



AMMONIUM. PERSULPHATE

ALPHA CHEMICALS PTY LTD

Chemwatch Hazard Alert Code: 2

Chemwatch: 1444

Version No: 10.7.7

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

Issue Date: 27/06/2017

Print Date: 20/06/2021

S.GHS.AUS.EN

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

Product Identifier

| | |
|-------------------------------|---|
| Product name | AMMONIUM. PERSULPHATE |
| Chemical Name | ammonium persulfate |
| Synonyms | N2-H8-S2-O8; (NH4)2-S2-O8; ammonium peroxydisulphate; peroxydisulphuric acid, diammonium salt; ammonium peroxydisulfate; diammonium peroxydisulfate; ammonium persulphate; peroxydisulfuric acid, diammonium salt |
| Proper shipping name | AMMONIUM PERSULPHATE |
| Chemical formula | H3N.1/2H2O8S2 |
| Other means of identification | Not Available |
| CAS number | 7727-54-0 |

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

| | |
|--------------------------|--|
| Relevant identified uses | Used as an oxidizer and bleacher; to remove sodium thiosulfate; reducer and retarder in photography; in dyeing, manufacture of aniline dyes; oxidizer for copper, etching zinc; decolourising and deodourising oils. Electroplating; washing infected yeast; removing pyrogallol stains; making soluble starch; depolarizer in electric batteries; in analytical chemistry for detection and determination of manganese. |
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Details of the supplier of the safety data sheet

| | |
|-------------------------|---|
| Registered company name | ALPHA CHEMICALS PTY LTD |
| Address | 4 ALLEN PLACE WETHERILL PARK NSW 2099 Australia |
| Telephone | 61 (0)2 9982 4622 |
| Fax | Not Available |
| Website | ~ |
| Email | shane@alphachem.com.au |

Emergency telephone number

| | |
|-----------------------------------|-------------------------|
| Association / Organisation | ALPHA CHEMICALS PTY LTD |
| Emergency telephone numbers | 61 (0)418 237 771 |
| Other emergency telephone numbers | Not Available |

SECTION 2 Hazards identification

Classification of the substance or mixture

HAZARDOUS CHEMICAL. DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

ChemWatch Hazard Ratings

| | Min | Max |
|--------------|-----|-----|
| Flammability | 0 | |
| Toxicity | 2 | |
| Body Contact | 2 | |
| Reactivity | 2 | |
| Chronic | 2 | |

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

| | |
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| Poisons Schedule | S6 |
| Classification [1] | Oxidizing Solid Category 3, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2A, Skin Sensitizer Category 1, Respiratory Sensitizer Category 1, Specific target organ toxicity - single exposure Category 3 (respiratory tract irritation) |
| Legend: | 1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI |

Label elements

AMMONIUM. PERSULPHATE

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

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|------|--|
| H272 | May intensify fire; oxidiser. |
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H317 | May cause an allergic skin reaction. |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H335 | May cause respiratory irritation. |

Precautionary statement(s) Prevention

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| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P261 | Avoid breathing dust/fumes. |
| P271 | Use only outdoors or in a well-ventilated area. |
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |
| P284 | [In case of inadequate ventilation] wear respiratory protection. |
| P220 | Keep away from clothing and other combustible materials. |
| P264 | Wash all exposed external body areas thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |

Precautionary statement(s) Response

| | |
|----------------|--|
| P304+P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| P342+P311 | If experiencing respiratory symptoms: Call a POISON CENTER/doctor/physician/first aider. |
| P370+P378 | In case of fire: Use alcohol resistant foam or fine spray/water fog to extinguish. |
| P302+P352 | IF ON SKIN: Wash with plenty of water. |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P333+P313 | If skin irritation or rash occurs: Get medical advice/attention. |
| P337+P313 | If eye irritation persists: Get medical advice/attention. |
| P362+P364 | Take off contaminated clothing and wash it before reuse. |

Precautionary statement(s) Storage

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

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

| CAS No | %[weight] | Name |
|---------------|-----------|---|
| 7727-54-0 | >98 | <u>Ammonium Persulphate</u> |
| Not Available | | NOTE: Decomposes slowly in water to produce |
| 7782-44-7. | ^ | <u>Medical Oxygen Compressed</u> |
| 10028-15-6 | ^ | <u>ozone</u> |

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

Mixtures

See section above for composition of Substances

SECTION 4 First aid measures

Description of first aid measures

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| Eye Contact | If this product comes in contact with the eyes: ▶ 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. |
|-------------|--|

Continued...

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|---------------------|---|
| | <ul style="list-style-type: none"> ▶ 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, without delay. |
| Ingestion | <ul style="list-style-type: none"> ▶ IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. ▶ For advice, contact a Poisons Information Centre or a doctor. ▶ Urgent hospital treatment is likely to be needed. ▶ In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. ▶ If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist. ▶ If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS. <p>Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:</p> <ul style="list-style-type: none"> ▶ INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. <p>NOTE: Wear a protective glove when inducing vomiting by mechanical means.</p> |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Toxic myocarditis may follow ingestion of oxidizing agents such as peroxides.

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema.
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.
- ▶ **DO NOT use emetics.** Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- ▶ **DO NOT attempt neutralisation as exothermic reaction may occur.**
- ▶ Skin burns should be covered with dry, sterile bandages, following decontamination.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

FOR SMALL FIRE:

- ▶ USE FLOODING QUANTITIES OF WATER.
- ▶ **DO NOT use dry chemical, CO₂, foam or halogenated-type extinguishers.**

FOR LARGE FIRE

- ▶ Flood fire area with water from a protected position
- Aqueous solution can be more reactive than solid. Rapid dilution is needed.

Special hazards arising from the substrate or mixture

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| Fire Incompatibility | <ul style="list-style-type: none"> ▶ Avoid storage with reducing agents. ▶ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous |
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Advice for firefighters

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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 full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water courses. ▶ Fight fire from a safe distance, with adequate cover. ▶ Extinguishers should be used only by trained personnel. ▶ Use water delivered as a fine spray to control fire and cool adjacent area. ▶ DO NOT approach containers suspected to be hot. |
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| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Will not burn but increases intensity of fire. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. ▶ Heat affected containers remain hazardous. ▶ Contact with combustibles such as wood, paper, oil or finely divided metal may produce spontaneous combustion or violent decomposition. ▶ May emit irritating, poisonous or corrosive fumes. <p>Decomposition may produce toxic fumes of: nitrogen oxides (NOx) sulfur oxides (SOx)</p> |
| HAZCHEM | 1Z |

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"> ▶ Clean up all spills immediately. ▶ No smoking, naked lights, ignition sources. ▶ Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result. ▶ Avoid breathing dust or vapours and all contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. ▶ Contain and absorb spill with dry sand, earth, inert material or vermiculite. ▶ DO NOT use sawdust as fire may result. ▶ Scoop up solid residues and seal in labelled drums for disposal. |
| 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 full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water courses. ▶ No smoking, flames or ignition sources. ▶ Increase ventilation. ▶ Contain spill with sand, earth or other clean, inert materials. |

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 | <p>For oxidisers, including peroxides.</p> <ul style="list-style-type: none"> -Avoid personal contact and inhalation of dust, mist or vapours. -Provide adequate ventilation. -Always wear protective equipment and wash off any spillage from clothing. -Keep material away from light, heat, flammables or combustibles. -Keep cool, dry and away from incompatible materials. -Avoid physical damage to containers. -DO NOT repack or return unused portions to original containers. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed as supplied. ▶ Store in a cool, well ventilated area. ▶ Keep dry. ▶ Store under cover and away from sunlight. ▶ Store away from flammable or combustible materials, debris and waste. Contact may cause fire or violent reaction. ▶ Store away from incompatible materials and foodstuff containers. <p>In addition, Goods of Class 5.1, packing group III should be stored in packages and be separated from buildings, tanks, and compounds containing other dangerous goods in tanks, and from property boundaries by a distance of at least 5 metres.</p> |

Conditions for safe storage, including any incompatibilities

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| Suitable container | <ul style="list-style-type: none"> ▶ DO NOT repack. Use containers supplied by manufacturer only. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids:</p> <ul style="list-style-type: none"> ▶ Removable head packaging and ▶ cans with friction closures may be used. <p>-</p> <p>Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *.</p> <p>-</p> <p>In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *.</p> <p>-</p> <p>* unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.</p> |
| Storage incompatibility | <ul style="list-style-type: none"> ▶ 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 |

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- 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.

For persulfate salts:

- ▶ Segregate from organics and other readily oxidisable materials.
- ▶ Segregate from powdered metals, phosphorous, hydrides, halogens, acids and alkalis.
- ▶ Avoid contact with combustibles, organic matter.
- ▶ Avoid reaction with acids, alkalis, halides, heavy metals and combustible material (wood, cloth).
- ▶ Contact with metals such as lead, silver, copper, magnesium, zinc, cadmium, nickel, iron and cobalt can lead to catalytic decomposition.
- ▶ An explosion hazard when mixed with finely powdered organic matter, metal powders such as aluminium, or reducing agents.
- ▶ Avoid reaction with alkaline hydroxide and water.
- ▶ Reacts vigorously with hydrazine.
- ▶ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous
- ▶ Many of the salts of peroxyacids are unstable or explosive and are capable of initiation by heat, friction or impact, and all are powerful oxidants.

BREITHERICK L.: Handbook of Reactive Chemical Hazards

- ▶ Avoid storage with reducing agents.

Decomposes on heating and produces corrosive fumes of sulfuric acid and ammonia

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA


| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|------------------------------|-----------------------|---------------------|---------------|---------------|---------------------|---------------|
| Australia Exposure Standards | Ammonium. Persulphate | Ammonium persulfate | Not Available | Not Available | 0.01 mg/m3 | Not Available |
| Australia Exposure Standards | ozone | Ozone | Not Available | Not Available | 0.1 ppm / 0.2 mg/m3 | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|-----------------------|-----------|----------|-----------|
| Ammonium. Persulphate | 0.3 mg/m3 | 22 mg/m3 | 130 mg/m3 |
| ozone | 0.24 ppm | 1 ppm | 10 ppm |

| Ingredient | Original IDLH | Revised IDLH |
|----------------------------|---------------|---------------|
| Ammonium. Persulphate | Not Available | Not Available |
| Medical Oxygen, Compressed | Not Available | Not Available |
| ozone | 5 ppm | Not Available |

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. 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> <p>Local exhaust ventilation usually required.</p> |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Chemical goggles. ▶ 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. |
| 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 <p>NOTE:</p> <ul style="list-style-type: none"> ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. <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</p> |

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| | <p>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.</p> <ul style="list-style-type: none"> ▶ DO NOT wear cotton or cotton-backed gloves. ▶ DO NOT wear leather gloves. ▶ Promptly hose all spills off leather shoes or boots or ensure that such footwear is protected with PVC over-shoes. |
| 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. ▶ Ensure there is ready access to a safety shower. ▶ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▶ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▶ 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 an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds. Electrical resistance must range between 0 to 500,000 ohms. Conductive shoes should be stored in lockers close to the room in which they are worn. Personnel who have been issued conductive footwear should not wear them from their place of work to their homes and return. |

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
| up to 10 x ES | P1 Air-line* | - - | PAPR-P1 - |
| up to 50 x ES | Air-line** | P2 | PAPR-P2 |
| up to 100 x ES | - | P3 | - |
| | | Air-line* | - |
| 100+ x ES | - | Air-line** | PAPR-P3 |

* - Negative pressure demand ** - Continuous flow

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)

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties**Information on basic physical and chemical properties**

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|---|---|--|----------------|
| Appearance | Odourless, colourless, monoclinic crystals, or white granular powder. Stable when dry. In the presence of moisture, it decomposes slowly evolving oxygen and some ozone. Solubility in water @ 0 deg.C: 58 g/100 cc. @ 25 deg.C: 80 g/100 cc. @ 40 deg.C: 110 g/100 cc. | | |
| Physical state | Divided Solid | Relative density (Water = 1) | 1.98 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Applicable |
| pH (as supplied) | Not Applicable | Decomposition temperature | 177 |
| Melting point / freezing point (°C) | 120 (decomposes) | Viscosity (cSt) | Not Applicable |
| Initial boiling point and boiling range (°C) | Not Applicable | Molecular weight (g/mol) | 228.19 |
| Flash point (°C) | Not Applicable | Taste | Not Available |
| Evaporation rate | Slow | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Applicable | Surface Tension (dyn/cm or mN/m) | Not Applicable |
| Lower Explosive Limit (%) | Not Applicable | Volatile Component (%vol) | Nil @ 38C |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |

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| Solubility in water | Miscible | pH as a solution (%) | 2.3-4.0 |
| Vapour density (Air = 1) | 7.9 | 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 under normal handling conditions. ▶ Prolonged exposure to heat. ▶ Hazardous polymerisation will not occur. ▶ Many of the salts of peroxyacids are unstable or explosive and are capable of initiation by heat, friction or impact, and all are powerful oxidants. <p>BREThERICK L.: Handbook of Reactive Chemical Hazards Presence of moisture, due to oxygen and some ozone evolution.</p> |
| 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. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.</p> <p>If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.</p> <p>Dust inhalation may cause nose, throat, mucous membrane and respiratory tract irritation, coughing, shortness of breath and chest discomfort.</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>Large doses of ammonia or injected ammonium salts may produce diarrhoea and may be sufficiently absorbed to produce increased production of urine and systemic poisoning. Symptoms include weakening of facial muscle, tremor, anxiety, reduced muscle and limb control.</p> |
| Skin Contact | <p>This material can cause inflammation of the skin on contact in some persons.</p> <p>The material may accentuate any pre-existing dermatitis condition</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>Prolonged or repeated contact may irritate the skin and may cause a rash and possible burns.</p> |
| Eye | This material can cause eye irritation and damage in some persons. |
| Chronic | <p>Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</p> <p>Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis, caused by particles less than 0.5 micron penetrating and remaining in the lung.</p> <p>Persulfate exposure commonly manifests itself in the form of a skin rash, eczema and respiratory conditions such as asthma. Allergy may develop after repeated exposures.</p> <p>A variety of central nervous system effects can occur following long-term exposure to oxygen at partial pressures in excess of 200kPa: these include dizziness, impaired co-ordination, visual and hearing disturbances, and seizures. Prolonged exposure at/ or normal elevated pressure may cause severe thickening and scarring of tissue.</p> <p>Allergic reactions clear up readily if further contact is avoided.</p> |

| | | |
|-----------------------------------|--|---|
| Ammonium. Persulphate | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] | Eye: adverse effect observed (irritating) ^[1] |
| | Inhalation(Rat) LC50; >=2.95 mg/4h ^[1] | Skin: adverse effect observed (irritating) ^[1] |
| | Oral(Rat) LD50; 495 mg/kg ^[2] | |
| Medical Oxygen, Compressed | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| ozone | TOXICITY | IRRITATION |
| | Inhalation(Rat) LC50; 3.6 ppm4h ^[1] | Eye: adverse effect observed (irreversible damage) ^[1] |
| | | Skin: adverse effect observed (corrosive) ^[1] |
| 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 | |

| | |
|------------------------------|--|
| AMMONIUM. PERSULPHATE | The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, |
|------------------------------|--|

AMMONIUM. PERSULPHATE

| | |
|--|--|
| | involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested. Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Allergic potential of the allergen and period of exposure often determine the severity of symptoms. Some people may be genetically more prone than others, and exposure to other irritants may aggravate symptoms. Allergy causing activity is due to interactions with proteins. Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure. Inhalation (rat) TClO: 3.8 mg/m ³ /23H/7D-I |
| MEDICAL OXYGEN, COMPRESSED | No significant acute toxicological data identified in literature search. Inhalation (human) TClO: 100pph (100%)/14hNil reported |
| OZONE | NOTE: Ozone aggravates chronic obstructive pulmonary diseases. Ozone is suspected also of increasing the risk of acute and chronic respiratory disease, mutagenesis and foetotoxicity. In animals short-term exposure to ambient concentrations of less than 1 ppm results in reduced capacity to kill intrapulmonary organisms and allows purulent bacteria to proliferate [Ellenhorn etal]. |
| AMMONIUM. PERSULPHATE & OZONE | 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. |

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

| | Endpoint | Test Duration (hr) | Species | Value | Source |
|-----------------------------------|---|--------------------|-------------------------------|---------------|---------------|
| | Ammonium. Persulphate | NOEC(ECx) | 48h | Crustacea | 41mg/l |
| EC50 | | 72h | Algae or other aquatic plants | 83.7mg/l | 2 |
| LC50 | | 96h | Fish | 76.3mg/l | 2 |
| EC50 | | 48h | Crustacea | 120mg/l | 1 |
| Medical Oxygen, Compressed | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| ozone | Endpoint | Test Duration (hr) | Species | Value | Source |
| | LC50 | 96h | Fish | 0.17mg/l | 2 |
| | NOEC(ECx) | 2160h | Fish | 0.002mg/L | 5 |
| Legend: | Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - 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 Persulfates:

Environmental Fate: Persulfates will readily degrade benzene, xylene, toluene, ethylbenzene and chlorinated benzenes to mineralized end products. Reaction rates with chlorinated solvents are much slower. Aqueous persulfates are expected to degrade in the environment via several mechanisms, (e.g. breakdown in water, decomposition stimulated by the presence of metals, and reactions with organic chemicals in the soil or water).

Atmospheric Fate: There are no data available for breakdown of these substances in sunlight, (photodegradation). Photodegradation in air is not relevant for the persulfates since they have a low tendency to evaporate into the air.

Terrestrial Fate: Persulfates are not expected to sorb to soil. Biological breakdown of these substances is not expected to occur. Persulfates are not expected to accumulate in soil organisms and will decompose into inorganic sulfate or bisulfate.

For Ammonia:

Atmospheric Fate: Ammonia reacts rapidly with available acids (mainly sulfuric, nitric, and sometimes hydrochloric acid) to form the corresponding salts. Ammonia is persistent in the air.

Aquatic Fate: Biodegrades rapidly to nitrate, producing a high oxygen demand. Non-persistent in water (half-life 2 days).

Ecotoxicity: Moderately toxic to fish under normal temperature and pH conditions and harmful to aquatic life at low concentrations. Does not concentrate in food chain.

For Inorganic Sulfate:

Environmental Fate - Sulfates can produce a laxative effect at concentrations of 1000 - 1200 mg/liter, but no increase in diarrhea, dehydration or weight loss. The presence of sulfate in drinking-water can also result in a noticeable taste. Sulfate may also contribute to the corrosion of distribution systems. No health-based guideline value for sulfate in drinking water is proposed.

Atmospheric Fate: Sulfates are removed from the air by both dry and wet deposition processes. Wet deposition processes including rain-out (a process that occurs within the clouds) and washout (removal by precipitation below the clouds) which contribute to the removal of sulfate from the atmosphere.

Terrestrial Fate: Soil - In soil, the inorganic sulfates can adsorb to soil particles or leach into surface water and groundwater. Plants - Sodium sulfate is not very toxic to terrestrial plants however; sulfates can be taken up by plants and be incorporated into the parenchyma of the plant.

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DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|---------------------------------------|---------------------------------------|
| | No Data available for all ingredients | No Data available for all ingredients |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------|---------------------------------------|
| | No Data available for all ingredients |

Mobility in soil

| Ingredient | Mobility |
|------------|---------------------------------------|
| | No Data available for all ingredients |


SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|---|
| Product / Packaging disposal | <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. <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. 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. In most instances the supplier of the material should be consulted.</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 small quantities of oxidising agent:</p> <ul style="list-style-type: none"> ▶ Cautiously acidify a 3% solution to pH 2 with sulfuric acid. ▶ Gradually add a 50% excess of sodium bisulfite solution with stirring. ▶ Add a further 10% sodium bisulfite. ▶ If no further reaction occurs (as indicated by a rise in temperature) cautiously add more acid. ▶ Recycle wherever possible or consult manufacturer for recycling options. ▶ Consult State Land Waste Management Authority for disposal. ▶ Bury residue in an authorised landfill. ▶ Recycle containers if possible, or dispose of in an authorised landfill. <p>For small spills and area cleanup: To reduce ammonium persulfate, mix with an excess of concentrated sodium thiosulfate (hypo) solution (acidified with dilute sulfuric acid). For large spills, consult State Land Waste Management Authority for disposal.</p> |
|-------------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|---|----|
|  | |
| Marine Pollutant | NO |
| HAZCHEM | 1Z |

Land transport (ADG)

| | | |
|-------------------------------------|----------------------|----------------|
| UN number | 1444 | |
| UN proper shipping name | AMMONIUM PERSULPHATE | |
| Transport hazard class(es) | Class | 5.1 |
| | Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | Not Applicable |
| | Limited quantity | 5 kg |

AMMONIUM. PERSULPHATE

Air transport (ICAO-IATA / DGR)

| | | | |
|-------------------------------------|---|----------------|--|
| UN number | 1444 | | |
| UN proper shipping name | Ammonium persulphate | | |
| Transport hazard class(es) | ICAO/IATA Class | 5.1 | |
| | ICAO / IATA Subrisk | Not Applicable | |
| | ERG Code | 5L | |
| Packing group | III | | |
| Environmental hazard | Not Applicable | | |
| Special precautions for user | Special provisions | A803 | |
| | Cargo Only Packing Instructions | 563 | |
| | Cargo Only Maximum Qty / Pack | 100 kg | |
| | Passenger and Cargo Packing Instructions | 559 | |
| | Passenger and Cargo Maximum Qty / Pack | 25 kg | |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y546 | |
| | Passenger and Cargo Limited Maximum Qty / Pack | 10 kg | |

Sea transport (IMDG-Code / GGVSee)

| | | | |
|-------------------------------------|----------------------|----------------|--|
| UN number | 1444 | | |
| UN proper shipping name | AMMONIUM PERSULPHATE | | |
| Transport hazard class(es) | IMDG Class | 5.1 | |
| | IMDG Subrisk | Not Applicable | |
| Packing group | III | | |
| Environmental hazard | Not Applicable | | |
| Special precautions for user | EMS Number | F-A , S-Q | |
| | Special provisions | Not Applicable | |
| | Limited Quantities | 5 kg | |

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

Not Applicable

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

| Product name | Group |
|----------------------------|---------------|
| Ammonium. Persulphate | Not Available |
| Medical Oxygen, Compressed | Not Available |
| ozone | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|----------------------------|---------------|
| Ammonium. Persulphate | Not Available |
| Medical Oxygen, Compressed | Not Available |
| ozone | Not Available |

SECTION 15 Regulatory information

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

Ammonium. Persulphate is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Australian Inventory of Industrial Chemicals (AIIC)

Medical Oxygen, Compressed is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

ozone is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|---|------------|
| Australia - AIIC / Australia Non-Industrial Use | No (ozone) |
| Canada - DSL | No (ozone) |

Continued...

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| National Inventory | Status |
|-------------------------------|--|
| Canada - NDSL | No (Ammonium. Persulphate; Medical Oxygen, Compressed) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | No (Medical Oxygen, Compressed; ozone) |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | No (ozone) |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |

Legend:
 Yes = All CAS declared ingredients are on the inventory
 No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

SECTION 16 Other information

| | |
|---------------|---------------|
| Revision Date | 27/06/2017 |
| Initial Date | Not Available |

SDS Version Summary

| Version | Date of Update | Sections Updated |
|----------|----------------|--|
| 12.1.1.1 | 27/02/2014 | Classification, Supplier Information, Synonyms |
| 12.1.2.1 | 26/04/2021 | Regulation Change |
| 12.1.3.1 | 03/05/2021 | Regulation Change |
| 12.1.4.1 | 06/05/2021 | Regulation Change |
| 12.1.5.1 | 10/05/2021 | Regulation Change |
| 12.1.5.2 | 30/05/2021 | Template Change |
| 12.1.5.3 | 04/06/2021 | Template Change |
| 12.1.5.4 | 05/06/2021 | Template Change |
| 12.1.6.4 | 07/06/2021 | Regulation Change |
| 12.1.6.5 | 09/06/2021 | Template Change |
| 12.1.6.6 | 11/06/2021 | Template Change |
| 12.1.6.7 | 15/06/2021 | Template Change |
| 12.1.7.7 | 17/06/2021 | Regulation Change |

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
 AIIC: 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

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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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