

PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS

Not Available

Chemwatch Hazard Alert Code: 3

Chemwatch: 4151-72

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

L.GHS.USA.EN

SECTION 1 IDENTIFICATION

Product Identifier

| | |
|--------------------------------------|---|
| Product name | PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS |
| Chemical Name | propylene glycol monomethyl ether acetate, alpha-isomer |
| Synonyms | 1 methoxy propyl acetate glycol ether PM acetate, 1-methoxy-2-acetoxypropane, 1-methoxy-2-propanol acetate, 1-methoxypropyl acetate-2, 2PG1MEA, Arcosolv PM Acetate, C6-H12-O3, CH3OCH2CH(CH3)OC(O)CH3, Dowanol PMA glycol ether acetate, Ektasol PM acetate, Hoechst C-260 Rinse, Methyl Proxitol Acetate, PGMA, PGMEA, PM Acetate, acetic acid, 2-methoxy-1-methylethyl ester, propylene glycol ether acetate ester |
| Proper shipping name | Esters, n.o.s. (contains propylene glycol monomethyl ether acetate, alpha-isomer) |
| Chemical formula | C6-H12-O3 |
| Other means of identification | Not Available |
| CAS number | 84540-57-8 |

Recommended use of the chemical and restrictions on use

| | |
|---------------------------------|---|
| Relevant identified uses | A solvent for acrylics, nitrocellulose, urethanes, lacquers, oils, resins. Component of thinner mixes. [-Regeant ~] |
|---------------------------------|---|

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

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|--------------------------------|---------------|
| Registered company name | Not Available |
| Address | Not Available |
| Telephone | Not Available |
| Fax | Not Available |
| Website | Not Available |
| Email | Not Available |

Emergency phone number

| | |
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| Association / Organisation | Not Available |
| Emergency telephone numbers | Not Available |
| Other emergency telephone numbers | Not Available |

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

CHEMWATCH HAZARD RATINGS

PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS

| | Min | Max |
|--------------|-----|-----|
| Flammability | 2 | |
| Toxicity | 1 | |
| Body Contact | 1 | |
| Reactivity | 1 | |
| Chronic | 3 | |

NFPA 704 diamond



0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

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)

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| Classification | Flammable Liquid Category 3, Reproductive Toxicity Category 1B |
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Label elements

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| GHS label elements | |
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|--------------------|---------------|
| SIGNAL WORD | DANGER |
|--------------------|---------------|

Hazard statement(s)

| | |
|-------------|---|
| H226 | Flammable liquid and vapour. |
| H360 | May damage fertility or the unborn child. |

Hazard(s) not otherwise specified

Not Applicable

Precautionary statement(s) Prevention

| | |
|-------------|--|
| P201 | Obtain special instructions before use. |
| P210 | Keep away from heat/sparks/open flames/hot surfaces. - No smoking. |
| P233 | Keep container tightly closed. |
| P281 | Use personal protective equipment as required. |

Precautionary statement(s) Response

| | |
|-----------------------|--|
| P308+P313 | IF exposed or concerned: Get medical advice/attention. |
| P370+P378 | In case of fire: Use alcohol resistant foam or normal protein foam for extinction. |
| P303+P361+P353 | IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. |

Precautionary statement(s) Storage

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| P403+P235 | Store in a well-ventilated place. Keep cool. |
| P405 | Store locked up. |

Precautionary statement(s) Disposal

| | |
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| P501 | Dispose of contents/container in accordance with local regulations. |
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

| CAS No | %[weight] | Name |
|------------|-----------|--|
| 84540-57-8 | >98 | <u>propylene glycol monomethyl ether acetate, isomers</u> |
| 108-65-6 | >98 | <u>propylene glycol monomethyl ether acetate, alpha-isomer</u> |
| 70657-70-4 | <2 | <u>propylene glycol monomethyl ether acetate, beta-isomer</u> |

Mixtures

See section above for composition of Substances

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"> ▶ Wash out immediately with fresh 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. ▶ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation. |
| 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. |
| Ingestion | <ul style="list-style-type: none"> ▶ 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. ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus. |

Most important symptoms and effects, both acute and delayed

See Section 11

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.

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

- ▶ Alcohol stable 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 |
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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. ▶ May be violently or explosively reactive. ▶ Wear breathing apparatus plus protective gloves. ▶ Prevent, by any means available, spillage from entering drains or water course. |
| 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. <p>Combustion products include; carbon monoxide (CO) carbon dioxide (CO₂) other pyrolysis products typical of burning organic material</p> |

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

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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. |
| 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. ▶ May be violently or explosively reactive. ▶ Wear breathing apparatus plus protective gloves. |

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"> ▶ Containers, even those that have been emptied, may contain explosive vapours. ▶ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. ▶ DO NOT allow clothing wet with material to stay in contact with skin <p>The tendency of many ethers to form explosive peroxides is well documented. Ethers lacking non-methyl hydrogen atoms adjacent to the ether link are thought to be relatively safe</p> <ul style="list-style-type: none"> ▶ DO NOT concentrate by evaporation, or evaporate extracts to dryness, as residues may contain explosive peroxides with DETONATION potential. ▶ Any static discharge is also a source of hazard. ▶ Before any distillation process remove trace peroxides by shaking with excess 5% aqueous ferrous sulfate solution or by percolation through a column of activated alumina. <p>The substance accumulates peroxides which may become hazardous only if it evaporates or is distilled or otherwise treated to concentrate the peroxides. The substance may concentrate around the container opening for example.</p> <p>Purchases of peroxidisable chemicals should be restricted to ensure that the chemical is used completely before it can become peroxidised.</p> <ul style="list-style-type: none"> ▶ A responsible person should maintain an inventory of peroxidisable chemicals or annotate the general chemical inventory to indicate which chemicals are subject to peroxidation. ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of overexposure occurs. ▶ Use in a well-ventilated area. ▶ Prevent concentration in hollows and sumps. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers in approved flammable liquid storage area. ▶ Store away from incompatible materials in a cool, dry, well-ventilated area. ▶ DO NOT store in pits, depressions, basements or areas where vapours may be trapped. ▶ No smoking, naked lights, heat or ignition sources. |

Conditions for safe storage, including any incompatibilities

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| Suitable container | <ul style="list-style-type: none"> ▶ Packing as supplied by manufacturer. ▶ Plastic containers may only be used if approved for flammable liquid. ▶ Check that containers are clearly labelled and free from leaks. ▶ For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : 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) ▶ For manufactured product having a viscosity of at least 250 cSt. |
| Storage incompatibility | <ul style="list-style-type: none"> ▶ Glycol ethers may form peroxides under certain conditions; the potential for peroxide formation is enhanced when these substances are used in processes such as distillation where they are concentrated or even evaporated to near-dryness or dryness; storage under a nitrogen atmosphere is recommended to minimise the possible formation of highly reactive peroxides ▶ Nitrogen blanketing is recommended if transported in containers at temperatures within 15 deg C of the flash-point and at or above the flash-point - large containers may first need to be purged and inerted with nitrogen prior to loading ▶ In the presence of strong bases or the salts of strong bases, at elevated temperatures, the potential exists for runaway reactions. ▶ Contact with aluminium should be avoided; release of hydrogen gas may result- glycol ethers will corrode scratched aluminium surfaces. ▶ May discolour in mild steel/ copper; lined containers, glass or stainless steel is preferred ▶ Glycols and their ethers undergo violent decomposition in contact with 70% perchloric acid. This seems likely to involve formation of the glycol perchlorate esters (after scission of ethers) which are explosive, those of ethylene glycol and 3-chloro-1,2-propanediol being more powerful than glyceryl nitrate, and the former so sensitive that it explodes on addition of water . <p>Propylene glycol monomethyl ether acetate:</p> |

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- ▶ may polymerise unless properly inhibited due to peroxide formation
- ▶ should be isolated from UV light, high temperatures, free radical initiators
- ▶ may react with strong oxidisers to produce fire and/ or explosion
- ▶ reacts violently with sodium peroxide, uranium fluoride
- ▶ is incompatible with sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates, boranes
- ▶ Avoid reaction with oxidising agents

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

| Ingredient | Material name | TEEL-1 | TEEL-2 | TEEL-3 |
|---|--|---------------|---------------|---------------|
| propylene glycol monomethyl ether acetate, alpha-isomer | Propylene glycol monomethyl ether acetate, alpha-isomer; (1-Methoxypropyl-2-acetate) | Not Available | Not Available | Not Available |
| propylene glycol monomethyl ether acetate, alpha-isomer | Propylene glycol monomethyl ether acetate, beta-isomer; (2-Methoxypropyl-1-acetate) | Not Available | Not Available | Not Available |
| propylene glycol monomethyl ether acetate, beta-isomer | Propylene glycol monomethyl ether acetate, beta-isomer; (2-Methoxypropyl-1-acetate) | Not Available | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|---|---------------|---------------|
| propylene glycol monomethyl ether acetate, isomers | Not Available | Not Available |
| propylene glycol monomethyl ether acetate, alpha-isomer | Not Available | Not Available |
| propylene glycol monomethyl ether acetate, beta-isomer | Not Available | Not Available |

MATERIAL DATA

for propylene glycol monomethyl ether acetate (PGMEA)

Saturated vapour concentration: 4868 ppm at 20 C.

A two-week inhalation study found nasal effects to the nasal mucosa in animals at concentrations up to 3000 ppm. Differences in the teratogenic potential of the alpha (commercial grade) and beta isomers of PGMEA may be explained by the formation of different metabolites. The beta-isomer is thought to be oxidised to methoxypropionic acid, a homologue to methoxyacetic acid which is a known teratogen.

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.</p> <p>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.</p> |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ 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. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber |

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| | 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. |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. ▶ Eyewash unit. <p>Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.</p> <p>For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).</p> <p>Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot and shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.</p> |
| Thermal hazards | Not Available |

Respiratory protection

Type A 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 | A-AUS | - | A-PAPR-AUS / Class 1 |
| up to 50 x ES | - | A-AUS / Class 1 | - |
| up to 100 x ES | - | A-2 | A-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)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

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| Appearance | Note that all of the monopropylene glycol ethers may exist in two isomeric forms, alpha or beta. The alpha form, which is thermodynamically favored during synthesis, consists of a secondary alcohol configuration. The beta form consists of a primary alcohol. The two isomeric forms are shown above. Colourless flammable liquid with sweet ether-like odour; mixes with water. Soluble in most solvents. |
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| Physical state | Liquid | Relative density (Water = 1) | 0.968 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | 354.5 |
| pH (as supplied) | Not Applicable | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Applicable | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | 145.0 | Molecular weight (g/mol) | 132.2 |
| Flash point (°C) | 50 | Taste | Not Available |
| Evaporation rate | Not Available | Explosive properties | Not Available |
| Flammability | Flammable. | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | 7.0 (200 deg C) | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | 1.5 (200 deg C) | Volatile Component (%vol) | 100 |

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| Vapour pressure (kPa) | 0.53 (20 C) | Gas group | Not Available |
| Solubility in water (g/L) | Miscible | pH as a solution (1%) | Not Available |
| Vapour density (Air = 1) | 4.6 | VOC g/L | Not Available |

SECTION 10 STABILITY AND REACTIVITY

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| Reactivity | See section 7 |
| 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

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| Inhaled | <p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</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> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.</p> <p>Mice exposed at up to 3000 ppm PGMEA 6 hr/day for a total of 9 days during an 11-day period showed no pronounced effect on the weights of liver, kidneys, heart, spleen, thymus or testes. Histopathological examination revealed degeneration of the olfactory epithelium in mice exposed at 300 ppm for the same time. Rats, similarly failed to show changes in internal organs and did not show olfactory epithelium degeneration until 3000 ppm. The no-effect level in rats was 1000 ppm.</p> |
| Ingestion | <p>Swallowing of the liquid may cause aspiration of vomit into the lungs with the risk of haemorrhaging, pulmonary oedema, progressing to chemical pneumonitis; serious consequences may result.</p> <p>Signs and symptoms of chemical (aspiration) pneumonitis may include coughing, gasping, choking, burning of the mouth, difficult breathing, and bluish coloured skin (cyanosis).</p> <p>Accidental ingestion of the material may be damaging to the health of the individual.</p> |
| Skin Contact | <p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant 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.</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, 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.</p> <p>Repeated application of commercial grade PGMEA to the skin of rabbits for 2-weeks caused slight redness and very slight exfoliation.</p> |
| Eye | <p>Evidence exists, or practical experience predicts, that the material may cause 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.</p> <p>Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p> <p>Undiluted propylene glycol monomethyl ether acetate (PGMEA) causes moderate discomfort, slight conjunctival redness and slight corneal injury in rabbits</p> |

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| Chronic | <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Studies with some glycol ethers (principally the monoethylene glycols) and their esters indicate reproductive changes, testicular atrophy, infertility and kidney function changes. The metabolic acetic acid derivatives of glycol ethers (alkoxyacetic acids), not the ether itself, have been found to be the proximal reproductive toxin in animals. The potency of these metabolites decreases significantly as the chain length of the ether increases. Consequently glycol ethers with longer substituents (e.g diethylene glycols, triethylene glycols) have not generally been associated with reproductive effects. Repeated exposure to higher concentrations of propylene glycol monomethyl ether acetate (PGMEA) (1000 ppm and above) causes mild liver and kidney damage in animals.</p> <p>A minor component, 2-methoxy-1-propyl acetate (the beta-isomer) produced birth defects on inhalation exposure of pregnant rabbits at 545 ppm, but not at 145 or 36 ppm; maternal and embryo/foetal toxicity on inhalation exposure of pregnant rats at 2710 ppm, but not at 545 or 110 ppm; and no adverse effects on dermal exposure of pregnant rabbits at applied dosages of 1000 and 2000 mg/kg of body weight per day during the critical period or embryo/foetal development. In a further study, no developmental effects were seen following exposure of pregnant rats at air concentrations of commercial propylene glycol monomethyl ether acetate (containing 3-5% of the minor component) up to 4000 ppm; slight maternal effects were seen at 5000 ppm and greater.</p> <p>Exposure of pregnant rats and rabbits to the parent glycol ether, propylene glycol monomethyl ether which contained comparable amounts of the primary isomer, 2-methoxy-1-propanol, did not produce teratogenic effects at concentrations up to 3000 ppm.</p> |
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| propylene glycol monomethyl ether acetate, isomers | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: >5000 mg/kg ^[2] | * [CCINFO] |
| | Inhalation (rat) LC50: 4345 ppm/6hr ^[2] | Nil reported |
| | Oral (rat) LD50: 8532 mg/kg ^[2] | |

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| propylene glycol monomethyl ether acetate, alpha-isomer | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] | * [CCINFO] |
| | Inhalation (rat) LC50: 4345 ppm/6hr ^[2] | Nil reported |
| | Oral (rat) LD50: >14.1 ml ^[1] | |

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|---|--|-------------------|
| propylene glycol monomethyl ether acetate, beta-isomer | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: >5000 mg/kg ^[2] | [CCINFO]* |
| | Inhalation (rat) LC50: 4345 ppm/6hr ^[2] | Nil reported |
| | Oral (rat) LD50: 8532 mg/kg ^[2] | |

Legend: 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

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| PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ALPHA-ISOMER | *Shin-Etsu SDS |
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| PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, BETA-ISOMER | <p>Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS.</p> <p>No data for material. Data for isomer only as its alpha isomer; propylene glycol monomethyl ether acetate:</p> |
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| PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS & PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ALPHA-ISOMER & PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, BETA-ISOMER | <p>A BASF report (in ECETOC) showed that inhalation exposure to 545 ppm PGMEA (beta isomer) was associated with a teratogenic response in rabbits; but exposure to 145 ppm and 36 ppm had no adverse effects.</p> <p>The beta isomer of PGMEA comprises only 10% of the commercial material, the remaining 90% is alpha isomer. Hazard appears low but emphasizes the need for care in handling this chemical. [I.C.I]</p> |
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PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS

| | |
|--|---|
| PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS & PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ALPHA-ISOMER & PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, BETA-ISOMER | <p>for propylene glycol ethers (PGEs): Typical propylene glycol ethers include propylene glycol n-butyl ether (PnB); dipropylene glycol n-butyl ether (DPnB); dipropylene glycol methyl ether acetate (DPMA); tripropylene glycol methyl ether (TPM). Testing of a wide variety of propylene glycol ethers Testing of a wide variety of propylene glycol ethers has shown that propylene glycol-based ethers are less toxic than some ethers of the ethylene series. The common toxicities associated with the lower molecular weight homologues of the ethylene series, such as adverse effects on reproductive organs, the developing embryo and fetus, blood (haemolytic effects), or thymus, are not seen with the commercial-grade propylene glycol ethers. In the ethylene series, metabolism of the terminal hydroxyl group produces an alkoxyacetic acid.</p> |
| PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS & PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ALPHA-ISOMER | <p>A BASF report (in ECETOC) showed that inhalation exposure to 545 ppm PGMEA (beta isomer) was associated with a teratogenic response in rabbits; but exposure to 145 ppm and 36 ppm had no adverse effects.</p> |
| PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS & PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ALPHA-ISOMER | <p>The beta isomer of PGMEA comprises only 10% of the commercial material, the remaining 90% is alpha isomer. Hazard appears low but emphasizes the need for care in handling this chemical. [I.C.]</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 available but does not fill the criteria for classification
 ✔ – Data required to make classification available
 ⊖ – Data Not Available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

| Ingredient | Endpoint | Test Duration (hr) | Species | Value | Source |
|---|----------|--------------------|-------------------------------|-------------|--------|
| propylene glycol monomethyl ether acetate, isomers | LC50 | 96 | Fish | 113.619mg/L | 3 |
| propylene glycol monomethyl ether acetate, isomers | EC50 | 96 | Algae or other aquatic plants | 8.588mg/L | 3 |
| propylene glycol monomethyl ether acetate, alpha-isomer | LC50 | 96 | Fish | 100mg/L | 1 |
| propylene glycol monomethyl ether acetate, alpha-isomer | EC50 | 48 | Crustacea | 373mg/L | 2 |
| propylene glycol monomethyl ether acetate, alpha-isomer | EC50 | 96 | Algae or other aquatic plants | 9.337mg/L | 3 |
| propylene glycol monomethyl ether acetate, alpha-isomer | EC50 | 504 | Crustacea | >100mg/L | 2 |
| propylene glycol monomethyl ether acetate, alpha-isomer | NOEC | 336 | Fish | 47.5mg/L | 2 |

Continued...

PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS

| | | | | | |
|---|--|----|-------------------------------|-------------|---|
| propylene glycol monomethyl ether acetate, beta-isomer | LC50 | 96 | Fish | 123.852mg/L | 3 |
| propylene glycol monomethyl ether acetate, alpha-isomer | EC50 | 96 | Algae or other aquatic plants | 9.337mg/L | 3 |
| Legend: | Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 - Aquatic Toxicity Data (Estimated) 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 glycol ethers:

Environmental fate:

Ether groups are generally stable to hydrolysis in water under neutral conditions and ambient temperatures. OECD guideline studies indicate ready biodegradability for several glycol ethers although higher molecular weight species seem to biodegrade at a slower rate. No glycol ethers that have been tested demonstrate marked resistance to biodegradative processes. Upon release to the atmosphere by evaporation, high boiling glycol ethers are estimated to undergo photodegradation (atmospheric half lives = 2.4-2.5 hr).

for propylene glycol ethers:

Environmental fate:

Most are liquids at room temperature and all are water-soluble.

Typical propylene glycol ethers include propylene glycol n-butyl ether (PnB); dipropylene glycol n-butyl ether (DPnB); dipropylene glycol methyl ether acetate (DPMA); tripropylene glycol methyl ether (TPM)

Environmental fate: Log octanol-water partition coefficients (log Kow's) range from 0.309 for TPM to 1.523 for DPnB. Calculated BCFs range from 1.47 for DPnB to 3.16 for DPMA and TPM, indicating low bioaccumulation. Henry's Law Constants, which indicate propensity to partition from water to air, are low for all category members, ranging from 5.7 x 10⁻⁹ atm-m³/mole for TPM to 2.7 x10⁻⁹ atm-m³/mole for PnB.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|---|-------------------------|------------------|
| propylene glycol monomethyl ether acetate, isomers | LOW | LOW |
| propylene glycol monomethyl ether acetate, alpha-isomer | LOW | LOW |
| propylene glycol monomethyl ether acetate, beta-isomer | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|---|-----------------------|
| propylene glycol monomethyl ether acetate, isomers | LOW (LogKOW = 0.5898) |
| propylene glycol monomethyl ether acetate, alpha-isomer | LOW (LogKOW = 0.56) |
| propylene glycol monomethyl ether acetate, beta-isomer | LOW (LogKOW = 0.5163) |

Mobility in soil

| Ingredient | Mobility |
|---|----------------------|
| propylene glycol monomethyl ether acetate, isomers | MEDIUM (KOC = 2.093) |
| propylene glycol monomethyl ether acetate, alpha-isomer | HIGH (KOC = 1.838) |
| propylene glycol monomethyl ether acetate, beta-isomer | HIGH (KOC = 1.838) |

PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS

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"> ▶ Reduction ▶ Reuse ▶ Recycling ▶ Disposal (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.</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. ▶ Recycle wherever possible. ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▶ Dispose of by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material). ▶ Decontaminate empty containers. |
|-------------------------------------|--|

SECTION 14 TRANSPORT INFORMATION

Labels Required

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

Land transport (DOT)

| | | | | | |
|-------------------------------------|--|--------------|---|--------------------|------------------------|
| UN number | 3272 | | | | |
| UN proper shipping name | Esters, n.o.s. (contains propylene glycol monomethyl ether acetate, alpha-isomer) | | | | |
| Transport hazard class(es) | <table border="0"> <tr> <td>Class</td> <td>3</td> </tr> <tr> <td>Subrisk</td> <td>Not Applicable</td> </tr> </table> | Class | 3 | Subrisk | Not Applicable |
| Class | 3 | | | | |
| Subrisk | Not Applicable | | | | |
| Packing group | III | | | | |
| Environmental hazard | Not Applicable | | | | |
| Special precautions for user | <table border="0"> <tr> <td>Hazard Label</td> <td>3</td> </tr> <tr> <td>Special provisions</td> <td>B1, IB3, T4, TP1, TP29</td> </tr> </table> | Hazard Label | 3 | Special provisions | B1, IB3, T4, TP1, TP29 |
| Hazard Label | 3 | | | | |
| Special provisions | B1, IB3, T4, TP1, TP29 | | | | |

Air transport (ICAO-IATA / DGR)

| | | | | | | | | | |
|--|--|--------------------|----|---------------------------------|----------------|-------------------------------|-------|--|-----|
| UN number | 3272 | | | | | | | | |
| UN proper shipping name | Esters, n.o.s. * (contains propylene glycol monomethyl ether acetate, alpha-isomer) | | | | | | | | |
| Transport hazard class(es) | <table border="0"> <tr> <td>ICAO/IATA Class</td> <td>3</td> </tr> <tr> <td>ICAO / IATA Subrisk</td> <td>Not Applicable</td> </tr> <tr> <td>ERG Code</td> <td>3L</td> </tr> </table> | ICAO/IATA Class | 3 | ICAO / IATA Subrisk | Not Applicable | ERG Code | 3L | | |
| ICAO/IATA Class | 3 | | | | | | | | |
| ICAO / IATA Subrisk | Not Applicable | | | | | | | | |
| ERG Code | 3L | | | | | | | | |
| Packing group | III | | | | | | | | |
| Environmental hazard | Not Applicable | | | | | | | | |
| Special precautions for user | <table border="0"> <tr> <td>Special provisions</td> <td>A3</td> </tr> <tr> <td>Cargo Only Packing Instructions</td> <td>366</td> </tr> <tr> <td>Cargo Only Maximum Qty / Pack</td> <td>220 L</td> </tr> <tr> <td>Passenger and Cargo Packing Instructions</td> <td>355</td> </tr> </table> | Special provisions | A3 | Cargo Only Packing Instructions | 366 | Cargo Only Maximum Qty / Pack | 220 L | Passenger and Cargo Packing Instructions | 355 |
| Special provisions | A3 | | | | | | | | |
| Cargo Only Packing Instructions | 366 | | | | | | | | |
| Cargo Only Maximum Qty / Pack | 220 L | | | | | | | | |
| Passenger and Cargo Packing Instructions | 355 | | | | | | | | |

PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS

| | |
|---|------|
| Passenger and Cargo Maximum Qty / Pack | 60 L |
| Passenger and Cargo Limited Quantity Packing Instructions | Y344 |
| Passenger and Cargo Limited Maximum Qty / Pack | 10 L |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|---|----------------|
| UN number | 3272 | |
| UN proper shipping name | ESTERS, N.O.S. (contains propylene glycol monomethyl ether acetate, alpha-isomer) | |
| Transport hazard class(es) | IMDG Class | 3 |
| | IMDG Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | EMS Number | F-E, S-D |
| | Special provisions | 223 274 |
| | Limited Quantities | 5 L |

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

| Source | Product name | Pollution Category | Ship Type |
|--|---------------------------------------|--------------------|-----------|
| IMO MARPOL (Annex II) - List of Noxious Liquid Substances Carried in Bulk | Propylene glycol methyl ether acetate | Z | 3 |

SECTION 15 REGULATORY INFORMATION

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

PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS(84540-57-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

| | |
|---|------------------------------------|
| US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) | US EPCRA Section 313 Chemical List |
| US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) | |

PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ALPHA-ISOMER(108-65-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

| | |
|---|---|
| US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) | US AIHA Workplace Environmental Exposure Levels (WEELs) |
| US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) | US EPCRA Section 313 Chemical List |
| US - California Permissible Exposure Limits for Chemical Contaminants | US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory |

PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, BETA-ISOMER(70657-70-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

| | |
|---|------------------------------------|
| US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) | US EPCRA Section 313 Chemical List |
| US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) | |

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SECTION 311/312 HAZARD CATEGORIES

| | |
|---------------------------------|-----|
| Immediate (acute) health hazard | No |
| Delayed (chronic) health hazard | Yes |
| Fire hazard | Yes |
| Pressure hazard | No |
| Reactivity hazard | No |

US. EPA CERCLA HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES (40 CFR 302.4)

PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE, ISOMERS

None Reported

State Regulations

US. CALIFORNIA PROPOSITION 65

None Reported

| National Inventory | Status |
|-------------------------------|--|
| Australia - AICS | N (propylene glycol monomethyl ether acetate, isomers) |
| Canada - DSL | Y |
| Canada - NDSL | N (propylene glycol monomethyl ether acetate, alpha-isomer; propylene glycol monomethyl ether acetate, isomers; propylene glycol monomethyl ether acetate, beta-isomer) |
| China - IECSC | Y |
| Europe - EINEC / ELINCS / NLP | Y |
| Japan - ENCS | N (propylene glycol monomethyl ether acetate, isomers; propylene glycol monomethyl ether acetate, beta-isomer) |
| Korea - KECI | Y |
| New Zealand - NZIoC | Y |
| Philippines - PICCS | Y |
| USA - TSCA | N (propylene glycol monomethyl ether acetate, isomers; propylene glycol monomethyl ether acetate, beta-isomer) |
| Legend: | <i>Y = All ingredients are on the inventory</i> <i>N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)</i> |

SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

| Name | CAS No |
|---|-----------------------------------|
| propylene glycol monomethyl ether acetate, alpha-isomer | 108-65-6, 84540-57-8, 142300-82-1 |

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.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net

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
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

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