



ASCORBIC ACID

ALPHA CHEMICALS PTY LTD

Chemwatch Hazard Alert Code: 3

Chemwatch: 21835

Version No: 5.1.7.7

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

Issue Date: 27/06/2017

Print Date: 21/06/2021

S.GHS.AUS.EN

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

Product Identifier

| | |
|-------------------------------|--|
| Product name | ASCORBIC ACID |
| Chemical Name | ascorbic acid |
| Synonyms | C6-H8-O6; vitamin C; antiscorbic vitamin; L-xyloascorbic acid; L-3-ketothreohexuronic acid lactone; 3-oxo-L-gulofuranolactone (enol form); 3-keto-L-gulofuranolactone; L-(+)-ascorbic acid; V-ascorbic acid; Cevitamin Vitacee Scorbu-C Testascorbic Cantan Ribena; Redoxon Allercorb Catavin C Vicelat; Proscorbin Cecon Celin Vitacin; cevitic acid Ce-Vi-Sol Centone Vitacimin; Cebion Ascorin Cescorbat Vitascorbol; Cetaxin Ascortea Cereon Xitix; Cevalin Cegiolan Cergona Cevitan; Cevatine Adenex Cetemican Laroscorbine; Cevimin Ascorvit Cetamid C6-H8-O6; Cevitex Cevex Planavit C Davitamon C; Cipca Lemascorb Concemin Hybrin; Cebicure Ciamin Scorbacid C-Vimin; Ajax Cat. No: 00000079, 00004078, 06033034, 01173095; Reagent BIV; L-Ascorbic acid; L-Ascorbic acid Cat. No. 10303-44006-73; L(+)-ascorbic acid GR & for biochemistry; L-ascorbic acid, UNILAB; Ascorbic acid; 9/03 |
| Proper shipping name | SELF-HEATING SOLID, ORGANIC, N.O.S. (contains ascorbic acid) |
| Chemical formula | C6-H8-O6 C6H8O6 |
| Other means of identification | Not Available |
| CAS number | 50-81-7 |

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

| | |
|--------------------------|---|
| Relevant identified uses | As antimicrobial and antioxidant in foodstuffs. Used for Vitamin C deficiency. Vitamin C is purely the L-enantiomer of ascorbate; the opposite D-enantiomer has no physiological significance. Ascorbic acid is well known for its antioxidant activity, acting as a reducing agent to reverse oxidation in liquids. When there are more free radicals (reactive oxygen species, ROS) in the human body than antioxidants, the condition is called oxidative stress, and has an impact on cardiovascular disease, hypertension, chronic inflammatory diseases, diabetes as well as on critically ill patients and individuals with severe burns. Individuals experiencing oxidative stress have ascorbate blood levels lower than 45 umol/L, compared to healthy individual who range between 61.4-80 umol/L. It is not certain whether vitamin C and antioxidants in general prevent oxidative stress-related diseases and promote health. Clinical studies regarding the effects of vitamin C supplementation on lipoproteins and cholesterol have found that vitamin C supplementation does not improve disease markers in the blood. Ascorbic acid behaves not only as an antioxidant but also as a pro-oxidant.[63] Ascorbic acid has been shown to reduce transition metals, such as cupric ions (Cu ²⁺), to cuprous (Cu ¹⁺), and ferric ions (Fe ³⁺) to ferrous (Fe ²⁺) during conversion from ascorbate to dehydroascorbate in vitro. This reaction can generate superoxide and other ROS. However, in the body, free transition elements are unlikely to be present while iron and copper are bound to diverse proteins and the intravenous use of vitamin C does not appear to increase pro-oxidant activity. Thus, ascorbate as a pro-oxidant is unlikely to convert metals to create ROS in vivo. However, vitamin C supplementation has been associated with increased DNA damage in the lymphocytes of healthy volunteers. Vitamin C is a natural antihistamine. It both prevents histamine release and increases the detoxification of histamine |
|--------------------------|---|

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 | 3 | | |
| Toxicity | 0 | | 0 = Minimum |
| Body Contact | 2 | | 1 = Low |
| Reactivity | 1 | | 2 = Moderate |
| Chronic | 2 | | 3 = High |
| | | | 4 = Extreme |

| | |
|---------------------------|---|
| Poisons Schedule | Not Applicable |
| Classification [1] | Flammable Solid Category 1, Self-Heating Material Category 1, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2A, Germ cell mutagenicity Category 2, Reproductive Toxicity Category 2, 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

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

Hazard statement(s)

| | |
|---------------|--|
| H228 | Flammable solid. |
| H251 | Self-heating: may catch fire. |
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H341 | Suspected of causing genetic defects. |
| H361fd | Suspected of damaging fertility. Suspected of damaging the unborn child. |
| H335 | May cause respiratory irritation. |

Precautionary statement(s) Prevention

| | |
|-------------|--|
| P201 | Obtain special instructions before use. |
| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P235 | Keep cool. |
| P271 | Use only outdoors or in a well-ventilated area. |
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |
| P240 | Ground and bond container and receiving equipment. |
| P241 | Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment. |
| P261 | Avoid breathing dust/fumes. |

Precautionary statement(s) Response

| | |
|-----------------------|--|
| P308+P313 | IF exposed or concerned: Get medical advice/ attention. |
| P370+P378 | In case of fire: Use water jets to extinguish. |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P312 | Call a POISON CENTER/doctor/physician/first aider/if you feel unwell. |
| P337+P313 | If eye irritation persists: Get medical advice/attention. |
| P302+P352 | IF ON SKIN: Wash with plenty of water. |
| P304+P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| P332+P313 | If skin irritation occurs: Get medical advice/attention. |

Precautionary statement(s) Storage

| | |
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| P405 | Store locked up. |
| P407 | Maintain air gap between stacks or pallets. |
| P410 | Protect from sunlight. |
| P403+P233 | Store in a well-ventilated place. Keep container tightly closed. |
| P413 | Store bulk masses greater than ... kg/...lbs at temperatures not exceeding ...°C/...°F. |
| P420 | Store separately. |

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. |
|-------------|--|

SECTION 3 Composition / information on ingredients

Substances

| CAS No | %[weight] | Name |
|---------|-----------|---------------|
| 50-81-7 | >99 | ascorbic acid |

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 | <ul style="list-style-type: none"> ▶ If in eyes, hold eyelids apart and flush the eye continuously with running water. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ 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. <p>For THERMAL burns:</p> <ul style="list-style-type: none"> ▶ Do NOT remove contact lens ▶ Lay victim down, on stretcher if available and pad BOTH eyes, make sure dressing does not press on the injured eye by placing thick pads under dressing, above and below the eye. ▶ Seek urgent medical assistance, or transport to hospital. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor. <p>In case of burns:</p> <ul style="list-style-type: none"> ▶ Immediately apply cold water to burn either by immersion or wrapping with saturated clean cloth. ▶ DO NOT remove or cut away clothing over burnt areas. DO NOT pull away clothing which has adhered to the skin as this can cause further injury. ▶ DO NOT break blister or remove solidified material. ▶ Quickly cover wound with dressing or clean cloth to help prevent infection and to ease pain. ▶ For large burns, sheets, towels or pillow slips are ideal; leave holes for eyes, nose and mouth. ▶ DO NOT apply ointments, oils, butter, etc. to a burn under any circumstances. ▶ Water may be given in small quantities if the person is conscious. ▶ Alcohol is not to be given under any circumstances. ▶ Reassure. ▶ Treat for shock by keeping the person warm and in a lying position. ▶ Seek medical aid and advise medical personnel in advance of the cause and extent of the injury and the estimated time of arrival of the patient. |
| 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"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures**Extinguishing media**

For **SMALL FIRES**:

- ▶ Dry chemical, CO₂, water spray or foam.

For **LARGE FIRES**:

- ▶ Foam, fog or water spray
- ▶ **DO NOT use water jets.**

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

Advice for firefighters

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| Fire Fighting | <ul style="list-style-type: none"> ▶ Wear SCBA and fully-encapsulating, gas-tight suits when handling these substances. ▶ Always wear thermal protective clothing when handling molten substances. ▶ Structural fire fighter's uniform will only provide limited protection. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. ▶ Consider evacuation (or protect in place). ▶ Fight fire from a safe distance, with adequate cover. ▶ If safe, switch off electrical equipment until vapour fire hazard removed. ▶ Use water delivered as a fine spray to control fire and cool adjacent area. ▶ Avoid spraying water onto liquid pools. |
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| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ May ignite on contact with air leading to spontaneous combustion ▶ May decompose explosively when heated or involved in fire. ▶ May REIGNITE after fire is extinguished. ▶ Gases generated in fire may be poisonous, corrosive or irritating. ▶ Containers may explode on heating. ▶ Runoff may create multiple fire or explosion hazard. <p>Combustion products include: carbon monoxide (CO) carbon dioxide (CO₂) other pyrolysis products typical of burning organic material. May emit clouds of acrid smoke</p> |
| HAZCHEM | 1Y |

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"> ▶ Eliminate all ignition sources. ▶ Cover with WET earth, sand or other non-combustible material. ▶ Use clean, non-sparking tools to collect absorbed material ▶ Wear gloves and safety glasses as appropriate. |
| 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. ▶ Eliminate all ignition sources (no smoking, flares, sparks or flames) ▶ Stop leak if safe to do so; prevent entry into waterways, drains or confined spaces. ▶ May be violently or explosively reactive. ▶ DO NOT walk through spilled material. ▶ DO NOT touch damaged containers or spilled material unless wearing appropriate protective clothing. ▶ Cover with WET earth, sand or other non-combustible material. ▶ Use clean, non-sparking tools to collect absorbed material and place into loosely-covered metal or plastic containers ready for disposal. |

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"> ▶ For large scale or continuous use, spark-free, earthed ventilation system venting directly to the outside and separate from usual ventilation systems ▶ Provide dust collectors with explosion vents. ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of overexposure occurs. ▶ Use in a well-ventilated area. ▶ Avoid smoking, naked lights or ignition sources. ▶ Avoid contact with incompatible materials. ▶ When handling, DO NOT eat, drink or smoke. ▶ Keep containers securely sealed when not in use. ▶ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) ▶ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame. ▶ Establish good housekeeping practices. ▶ Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds. ▶ Use continuous suction at points of dust generation to capture and minimise the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimise the probability of a "secondary" explosion. According to NFPA Standard 654, dust layers 1/32 in.(0.8 mm) thick can be sufficient to warrant immediate cleaning of the area. ▶ Do not use air hoses for cleaning. |
| Other information | <ul style="list-style-type: none"> ▶ Store under an inert gas, e.g. argon or nitrogen. <p>FOR MINOR QUANTITIES:</p> <ul style="list-style-type: none"> ▶ Store in an indoor fireproof cabinet or in a room of noncombustible construction. ▶ Provide adequate portable fire-extinguishers in or near the storage area. <p>FOR PACKAGE STORAGE:</p> <ul style="list-style-type: none"> ▶ Store in original containers in approved flame-proof area. ▶ No smoking, naked lights, heat or ignition sources. ▶ DO NOT store in pits, depressions, basements or areas where vapours may be trapped. ▶ Keep containers securely sealed. ▶ Store away from incompatible materials in a cool, dry, well ventilated area. ▶ Protect containers against physical damage and check regularly for leaks. |

Conditions for safe storage, including any incompatibilities

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|---------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▶ Glass container is suitable for laboratory quantities <p>For low viscosity materials and solids: Drums and jerricans must be of the non-removable head type. Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. (23 deg. C):</p> <ul style="list-style-type: none"> ▶ Removable head packaging and ▶ cans with friction closures may be used. |
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| | - Where combination packages are used, there must be sufficient inert absorbent material to absorb completely any leakage that may occur, unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic. All combination packages for Packing group I and II must contain cushioning material. |
| Storage incompatibility | <ul style="list-style-type: none"> ▶ Avoid strong acids, bases. ▶ Avoid reaction with oxidising agents <p>As a mild reducing agent, ascorbic acid degrades upon exposure to air, converting the oxygen to water. The redox reaction is accelerated by the presence of metal ions and light. It can be oxidised by one electron to a radical state or doubly oxidized to the stable form called dehydroascorbic acid. Ascorbate usually acts as an antioxidant. It typically reacts with oxidants of the reactive oxygen species, such as the hydroxyl radical formed from hydrogen peroxide</p> |

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|---------------|---------------|---------------|---------------|
| ASCORBIC ACID | Not Available | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|---------------|---------------|---------------|
| ascorbic acid | Not Available | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|---------------|-----------------------------------|----------------------------------|
| ascorbic acid | E | ≤ 0.01 mg/m ³ |

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

Exposure controls

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| Appropriate engineering controls | <p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <ul style="list-style-type: none"> ▶ Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction. |
| 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. 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 | <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <p>Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.</p> <p>Suitability and durability of glove type is dependent on usage.</p> <ul style="list-style-type: none"> ▶ Fire resistant/ heat resistant gloves where practical, otherwise ▶ Heavy-duty chemically resistant gloves capable of providing short-term protection against spontaneous ignition. |
| Body protection | See Other protection below |
| Other protection | <p>Wear protective clothing appropriate for the work situation.</p> <p>For large scale or continuous use, when handling dry powder, wear :</p> <ul style="list-style-type: none"> -tight-weave, non-static, noncombustible or flameproof clothing without cuffs, metallic fasteners, pockets, or laps in which powder may collect. -non-sparking safety or conductive footwear. 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. 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 |

Continued...

issued conductive footwear should not wear them from their place of work to their homes and return.

Respiratory protection

- 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 | White crystals, soluble in water (33 g/100 ml). Pleasant, sharp acidic taste. stable to air when dry and pure. Aqueous solutions are rapidly oxidized by air. This reaction is accelerated by alkalis and copper. Ascorbic acid resembles the sugar from which it is derived, being a ring containing many oxygen-containing functional groups. The molecule exists in equilibrium with two ketone tautomers, which are less stable than the enol form. In solutions, these forms of ascorbic acid rapidly interconvert. L-Ascorbate is a weak sugar acid structurally related to glucose that naturally occurs attached either to a hydrogen ion, forming ascorbic acid, or to a metal ion, forming a mineral ascorbate | | |
| Physical state | Divided Solid | Relative density (Water = 1) | 1.65 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | 660 |
| pH (as supplied) | Not Applicable | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | 190 | Viscosity (cSt) | Not Applicable |
| Initial boiling point and boiling range (°C) | Decomposes | Molecular weight (g/mol) | 176.14 |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Applicable | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Applicable |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Applicable |
| Vapour pressure (kPa) | Not Applicable | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (%) | approx. 3 |
| Vapour density (Air = 1) | Not Applicable | 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"> May heat spontaneously Identify and remove sources of ignition and heating. Incompatible material, especially oxidisers, and/or other sources of oxygen may produce unstable product(s). Hazardous polymerization 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>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>Not normally a hazard due to non-volatile nature of product</p> |
| Ingestion | <p>The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.</p> <p>Relatively large doses of ascorbic acid may cause indigestion, particularly when taken on an empty stomach. However, taking vitamin C in the form of sodium ascorbate and calcium ascorbate may minimize this effect. When taken in large doses, ascorbic acid causes diarrhea in healthy</p> |

| | subjects. In one trial in 1936, doses up to 6 grams of ascorbic acid were given to 29 infants, 93 children of preschool and school age, and 20 adults for more than 1400 days. With the higher doses, toxic manifestations were observed in five adults and four infants. The signs and symptoms in adults were nausea, vomiting, diarrhea, flushing of the face, headache, fatigue and disturbed sleep. The main toxic reactions in the infants were skin rashes | | | | |
|---|---|----------|------------|---|---------------|
| Skin Contact | This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition 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. Open cuts, abraded or irritated skin should not be exposed to this material 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. | | | | |
| Eye | This material can cause eye irritation and damage in some persons. | | | | |
| Chronic | Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Strong evidence exists that this substance may cause irreversible mutations (though not lethal) even following a single exposure. Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility. Based on experience with animal studies, exposure to the material may result in toxic effects to the development of the foetus, at levels which do not cause significant toxic effects to the mother. Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. 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. Vitamin C increases iron absorption; people with iron overload disorders, such as haemochromatosis may develop iron toxicity. Patients with the genetic condition glucose-6-phosphate dehydrogenase (G6PD) deficiency may develop haemolytic anaemia after taking large doses of vitamin C by mouth. Animal testing shows that in pregnancy, high doses of vitamin C may reduce production of progesterone, leading to miscarriage, although causal association has not been proven. Animal and human studies have suggested that high doses of vitamin C may reduce exercise performance; however, the results were not statistically significant. Vitamin C may trigger a cancer-causing mechanism of hexavalent chromium. Prolonged use of Vitamin C may cause high levels of oxalate in the blood and possibly the formation of kidney stones, although the effect is widely variable between individuals. Chronic exposure to oxalates may result in circulatory failure or nervous system irregularities, the latter due to calcium binding to oxalate. Prolonged and severe exposure can cause chronic cough, protein in the urine, vomiting, pain in the back, and gradual weight loss and weakness. | | | | |
| ascorbic acid | <table border="1"> <thead> <tr> <th>TOXICITY</th> <th>IRRITATION</th> </tr> </thead> <tbody> <tr> <td>Oral(Mouse) LD50; 3367 mg/kg^[2]</td> <td>Not Available</td> </tr> </tbody> </table> | TOXICITY | IRRITATION | Oral(Mouse) LD50; 3367 mg/kg ^[2] | Not Available |
| TOXICITY | IRRITATION | | | | |
| Oral(Mouse) LD50; 3367 mg/kg ^[2] | Not Available | | | | |
| 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 | | | | |

| | |
|----------------------|---|
| ASCORBIC ACID | 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 |
|----------------------|---|--------------------|---------------|---------------|---------------|
| ascorbic acid | Not Available | Not Available | Not Available | Not Available | Not Available |
| 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 Oxalic Acid and Oxalate Salts:

Atmospheric Fate: If released to the atmosphere, removal from air via wet deposition, dry deposition, and photolysis is likely to occur.

Terrestrial Fate: If released to soil, oxalic acid at pH 5 - 9 will be in the form of the oxalate ion and is expected to leach in soil. Photolysis and biodegradation are expected to be an important fate processes. It has not been determined whether the oxalate ion will adsorb to sediment or soil more strongly than its estimated Koc value indicates.

Aquatic Fate: If released to water, oxalic acid / oxalates will not volatilize, adsorb to sediment, bioconcentrate in aquatic organisms, oxidize or hydrolyze. Oxalic acid, however, may act as a leaching agent for those metals that form soluble oxalate complexes, including aluminum and iron. Oxalic acid is not expected to bioconcentrate in aquatic organisms. The predominant aquatic fate processes are expected to be photolysis in surface waters, aerobic and anaerobic biodegradation.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|---------------|-------------------------|------------------|
| ascorbic acid | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|---------------|----------------------|
| ascorbic acid | LOW (LogKOW = -1.85) |

Mobility in soil

| Ingredient | Mobility |
|---------------|----------------|
| ascorbic acid | LOW (KOC = 10) |

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. ▶ Recycle wherever possible or consult manufacturer for recycling options. ▶ Consult State Land Waste Authority for disposal. ▶ Bury or incinerate residue at an approved site. ▶ Recycle containers if possible, or dispose of in an authorised landfill. |
|-------------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|---|
| |  |
| Marine Pollutant | NO |
| HAZCHEM | 1Y |

Land transport (ADG)

| | | |
|-------------------------------------|--|----------------|
| UN number | 3088 | |
| UN proper shipping name | SELF-HEATING SOLID, ORGANIC, N.O.S. (contains ascorbic acid) | |
| Transport hazard class(es) | Class | 4.2 |
| | Subrisk | Not Applicable |
| Packing group | II | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | 274 |
| | Limited quantity | 0 |

Air transport (ICAO-IATA / DGR)

| | | |
|-----------------------------------|--|----------------|
| UN number | 3088 | |
| UN proper shipping name | Self-heating solid, organic, n.o.s. * (contains ascorbic acid) | |
| Transport hazard class(es) | ICAO/IATA Class | 4.2 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 4L |

| | | |
|-------------------------------------|---|-----------|
| Packing group | II | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | A3 A803 |
| | Cargo Only Packing Instructions | 470 |
| | Cargo Only Maximum Qty / Pack | 50 kg |
| | Passenger and Cargo Packing Instructions | 467 |
| | Passenger and Cargo Maximum Qty / Pack | 15 kg |
| | Passenger and Cargo Limited Quantity Packing Instructions | Forbidden |
| | Passenger and Cargo Limited Maximum Qty / Pack | Forbidden |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|--|----------------|
| UN number | 3088 | |
| UN proper shipping name | SELF-HEATING SOLID, ORGANIC, N.O.S. (contains ascorbic acid) | |
| Transport hazard class(es) | IMDG Class | 4.2 |
| | IMDG Subrisk | Not Applicable |
| Packing group | II | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | EMS Number | F-A , S-J |
| | Special provisions | 274 |
| | Limited Quantities | 0 |

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

| Product name | Pollution Category | Ship Type |
|--|--------------------|-----------|
| Oxygenated aliphatic hydrocarbon mixture | Z | 3 |

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

| Product name | Group |
|---------------|---------------|
| ascorbic acid | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|---------------|---------------|
| ascorbic acid | Not Available |

SECTION 15 Regulatory information

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

ascorbic acid is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

National Inventory Status

| National Inventory | Status |
|---|--------------------|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (ascorbic acid) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |

Legend:

Yes = All CAS declared ingredients are on the inventory

No = One or more of the CAS listed ingredients are not on the inventory 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 |
|---------|----------------|--|
| 4.1.1.1 | 02/06/2010 | CAS Number, Classification, Supplier Information, Synonyms |
| 4.1.2.1 | 26/04/2021 | Regulation Change |
| 4.1.3.1 | 03/05/2021 | Regulation Change |
| 4.1.4.1 | 06/05/2021 | Regulation Change |
| 4.1.5.1 | 10/05/2021 | Regulation Change |
| 4.1.5.2 | 30/05/2021 | Template Change |
| 4.1.5.3 | 04/06/2021 | Template Change |
| 4.1.5.4 | 05/06/2021 | Template Change |
| 4.1.6.4 | 07/06/2021 | Regulation Change |
| 4.1.6.5 | 09/06/2021 | Template Change |
| 4.1.6.6 | 11/06/2021 | Template Change |
| 4.1.6.7 | 15/06/2021 | Template Change |
| 4.1.7.7 | 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
 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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