metal chlorates in contact with strong acids liberate explosive chlorine dioxide gas. With concentrated sulfuric acid a violent explosion can occur unless effective cooling is used. Mixing potassium chlorate and concentrated sulfuric acid results in an explosion with optimum temperature range being 120-130. Heating a moist mixture of metal chlorate and a dibasic organic acid (tartaric or citric acid) liberates chlorine dioxide diluted with carbon dioxide.
- ▶ Fusion of chlorates with metal cyanides may lead to an explosion.
- ▶ Chlorates containing 1-2% bromate or sulfur are liable to spontaneous explosion.
- ▶ Chlorates releases oxygen, chlorine and chlorine dioxide when heated above 300 deg. C..
- ▶ In presence of moisture may release oxygen and ozone
- ▶ Avoid strong bases.
- ▶ Intimate mixtures of chlorates, bromates or iodates of barium, cadmium, calcium, magnesium, potassium, sodium or zinc, with finely divided aluminium, arsenic, copper, carbon, phosphorus, sulfur, hydrides of alkali- and alkaline earth-metals; sulfides of antimony, arsenic, copper or tin; metal cyanides, thiocyanates; or impure manganese dioxide may react explosively or violently, either spontaneously (especially in the presence of moisture) or on initiation by heat, impact or friction, sparks or addition of sulfuric acid.

BREThERICKS HANDBOOK OF REACTIVE CHEMICAL HAZARDS, 4th Edition

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|--|------------|-------------------------|-----------------------|---------------|---------------|---------------|
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 | ethanol | Ethyl alcohol (Ethanol) | 1000 ppm / 1900 mg/m3 | Not Available | Not Available | Not Available |
| US NIOSH Recommended Exposure Limits (RELs) | ethanol | Ethyl alcohol | 1000 ppm / 1900 mg/m3 | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|-------------------------|---------------|---------------|------------|
| guanidine hydrochloride | 1.4 mg/m3 | 16 mg/m3 | 94 mg/m3 |
| sodium perchlorate | 6.3 mg/m3 | 69 mg/m3 | 420 mg/m3 |
| sodium perchlorate | 3.8 mg/m3 | 41 mg/m3 | 250 mg/m3 |
| ethanol | Not Available | Not Available | 15000* ppm |

| Ingredient | Original IDLH | Revised IDLH |
|-------------------------|---------------|---------------|
| guanidine hydrochloride | Not Available | Not Available |
| sodium perchlorate | Not Available | Not Available |
| ethanol | 3,300 ppm | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|-------------------------|-----------------------------------|----------------------------------|
| guanidine hydrochloride | E | ≤ 0.01 mg/m³ |
| sodium perchlorate | E | ≤ 0.01 mg/m³ |

Notes: Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

Exposure controls

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|---|---|
| Appropriate engineering controls | <p>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:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>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.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <ul style="list-style-type: none">▶ Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area.▶ Work should be undertaken in an isolated system such as a 'glove-box' . Employees should wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system.▶ Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within.▶ Open-vessel systems are prohibited.▶ Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation.▶ Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system.▶ For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.▶ Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas).▶ Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air.▶ Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face velocity of 0.76 m/sec with a minimum of 0.64 m/sec. Design and construction of the fume hood requires that insertion of any portion of the employees body, other than hands and arms, be disallowed. |
| Individual protection measures, such as personal protective equipment |  |
| Eye and face protection | <p>When handling very small quantities of the material eye protection may not be required.</p> <p>For laboratory, larger scale or bulk handling or where regular exposure in an occupational setting occurs:</p> <ul style="list-style-type: none">▶ Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent]▶ Face shield. Full face shield may be required for supplementary but never for primary protection of eyes.▶ 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]. |

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| Skin protection | See Hand protection below |
| Hands/feet protection | <p>▶ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none">· frequency and duration of contact,· chemical resistance of glove material,· glove thickness and· dexterity <p>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).</p> <ul style="list-style-type: none">· 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. <p>As defined in ASTM F-739-96 in any application, gloves are rated as:</p> <ul style="list-style-type: none">· Excellent when breakthrough time > 480 min· Good when breakthrough time > 20 min· Fair when breakthrough time < 20 min· Poor when glove material degrades <p>For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.</p> <p>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.</p> <p>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.</p> <p>Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:</p> <ul style="list-style-type: none">· 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 <p>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.</p> <ul style="list-style-type: none">▶ Rubber gloves (nitrile or low-protein, powder-free latex, latex/ nitrile). Employees allergic to latex gloves should use nitrile gloves in preference.▶ Double gloving should be considered.▶ PVC gloves.▶ Change gloves frequently and when contaminated, punctured or torn.▶ Wash hands immediately after removing gloves.▶ Protective shoe covers. [AS/NZS 2210]▶ Head covering. |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none">▶ Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent]▶ Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent]▶ Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.▶ Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood.▶ Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.▶ For quantities up to 500 grams a laboratory coat may be suitable.▶ For quantities up to 1 kilogram a disposable laboratory coat or coverall of low permeability is recommended. Coveralls should be buttoned at collar and cuffs.▶ For quantities over 1 kilogram and manufacturing operations, wear disposable coverall of low permeability and disposable shoe covers.▶ For manufacturing operations, air-supplied full body suits may be required for the provision of advanced respiratory protection.▶ Eye wash unit.▶ Ensure there is ready access to an emergency shower.▶ For Emergencies: Vinyl suit |

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 |
|----------|-----|
| BUTYL | A |
| NEOPRENE | A |

Respiratory protection

Type A-P 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 5 x ES | Air-line* | A-2 P2 | A-PAPR-2 P2 ^ |

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| | |
|------------------|---|
| NITRILE | A |
| NITRILE+PVC | A |
| PE/EVAL/PE | A |
| PVC | B |
| NATURAL RUBBER | C |
| NATURAL+NEOPRENE | C |

* 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.

Ansell Glove Selection

| |
|--|
| Glove — <i>In order of recommendation</i> |
| AlphaTec 02-100 |
| MICROFLEX® 63-864 |
| MICROFLEX® Diamond Grip® MF-300 |
| AlphaTec® Solvex® 37-185 |
| AlphaTec® 38-612 |
| AlphaTec® 58-008 |
| AlphaTec® 79-700 |
| AlphaTec® Solvex® 37-675 |
| TouchNTuff® 83-500 |
| DermaShield™ 73-711 |

The suggested gloves for use should be confirmed with the glove supplier.

| | | | |
|---------------|---|------------|---|
| up to 10 x ES | - | A-3 P2 | - |
| 10+ x ES | - | Air-line** | - |

* - Continuous Flow; ** - Continuous-flow or positive pressure demand
^ - 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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|---------------|--|---------------|
| Appearance | Colourless | | |
| Physical state | Liquid | Relative density (Water = 1) | Not Available |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | Not Available | Decomposition temperature (°C) | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | Not Available | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Available | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (1%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|-------------------|---------------|
| Reactivity | See section 7 |
|-------------------|---------------|

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|---|--|
| Chemical stability | <ul style="list-style-type: none"> ▶ 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 | <p>The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.</p> <p>Animal testing shows that the most common signs of inhalation overdose is inco-ordination and drowsiness.</p> <p>Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> | | | | | | | | |
|---------------------|---|---------------------|---------|----------|---|-------------|---|---------|--|
| Ingestion | <p>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.</p> <p>The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.</p> <p>Nonionic surfactants may produce localised irritation of the oral or gastrointestinal lining and induce vomiting and mild diarrhoea.</p> <p>Ingestion of ethanol (ethyl alcohol, 'alcohol') may produce nausea, vomiting, bleeding from the digestive tract, abdominal pain, and diarrhoea.</p> <p>Effects on the body:</p> <table border="1"> <thead> <tr> <th>Blood concentration</th><th>Effects</th></tr> </thead> <tbody> <tr> <td><1.5 g/L</td><td>Mild: impaired vision, co-ordination and reaction time; emotional instability</td></tr> <tr> <td>1.5-3.0 g/L</td><td>Moderate: Slurred speech, confusion, inco-ordination, emotional instability, disturbances in perception and senses, possible blackouts, and impaired objective performance in standardized tests. Possible double vision, flushing, fast heart rate, sweating and incontinence. Slow breathing may occur rarely and fast breathing may develop in cases of metabolic acidosis, low blood sugar and low blood potassium. Central nervous system depression may progress to coma.</td></tr> <tr> <td>3-5 g/L</td><td>Severe: cold clammy skin, low body temperature and low blood pressure. Atrial fibrillation and heart block have been reported. Depression of breathing may occur, respiratory failure may follow serious poisoning, choking on vomit may result in lung inflammation and swelling. Convulsions due to severe low blood sugar may also occur. Acute liver inflammation may develop.</td></tr> </tbody> </table> <p>Symptoms of exposure to perchlorates include shortness of breath, difficulty breathing and a bluish discolouration of the skin. The effects may be delayed for several hours following exposure.</p> <p>Nausea and vomiting are almost always apparent after chlorate poisonings usually with upper stomach pain. Diarrhoea may also occur.</p> | Blood concentration | Effects | <1.5 g/L | Mild: impaired vision, co-ordination and reaction time; emotional instability | 1.5-3.0 g/L | Moderate: Slurred speech, confusion, inco-ordination, emotional instability, disturbances in perception and senses, possible blackouts, and impaired objective performance in standardized tests. Possible double vision, flushing, fast heart rate, sweating and incontinence. Slow breathing may occur rarely and fast breathing may develop in cases of metabolic acidosis, low blood sugar and low blood potassium. Central nervous system depression may progress to coma. | 3-5 g/L | Severe: cold clammy skin, low body temperature and low blood pressure. Atrial fibrillation and heart block have been reported. Depression of breathing may occur, respiratory failure may follow serious poisoning, choking on vomit may result in lung inflammation and swelling. Convulsions due to severe low blood sugar may also occur. Acute liver inflammation may develop. |
| Blood concentration | Effects | | | | | | | | |
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| Skin Contact | <p>Skin contact with the material may be harmful; systemic effects may result following absorption.</p> <p>The material can produce chemical burns following direct contact with the skin.</p> <p>Non-ionic surfactants cause less irritation than other surfactants as they have less ability to denature protein in the skin.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions 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.</p> <p>There is some evidence to suggest that the material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.</p> | | | | | | | | |
| Eye | <p>The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.</p> <p>If applied to the eyes, this material causes severe eye damage.</p> <p>Direct contact of the eye with ethanol (alcohol) may cause an immediate stinging and burning sensation, with reflex closure of the lid, and a temporary, tearing injury to the cornea together with redness of the conjunctiva. Discomfort may last 2 days but usually the injury heals without treatment.</p> <p>Non-ionic surfactants can cause numbing of the cornea, which masks discomfort normally caused by other agents and leads to corneal injury.</p> <p>Irritation varies depending on the duration of contact, the nature and concentration of the surfactant.</p> | | | | | | | | |
| Chronic | Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems. | | | | | | | | |

Continued...

KWB Buffer

| | <p>Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.</p> <p>Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems.</p> <p>There is sufficient evidence to suggest that this material directly causes cancer in humans.</p> <p>Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.</p> <p>This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects.</p> <p>Ample evidence exists that this material directly causes reduced fertility</p> <p>Prolonged exposure to ethanol may cause damage to the liver and cause scarring. It may also worsen damage caused by other agents.</p> <p>Chronic or sublethal exposure to inorganic chlorate may have negative effects on human health, such as redness of the eyes and skin (including skin inflammation), sore throat, abdominal pain, blue lips or skin, diarrhea, nausea, vomiting, shortness of breath, and unconsciousness. Sodium chlorate may damage the liver, kidneys and blood cells of humans.</p> <p>Animal testing showed that chlorate is toxic to the thyroid gland, although it does not cause mutations and is therefore unlikely to cause cancer. Chlorate does not appear to cause birth defects or chromosomal abnormalities in animal testing.</p> <p>Prolonged or repeated skin contact may cause degreasing, followed by drying, cracking and skin inflammation.</p> <p>Perchlorates may affect the use of iodine by the thyroid gland and chronic exposures may result in symptoms of thyroid dysfunction such as goitre.</p> <p>Guanidine hydrochloride causes decrease in bone marrow activity usually shown as gastrointestinal disturbance and 'pins and needles' in the lips, face and extremities. Irritability, tremor, inco-ordination and seizures can occur, rarely, there is low blood pressure, skin reactions, low blood glucose and increased levels of creatinine.</p> | | | | | | | | | | | | | | |
|---|---|----------|------------|--|----------------------------------|---|----------------------------------|---|--|--|-----------------------------------|--|----------------------------------|--|--|
| KWB Buffer | <table><tr><th>TOXICITY</th><th>IRRITATION</th></tr><tr><td>Not Available</td><td>Not Available</td></tr></table> | TOXICITY | IRRITATION | Not Available | Not Available | | | | | | | | | | |
| TOXICITY | IRRITATION | | | | | | | | | | | | | | |
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| TOXICITY | IRRITATION | | | | | | | | | | | | | | |
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| Oral (Rat) LD50: 474.6 mg/kg ^[1] | | | | | | | | | | | | | | | |
| sodium perchlorate | <table><tr><th>TOXICITY</th><th>IRRITATION</th></tr><tr><td>Oral (Rat) LD50: 2100 mg/kg^[2]</td><td>Not Available</td></tr></table> | TOXICITY | IRRITATION | Oral (Rat) LD50: 2100 mg/kg ^[2] | Not Available | | | | | | | | | | |
| TOXICITY | IRRITATION | | | | | | | | | | | | | | |
| Oral (Rat) LD50: 2100 mg/kg ^[2] | Not Available | | | | | | | | | | | | | | |
| ethanol | <table><tr><th>TOXICITY</th><th>IRRITATION</th></tr><tr><td>Dermal (rabbit) LD50: 17100 mg/kg^[1]</td><td>Eye (rabbit): 500 mg SEVERE</td></tr><tr><td>Inhalation(Rat) LC50: 64000 ppm4h^[2]</td><td>Eye (rabbit):100mg/24hr-moderate</td></tr><tr><td>Oral (Rat) LD50: 7060 mg/kg^[2]</td><td>Eye: adverse effect observed (irritating)^[1]</td></tr><tr><td></td><td>Skin (rabbit):20 mg/24hr-moderate</td></tr><tr><td></td><td>Skin (rabbit):400 mg (open)-mild</td></tr><tr><td></td><td>Skin: no adverse effect observed (not irritating)^[1]</td></tr></table> | TOXICITY | IRRITATION | Dermal (rabbit) LD50: 17100 mg/kg ^[1] | Eye (rabbit): 500 mg SEVERE | Inhalation(Rat) LC50: 64000 ppm4h ^[2] | Eye (rabbit):100mg/24hr-moderate | Oral (Rat) LD50: 7060 mg/kg ^[2] | Eye: adverse effect observed (irritating) ^[1] | | Skin (rabbit):20 mg/24hr-moderate | | Skin (rabbit):400 mg (open)-mild | | Skin: no adverse effect observed (not irritating) ^[1] |
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| | Skin: no adverse effect observed (not irritating) ^[1] | | | | | | | | | | | | | | |
| Legend: | <p>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</p> | | | | | | | | | | | | | | |
| KWB Buffer | <p>Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.</p> <p>Goitrogenic:</p> <p>Goitrogens are substances that suppress the function of the thyroid gland by interfering with iodine uptake, which can, as a result, cause an enlargement of the thyroid (a goitre).</p> <p>Goitrogens include:</p> <ul style="list-style-type: none">- Vitexin, a flavonoid, which inhibits thyroid peroxidase, contributing to goitre- Thiocyanate and perchlorate, which decrease iodide uptake by competitive inhibition and consequently increase release of TSH from the pituitary gland- Lithium, which inhibits thyroid hormone release- Certain foods, such as soy and millet (containing vitexins) and vegetables in the genus Brassica (which includes broccoli, Brussels sprouts, cabbage, cauliflower and horseradish).- Caffeine (found in coffee, tea, cola and chocolate), which acts on thyroid function as a suppressant. <p>Polyethers (such as ethoxylated surfactants and polyethylene glycols) are highly susceptible to being oxidized in the air. They then form complex mixtures of oxidation products.</p> <p>Animal testing reveals that whole the pure, non-oxidised surfactant is non-sensitizing, many of the oxidation products are sensitisers. The oxidation products also cause irritation.</p> <p>The Cosmetic Ingredient Review (CIR) Expert Panel concluded that listed polysorbates are safe in cosmetics when formulated to be non-irritating. This conclusion supersedes the conclusion reached in the 1984, 2000, and 2001 CIR safety assessments. This safety assessment combines polysorbates reviewed in 3 previous safety assessments with other polysorbates that have not been reviewed by the CIR Panel into a group of 80 polyethoxylated sorbitan or sorbitol esters of fatty acid.</p> <p>Following oral administration of polysorbate 20 to rats, ester bonds of polysorbates are hydrolyzed within the</p> | | | | | | | | | | | | | | |

KWB Buffer

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|--------------------------------|--|
| | <p>digestive tract by pancreatic lipase. 24 Free fatty acids were absorbed from the digestive tract and oxidized and excreted, mainly as carbon dioxide in exhaled breath. No migration of the polyoxyethylene sorbitan into the thymus lymph nodes has been demonstrated. No sex difference has been detected in the disposition of polysorbates in rats. Following oral ingestion of polysorbate 20 in humans, 90% or more of the administered substance was excreted in the feces as metabolites, with the polyoxyethylene sorbitan structure maintained, and 2%-3% of these metabolites were excreted in the urine.</p> <p>The Panel considered the data available to characterize the potential for polysorbates to cause systemic toxicity, irritation, sensitization, reproductive and developmental toxicity, and genotoxicity. They noted the lack of systemic toxicity at low and moderate doses in several acute and repeated-dose oral exposure studies, and low toxicity at high doses; little or no irritation or sensitization in multiple tests of dermal and ocular exposure; the absence of genotoxicity in multiple Ames tests and chromosome aberration tests, and minimal irritation and lack of sensitization in tests of dermal exposure at concentration of use. The Panel recognizes that there are data gaps regarding use and concentration of these ingredients. However, the overall information available on the types of products in which these ingredients are used, concentrations of use and the similar pattern of use raise no safety concerns. The Panel notes that polysorbate 20, polysorbate 65, and polysorbate 80 were shown to enhance dermal drug absorption. The Panel cautions that care should be taken in formulating cosmetic products that may contain these ingredients in combination with any ingredients whose safety was based on their lack of dermal absorption, or when dermal absorption was a concern. Especially, care should be taken when creating formulations intended for use on infants.</p> <p>To address the possible presence of 1,4-dioxane and ethylene oxide impurities in these ingredients, the Panel stressed that the cosmetics industry should continue to use the necessary procedures to limit these impurities from the PEG ingredients before blending them into cosmetic formulations. The Panel expressed concern about pesticide residues and heavy metals that may be present in botanical (ie, coconut-derived) ingredients. They stressed that the cosmetics industry should continue to use current good manufacturing practices (cGMPs) to limit impurities. Data from the 1984 safety assessment suggested that polysorbates caused a slight enhancement of tumor development caused by 7,12-dimethyl-benz[a]anthracene (DMBA) and N-methyl-N-nitro-N-nitrosoguanidine (MNNG); however, the data were not consistent. For other compounds, the tumorigenic properties of 3-methyl-cholanthrene (MCA) and 3,4-benz[a]pyrene (BP) were not enhanced by polysorbates. Since the tumor enhancement effects were inconsistent and depended on the simultaneous exposure to strong chemical carcinogens, which are not present in cosmetics, the Panel felt that the weak tumor enhancement effects were not relevant to cosmetic formulations. Because some studies showed minimal irritation at concentrations that are used in cosmetics, the Panel cautioned that products containing these ingredients should be formulated to be non-irritating. It was noted that at the time of the 2001 safety assessment on sorbeth beeswaxes, the Panel had recommended that cosmetic formulations containing PEGs not be used on damaged skin because of the possibility of renal toxicity when PEGs were applied to severely damaged skin, such as in burn patients. Since then, PEGs have been re-reviewed and the additional data demonstrated minimal dermal penetration of low-molecular weight PEGs. The amount of PEGs that would penetrate the stratum corneum barrier, even if damaged, from the use of cosmetics was well below the level of renal toxicity. Therefore, the Panel has removed the caveat that PEGs should not be used on damaged skin. The Panel strongly asserted that it is inappropriate to apply cosmetic products containing high concentrations of PEGs to individuals exhibiting barrier skin disruption through both the stratum corneum and the epidermis.</p> <p>The Panel discussed the issue of incidental inhalation exposure from spray products, including aerosol and pump hair sprays, spray deodorants, spray body and hand products, and spray moisturizing products. The limited acute exposure data available from 1 new inhalation study and 1 historical tracheal study suggest little potential for respiratory effects at relevant doses. These ingredients are reportedly used at concentrations up to 4% in cosmetic products that may be aerosolized. The Panel noted that 95%-99% of droplets/particles would not be respirable to any appreciable amount. Coupled with the small actual exposure in the breathing zone and the concentrations at which the ingredients are used, the available information indicates that incidental inhalation would not be a significant route of exposure that might lead to local respiratory or systemic effects.</p> <p>Safety Assessment of Polysorbates as Used in Cosmetic July 2015 http://www.cir-safety.org/sites/default/files/PSorba_062015_FR_0.pdf</p> <p>The sorbitan esters are agents that typically find use as emulsifiers, stabilizers, and thickeners in foods, cosmetics and medical products. They do not represent a toxicological concern since they are derived from naturally occurring materials and are ultimately metabolised back to these same natural constituents.</p> |
| GUANIDINE HYDROCHLORIDE | <p>The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.</p> |
| ETHANOL | <p>The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.</p> |

| | | | |
|--|---|---------------------------------|---|
| 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

| | | | | | | |
|-------------------------|---------------|--------------------|-------------------------------|---------------|---------------|--------|
| KWB Buffer | Endpoint | Test Duration (hr) | Species | Value | Source | |
| | Not Available | Not Available | Not Available | Not Available | Not Available | |
| guanidine hydrochloride | Endpoint | Test Duration (hr) | Species | | Value | Source |
| | LC50 | 96h | Fish | | 690mg/l | 2 |
| | EC50 | 72h | Algae or other aquatic plants | | 11.8mg/l | 2 |
| | EC50 | 48h | Crustacea | | 70.2mg/l | 2 |
| | NOEC(ECx) | 504h | Crustacea | | 2.9mg/l | 2 |

Continued...

KWB Buffer

| sodium perchlorate | Endpoint | Test Duration (hr) | Species | Value | Source |
|---|-----------|--------------------|-------------------------------|---------------------|--------|
| | EC50 | 48h | Crustacea | >100mg/l | 2 |
| | LC50 | 96h | Fish | 396.486-712.077mg/l | 4 |
| | NOEC(ECx) | 48h | Fish | 0.004mg/L | 4 |
| | EC50 | 72h | Algae or other aquatic plants | >435.7mg/l | 2 |
| ethanol | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50 | 72h | Algae or other aquatic plants | 275mg/l | 2 |
| | EC50 | 48h | Crustacea | 2mg/l | 4 |
| | EC50 | 96h | Algae or other aquatic plants | <0.001mg/L | 4 |
| | LC50 | 96h | Fish | 42mg/l | 4 |
| | EC50(ECx) | 96h | Algae or other aquatic plants | <0.001mg/L | 4 |
| 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 | | | | | |

For Ethanol:

log Kow: -0.31 to -0.32;

Koc 1: Estimated BCF= 3;

Half-life (hr) air: 144;

Half-life (hr) H₂O surface water: 144;

Henry's atm m³/mol: 6.29E-06;

BOD 5 if unstated: 0.93-1.67,63%

COD: 1.99-2.11,97%;

ThOD : 2.1.

Environmental Fate: Terrestrial - Ethanol quickly biodegrades in soil but may leach into ground water; most is lost by evaporation. Ethanol is expected to have very high mobility in soil. Volatilization of ethanol from moist soil surfaces is expected to be an important fate process. The potential for volatilization of ethanol from dry soil surfaces may exist. Biodegradation is expected to be an important fate process for ethanol based on half-lives on the order of a few days for ethanol in sandy soil/groundwater microcosms.

Atmospheric Fate: Ethanol is expected to exist solely as a vapour in the ambient atmosphere. Vapour-phase ethanol is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 5 days. Ethanol readily degraded by reaction with photochemically produced hydroxy radicals; release into air will result in photodegradation and wet deposition.

Aquatic Fate: When released into water ethanol readily evaporates and is biodegradable. Ethanol is not expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is expected and volatilization half-lives for a model river and model lake are 3 and 39 days, respectively. Bioconcentration in aquatic organisms is considered to be low. Hydrolysis and photolysis in sunlit surface waters is not expected to be an important environmental fate process for ethanol and is unlikely to be persistent in aquatic environments.

Perchlorate poses a human health concern because this contaminant has the same ionic size as iodide, and can compete with iodide for uptake into the thyroid gland, causing changes in thyroid hormone levels and possibly thyroid disorders. Public concerns have generated considerable legislation designed to minimise potential damage. The environmental impacts of perchlorate have been less well studied, but the pollutant is clearly being transferred between abiotic and biotic ecosystem components. Perchlorate is a highly soluble oxyanion that is very stable and nonreactive in water. Perchlorate salts also have a very low volatility. Although a strong oxidizing agent, the perchlorate anion is stable in the environment. Perchlorate does not form complexes with metals in the same manner as other anions, and it does not readily sorb to material in the environment. This combination of perchlorate solubility, stability, and mobility creates the potential for both localised and area-wide potential ecotoxicological effects, as it is a relatively non-reactive and very stable contaminant, with very low biodegradation rates under many natural conditions. Biodegradation of perchlorate in the natural environment (e.g., sediments) will not occur unless significant levels of organic carbon are present, oxygen and nitrate are depleted, and perchlorate-degrading anaerobic bacteria are present. Perchlorate is a highly toxic compound that is stable and persistent in the environment. Once perchlorate gets into the food chain or water supply, it does not break down easily. It has been detected in surface and ground water, soils and food (lettuce, bottled water, milk, meat, kelp, animal feed). It is stable, water soluble and persistent; it is not volatile and does not readily adhere to soil. It is also found in plants because its solubility in water allows it to be taken up by their roots. The populations considered to be most sensitive to perchlorate exposure are nursing infants, children, post-menopausal women, and people with hypothyroidism. Perchlorate interferes with thyroid functioning and is especially dangerous to fetuses, babies, and children. It causes thyroid iodine deficiency that in turn limits the gland's ability to produce a hormone essential to neurological development, leading to neurological disorders. A human reference dose (daily exposure level below which EPA believes there would be no serious negative effects to a human over their lifetime) of 0.0007 mg/kg per day has been suggested by the US EPA, who considers drinking water safe if it contains no more than 24.5 parts per billion (ppb) of perchlorate. Perchlorate has contaminated ground and surface waters that are currently being used for irrigation in food production. Physical processes, including mixing and dispersion, control the distribution of perchlorate in groundwater. Soil is not expected to naturally contain perchlorate. Perchlorate does not adsorb onto inorganic surfaces, including hydrous ferric oxide, smectite, and manganese oxide. The inorganic perchlorate compounds introduced into soils are readily soluble and are not strongly adsorbed by other soil components. In soils, perchlorate is chemically stable and is expected to behave in a manner similar to dissolved minerals. While perchlorate is subject to leaching, its content in the soil is expected to remain in equilibrium in irrigated crop production systems. Perchlorate has been shown to be absorbed into crops from irrigation water or other sources such as fertilizers. Plants absorb nutrients and pollutants from solutions in the soil and are expected to accumulate perchlorate taken from the soil, which may be influenced by external factors such as plant species and maturity, nutrient concentrations, and consumptive use of water. While there is evidence that a portion of the absorbed perchlorate may be reduced inside the plant through biochemical pathways, the majority of the absorbed perchlorate will translocate to and concentrate in the leaf tissue where oxygen is always present and will thus limit its reduction. This is illustrated by the detection of higher perchlorate concentrations in leaves collected later in the growing season and in dead leaves compared to younger, live leaves, proving that perchlorate is recycled back into the soil upon decomposition of dead leaf litter. To minimise the potential recycling of perchlorate by leaf litter it is recommended that dead leaves be collected and composted, or phytoremediation be designed to enhance rapid rhizodegradation (rhizoremediation). The fate of perchlorate in streambed sediments is becoming a concern due to the increasing number of groundwater and surface water contamination sites. Results indicate that ClO₄⁻ penetration into sediments could be affected by numerous factors, such as temperature, microbial degradation, ClO₄⁻ surface water concentration, and sediment physico-geological properties. Maximum ClO₄⁻ penetration into sediments at study sites was 30 cm below the sediment-water surface. Evidence suggests that microbial reduction is responsible for perchlorate depletion in stream sediments. Biodegradation of ClO₄⁻ occurred over a seasonally variable active depth zone of 1-10 cm, implying that there was a rapid natural attenuation potential of perchlorate in near-surface sediments. Perchlorate is reduced to intermediate compounds (chlorate [Cl(V)] and chlorite [Cl(III)]) and eventually to chloride in anaerobic environments. Perchlorate reduction is both thermodynamically and microbially enhanced under denitrifying conditions. There are numerous strains of micro-organisms capable of reducing both chlorate and perchlorate under anoxic conditions. Perchlorate is not likely to come out of solution given its low vapour pressure. Droplet size during showering would likely preclude significant inhalation of perchlorate-contaminated water as an aerosol. In perchlorate-contaminated lakes and streams, perchlorate is detected infrequently in fish heads, filets, and whole bodies, but may be detected more often depending on species and seasonal trends, and always at concentrations higher in the fish than in the water. Perchlorates may perturb thyroid-hormone concentration in fish; this may affect growth and neurological development. Data from fish indicates that perchlorate can also disrupt sexual development. Certain have been so dramatic that female fish have been mistaken for males. Several females displayed male-courtship behaviour and produced sperm. This is suggestive of the fact that perchlorate may act as an androgen (male sex hormone). The concentration of perchlorate used in these studies was at least a 1000 times the US EPA limit (24.5 parts per billion in natural bodies of water).

For Surfactants: Kow cannot be easily determined due to hydrophilic/hydrophobic properties of the molecules in surfactants. BCF value: 1-350.

Aquatic Fate: Surfactants tend to accumulate at the interface of the air with water and are not extracted into one or the other liquid phases.

Terrestrial Fate: Anionic surfactants are not appreciably sorbed by inorganic solids. Cationic surfactants are strongly sorbed by solids, particularly clays. Significant sorption of anionic and non-ionic surfactants has been observed in activated sludge and organic river sediments. Surfactants have been shown to improve water infiltration into soils with moderate to severe hydrophobic or water-repellent properties.

Ecotoxicity: Some surfactants are known to be toxic to animals, ecosystems and humans, and can increase the diffusion of other environmental contaminants. The acute aquatic toxicity generally is considered to be related to the effects of the surfactant properties on the organism and not to direct chemical toxicity. Surfactants should be considered to be toxic to aquatic species under conditions that allow contact of the chemicals with the organisms. Surfactants are expected to transfer slowly from water into the flesh of fish. During this

Continued...

process, readily biodegradable surfactants are expected to be metabolized rapidly during the process of bioaccumulation. Surfactants are not to be considered to show bioaccumulation potential if they are readily biodegradable.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|-----------------------------|-----------------------------|
| ethanol | LOW (Half-life = 2.17 days) | LOW (Half-life = 5.08 days) |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------|----------------------|
| ethanol | LOW (LogKOW = -0.31) |

Mobility in soil

| Ingredient | Mobility |
|------------|----------------|
| ethanol | HIGH (KOC = 1) |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|------------------------------|--|
| Product / Packaging disposal | <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <p>A Hierarchy of Controls seems to be common - the user should investigate:</p> <ul style="list-style-type: none">ReductionReuseRecyclingDisposal (if all else fails) <p>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.</p> <ul style="list-style-type: none">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. <p>FOR DISPOSAL OF SMALL QUANTITIES:</p> <ul style="list-style-type: none">Cautiously acidify a 3% solution or a suspension of the material to pH 2 with sulfuric acid.Gradually add a 50% excess of aqueous sodium bisulfite with stirring at room temperature. (Other reducers such as thiosulfate or ferrous salts may substitute; do NOT use carbon, sulfur or other strong reducing agents). An increase in temperature indicates reaction is taking place. If no reaction is observed on the addition of about 10% of the sodium bisulfite solution, initiate it by cautiously adding more acid.If manganese, chromium or molybdenum are present adjust the pH of the solution to 7 and treat with sulfide to precipitate for burial as a hazardous waste. Destroy excess sulfide, neutralise and flush the solution down the drain (subject to State and Local Regulation). <p>[Sigma/Aldrich]</p> <ul style="list-style-type: none">Containers may still present a chemical hazard/ danger when empty.Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none">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.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. |
|------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|------------------|----|
| Marine Pollutant | NO |
|------------------|----|

Land transport (DOT): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

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

Not Applicable

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

| Product name | Group |
|-------------------------|---------------|
| guanidine hydrochloride | Not Available |
| Non-ionic detergent | Not Available |
| sodium perchlorate | Not Available |
| ethanol | Not Available |

KWB Buffer

14.7.3. Transport in bulk in accordance with the IGC Code

| Product name | Ship Type |
|-------------------------|---------------|
| guanidine hydrochloride | Not Available |
| Non-ionic detergent | Not Available |
| sodium perchlorate | Not Available |
| ethanol | Not Available |

SECTION 15 Regulatory information

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

| |
|---|
| guanidine hydrochloride is found on the following regulatory lists |
| US DOE Temporary Emergency Exposure Limits (TEELs) |
| US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory |
| sodium perchlorate is found on the following regulatory lists |
| US - California - Biomonitoring - Priority Chemicals |
| US - Massachusetts - Right To Know Listed Chemicals |
| US DOE Temporary Emergency Exposure Limits (TEELs) |
| US EPA Integrated Risk Information System (IRIS) |
| US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory |
| ethanol is found on the following regulatory lists |
| US - Massachusetts - Right To Know Listed Chemicals |
| US DOE Temporary Emergency Exposure Limits (TEELs) |
| US NIOSH Recommended Exposure Limits (RELs) |
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 |
| US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory |

Additional Regulatory Information

Not Applicable

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

| | |
|--|-----|
| Section 311/312 hazard categories | |
| Flammable (Gases, Aerosols, Liquids, or Solids) | Yes |
| Gas under pressure | No |
| Explosive | No |
| Self-heating | No |
| Pyrophoric (Liquid or Solid) | No |
| Pyrophoric Gas | No |
| Corrosive to metal | No |
| Oxidizer (Liquid, Solid or Gas) | Yes |
| Organic Peroxide | No |
| Self-reactive | No |
| In contact with water emits flammable gas | No |
| Combustible Dust | No |
| Carcinogenicity | No |
| Acute toxicity (any route of exposure) | Yes |
| Reproductive toxicity | No |
| Skin Corrosion or Irritation | Yes |
| Respiratory or Skin Sensitization | No |
| Serious eye damage or eye irritation | Yes |
| Specific target organ toxicity (single or repeated exposure) | Yes |
| Aspiration Hazard | No |
| Germ cell mutagenicity | No |
| Simple Asphyxiant | No |
| Hazards Not Otherwise Classified | No |

| |
|--|
| US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4) |
| None Reported |
| US. EPCRA Section 313 Toxic Release Inventory (TRI) (40 CFR 372) |
| None Reported |

Additional Federal Regulatory Information

KWB Buffer

Not Applicable

State Regulations

US. California Proposition 65
None Reported

Additional State Regulatory Information

Not Applicable

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (guanidine hydrochloride; Non-ionic detergent; sodium perchlorate; ethanol) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | No (guanidine hydrochloride) |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | No (Non-ionic detergent) |
| 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 | 19/01/2024 |
| Initial Date | 12/09/2023 |

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|---|
| 3.10 | 18/01/2024 | Hazards identification - Classification, Composition / information on ingredients - Ingredients |

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
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- AIIIC: 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

KWB Buffer

- ▶ 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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