YSI ASCORBIC ACID 1-2

GFS Chemicals, Inc.

Chemwatch: **21835**
Version No: **8.1**
Safety Data Sheet according to OSHA HazCom Standard (2024) requirements

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S.GHS.USA.EN

SECTION 1 Identification

Product Identifier

Product name	YSI ASCORBIC ACID 1-2
Chemical Name	Not Available
Synonyms	C6-H8-O6; vitamin C; antiscorbutic 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; cevitamic acid Ce-Vi-Sol Centone Vitacimin; Cebion Ascorin Cescorbat Vitascorbol; Cetaxin Ascorteal 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
Chemical formula	C6-H8-O6|C6H8O6
Other means of identification	Not Available
CAS number	50-81-7

Recommended use of the chemical and restrictions on use

Relevant identified uses	As antimicrobial and antioxidant in foodstuffs. Used for Vitamin C deficiency. -Ascorbic acid (L-Ascorbate), an electron donor, is an endogenous antioxidant agent. L-Ascorbic acid inhibits selectively Cav3.2 channels with an IC50 of 6.5 µM. L-Ascorbic acid is also a collagen deposition enhancer and an elastogenesis inhibitor[1][2][3]. L-Ascorbic acid exhibits anti-cancer effects through the generation of reactive oxygen species (ROS) and selective damage to cancer cells 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 (Cu2+), to cuprous (Cu1+), and ferric ions (Fe3+) to ferrous (Fe2+) 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 Antioxidant. Mineral ascorbates are used as dietary supplements and food additives. Ascorbate salts may be better tolerated by the human body than the corresponding weakly acidic ascorbic acid. Ascorbates are highly reactive antioxidants used as food preservatives. Therapeutic or pharmacologically-active agent. ion channel modulator, inhibitor ion channels are pore-forming proteins that allow the flow of ions across membranes, either plasma membranes, or the membranes of intracellular organelles. Many ion channels (such as most Na, K, Ca and some Cl channels) are gated by voltage but others (such as certain K and Cl channels, TRP channels, ryanodine receptors and IP3 receptors) are relatively voltage-insensitive and are gated by second messengers and other intracellular and/or extracellular mediators. As such, there is some blurring of the boundaries between "ion channels" and "ligand-gated channels" which are compiled separately in the Guide. Resolution of ion channel structures, beginning with K channels then Cl channels and most recently Na channels has greatly improved understanding of the structural basis behind ion channel function. Many ion channels (e.g., K, Na, Ca, HCN and TRP channels) share several structural similarities. These channels are thought to have evolved from a common ancestor and have been classfied together as the "voltage-gated-like (VGL) ion channel chanome". Other ion channels, however, such as Cl channels, aquaporins and connexins, have completely different structural properties to the VGL channels, having evolved quite separately. Currently, ion channels (including ligand-gated ion channels) represent the second largest target for existing drugs after G protein-coupled receptors. However, the advent of novel, faster screening techniques for compounds acting on ion channels suggests that these proteins represent promising targets for the development of additional, novel therapeutic agents for the near future. Calcium channel blockers (CCB), calcium channel antagonists or calcium antagonists are a group of medications that disrupt the movement of calcium (Ca2+) through calcium channels. Calcium channel blockers are used as antihypertensive drugs, i.e., as medications to decrease blood pressure in patients with hypertension. CCBs are particularly effective against large vessel stiffness, one of the common causes of elevated systolic blood pressure in elderly patients. Calcium channel blockers are also frequently used to alter heart rate (especially from atrial fibrillation), to prevent peripheral and cerebral vasospasm, and to reduce chest pain caused by angina pectoris. N-type, L-type, and T-type voltage-dependent calcium channels are present in the zona glomerulosa of the human adrenal gland, and CCBs can directly influence the biosynthesis of aldosterone in adrenocortical cells, with consequent impact on the clinical treatment of hypertension with these agents. CCBs have been shown to be slightly more effective than beta blockers at lowering cardiovascular mortality, but they are associated with more side effects. Potential major risks however were mainly found to be associated with short-acting CCBs. Calcium channel blockers, , may provide greater protection against stroke than beta blockers.[Evidence from two meta-analyses has reported no significant difference between calcium channel blockers, ACE inhibitors, diuretics [and angiotensin receptor blockers in stroke protection while one 2015 meta-analysis has suggested that calcium channel blockers offer greater protection against stroke than other classes of antihypertensive Classes of CCBs include:

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Dihydropyridines (DHPs) which often used to reduce systemic vascular resistance and arterial pressure. Sometimes when they are used to treat angina, the vasodilation and hypotension can lead to reflex tachycardia.
Phenylalkylamines which are relatively selective for myocardium, reduce myocardial oxygen demand and reverse coronary vasospasm, and are often used to treat angina. They have minimal vasodilatory effects compared with dihydropyridines and therefore cause less reflex tachycardia, making it appealing for treatment of angina, where tachycardia can be the most significant contributor to the heart's need for oxygen.
Benzothiazepines are an intermediate class between phenylalkylamine and dihydropyridines in their selectivity for vascular calcium channels. By having both cardiac depressant and vasodilator actions, benzothiazepines are able to reduce arterial pressure without producing the same degree of reflex cardiac stimulation caused by dihydropyridines.
Gabapentinoids are used primarily to treat epilepsy and neuropathic pain.
Nonselective: While most of the agents listed above are relatively selective, there are additional agents that are considered nonselective
N-type calcium channels are targets for the development of drugs to relieve chronic and neuropathic pain. They are also used for the treatment of hypertension, autism spectrum disorder, osteoarthritis, and other medical diagnoses. Additionally, N-type calcium channels have known functions in the kidney, and heart. N-type calcium channels are voltage gated calcium channels that are distributed throughout the entire body. These channels are known for their importance in the nervous system. They play a small role in the migration of immature neurons before the establishment of their mature synapses, and they are critically involved in the release of neurotransmitters, which is also similar to another type of calcium channels, known as P-type calcium channels.There are many known N-type calcium channel blockers that function to inhibit channel activity, although the most notable blockers are omega-Conotoxins.
N-type channels play a key role in being able to control the neurotransmission of pain in the spinal cord. Studies have shown that N-type channels are located in high amounts at the presynaptic terminals of neurons.
L-type calcium channel blocker drugs are used as cardiac antiarrhythmics or antihypertensives, depending on whether the drugs have higher affinity for the heart (the phenylalkylamines), or for the blood vessels (the dihydropyridines)
The L-type calcium channel (also known as the dihydropyridine channel, or DHP channel) is part of the high-voltage activated family of voltage-dependent calcium channel. "L" stands for long-lasting referring to the length of activation.
Ankle edema, is a common adverse effect of L-type calcium channel blocker (CCB) and can sometime progress to anasarca.
L-type calcium channels are responsible for the excitation-contraction coupling of skeletal, smooth, cardiac muscle, and for aldosterone secretion in endocrine cells of the adrenal cortex.. They are also found in neurons, and with the help of L-type calcium channels in endocrine cells, they regulate neurohormones and neurotransmitters. They have also been seen to play a role in gene expression, mRNA stability, neuronal survival, ischemic-induced axonal injury, synaptic efficacy, and both activation and deactivation of other ion channels.
Pharmacological evidence of T-type calcium channels suggest that they play a role in several forms cancer, absence epilepsy, pain, and Parkinson's disease.T-type calcium channels function to control the pace-making activity of the SA Node within the heart and relay rapid action potentials within the thalamus. These channels allow for continuous rhythmic bursts that control the SA Node of the heart.
T-type Calcium channels are expressed in different human cancers such as breast, colon, prostate, insulinoma, retinoblastoma, leukemia, ovarian, and melanoma, and they also play key roles in proliferation, survival, and the regulation of cell cycle progression in these forms of cancer . Down regulating T-type channel isoforms, or just blocking the T-type calcium channels caused cytostatic effects in cancer cells such as gliomas, breast, melanomas, and ovarian, esophageal, and colorectal cancers .
The major disease that involves the T-type calcium channel is absence epilepsy. When an individual has this disease, they will move in and out of a sleep-like state, even during normal activities.T-type calcium channel expression is not only up regulated in absence epilepsy, but also in other forms of epilepsy as well.
The Cav3.2 isoform of T-type calcium channels has been found to involve in pain in animal models with acute pain and chronic pain: neuropathic pain (PDN), inflammatory pain and visceral pain.
T-type calcium channels are highly expressed in basal ganglia structures as well as neurons in the motor areas of the thalamus and are thought to contribute to normal and pathological bursting by means of low-threshold spiking. Increased neuronal bursting occurs throughout the central motor system in both human forms and animals models of Parkinson's disease.
T-type calcium channels are low voltage activated calcium channels that become deinactivated during cell membrane hyperpolarization but then open to depolarization. The entry of calcium into various cells has many different physiological responses associated with it. Within cardiac muscle cell and smooth muscle cells voltage-gated calcium channel activation initiates contraction directly by allowing the cytosolic concentration to increase. Not only are T-type calcium channels known to be present within cardiac and smooth muscle, but they also are present in many neuronal cells within the central nervous system

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

Registered company name	**GFS Chemicals, Inc.**	**YSI Inc.**
Address	PO Box 245 Powell OH 43065 United States	1700/1725 Brannum Ln Yellow Springs OH 45387 United States
Telephone	740-881-5501|800-858-9682	(937) 767-7241
Fax	740-881-5989	Not Available
Website	www.gfschemicals.com	www.ysi.com
Email	service@gfschemicals.com	MSDSinfo@ysi.com

Emergency phone number

Association / Organisation	**ChemTrec**	**CHEMTREC**	**CHEMWATCH EMERGENCY RESPONSE (24/7)**
Emergency telephone number(s)	800-424-9300	(800) 424-9300	+1 855-237-5573 (ID#: 21835)
Other emergency telephone number(s)	Not Available	011 703-527-3887	+61 3 9573 3188

SECTION 2 Hazard(s) identification

Classification of the substance or mixture

Considered a Hazardous Substance by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200). Not classified as Dangerous Goods for transport purposes.

NFPA 704 diamond

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

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Classification	Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2A, Specific Target Organ Toxicity - Single Exposure Category 3, Germ Cell Mutagenicity Category 2, Reproductive Toxicity Category 2

Label elements

Hazard pictogram(s)	
Signal word	**Warning**

Hazard statement(s)

H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335+H336	May cause respiratory irritation or drowsiness or dizziness.
H341	Suspected of causing genetic defects.
H361	Suspected of damaging fertility or the unborn child.

Hazard(s) not otherwise classified

Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
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.
P202	Do not handle until all safety precautions have been read and understood.
P264	Wash all exposed external body areas thoroughly after handling.

Precautionary statement(s) Response

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

Precautionary statement(s) Storage

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

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.

No further product hazard information.

SECTION 3 Composition / information on ingredients

Substances

CAS No	%[weight]	Name
50-81-7	>99	YSI Ascorbic Acid 1-2

Mixtures

See section above for composition of Substances

SECTION 4 First-aid measures

Description of first aid measures

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. ▸ 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. For THERMAL burns:

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	▸ 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	If skin contact occurs: ▸ 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. In case of burns: ▸ 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. For thermal burns: ▸ Decontaminate area around burn. ▸ Consider the use of cold packs and topical antibiotics. For first-degree burns (affecting top layer of skin) ▸ Hold burned skin under cool (not cold) running water or immerse in cool water until pain subsides. ▸ Use compresses if running water is not available. ▸ Cover with sterile non-adhesive bandage or clean cloth. ▸ Do NOT apply butter or ointments; this may cause infection. ▸ Give over-the counter pain relievers if pain increases or swelling, redness, fever occur. For second-degree burns (affecting top two layers of skin) ▸ Cool the burn by immerse in cold running water for 10-15 minutes. ▸ Use compresses if running water is not available. ▸ Do NOT apply ice as this may lower body temperature and cause further damage. ▸ Do NOT break blisters or apply butter or ointments; this may cause infection. ▸ Protect burn by cover loosely with sterile, nonstick bandage and secure in place with gauze or tape. To prevent shock: (unless the person has a head, neck, or leg injury, or it would cause discomfort): ▸ Lay the person flat. ▸ Elevate feet about 12 inches. ▸ Elevate burn area above heart level, if possible. ▸ Cover the person with coat or blanket. ▸ Seek medical assistance. For third-degree burns Seek immediate medical or emergency assistance. In the mean time: ▸ Protect burn area cover loosely with sterile, nonstick bandage or, for large areas, a sheet or other material that will not leave lint in wound. ▸ Separate burned toes and fingers with dry, sterile dressings. ▸ Do not soak burn in water or apply ointments or butter; this may cause infection. ▸ To prevent shock see above. ▸ For an airway burn, do not place pillow under the person's head when the person is lying down. This can close the airway. ▸ Have a person with a facial burn sit up. ▸ Check pulse and breathing to monitor for shock until emergency help arrives.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

The highly lipophilic characteristics, high protein binding and extensive volume of distribution of calcium channel blockers makes haemodialyis, diuresis, and haemoperfusion impractical. Calcium gluconate has been used successfully to reverse hypotension. In dog models relatively small amounts of calcium reverse negative inotropic effects, even when exacerbated by propranolol.
For significant overdose of calcium channel blockers:
- patients should receive cardiac monitoring for 4-6 hours and an electrocardiogram (ECG).
- patients with conduction effects or signs of myocardial depression should be admitted to a monitored bed.
- Asymptomatic patients may then be discharged after appropriate counselling.
- The usual therapeutic measures for hypotension and bradycardia (atropine, isoproterenol, pacings) are appropriate together with calcium infusions.
- Other calcium channel blockers, digoxin, beta-blockers and Class I drugs should be avoided.

Ellenhorn, M.J., and Barceloux D.G.; Medical Toxicology - Diagnosis and Treatment of Human Poisoning. 1988.
Treat symptomatically.

SECTION 5 Fire-fighting measures

Extinguishing media

- Water spray or fog.
- Foam.

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- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

Special hazards arising from the substrate or mixture

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

Special protective equipment and precautions for fire-fighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear breathing apparatus plus protective gloves. ‣ Prevent, by any means available, spillage from entering drains or water courses. ‣ Use water delivered as a fine spray to control fire and cool adjacent area. ‣ **DO NOT** approach containers suspected to be hot. ‣ Cool fire exposed containers with water spray from a protected location. ‣ If safe to do so, remove containers from path of fire. ‣ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	‣ Combustible solid which burns but propagates flame with difficulty; it is estimated that most organic dusts are combustible (circa 70%) - according to the circumstances under which the combustion process occurs, such materials may cause fires and / or dust explosions. ‣ 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). ‣ Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust (420 micron or less) may burn rapidly and fiercely if ignited - particles exceeding this limit will generally not form flammable dust clouds; once initiated, however, larger particles up to 1400 microns diameter will contribute to the propagation of an explosion. ‣ In the same way as gases and vapours, dusts in the form of a cloud are only ignitable over a range of concentrations; in principle, the concepts of lower explosive limit (LEL) and upper explosive limit (UEL) are applicable to dust clouds but only the LEL is of practical use; - this is because of the inherent difficulty of achieving homogeneous dust clouds at high temperatures (for dusts the LEL is often called the "Minimum Explosible Concentration", MEC). ‣ When processed with flammable liquids/vapors/mists,ignitable (hybrid) mixtures may be formed with combustible dusts. Ignitable mixtures will increase the rate of explosion pressure rise and the Minimum Ignition Energy (the minimum amount of energy required to ignite dust clouds - MIE) will be lower than the pure dust in air mixture. The Lower Explosive Limit (LEL) of the vapour/dust mixture will be lower than the individual LELs for the vapors/mists or dusts. ‣ A dust explosion may release of large quantities of gaseous products; this in turn creates a subsequent pressure rise of explosive force capable of damaging plant and buildings and injuring people. ‣ Usually the initial or primary explosion takes place in a confined space such as plant or machinery, and can be of sufficient force to damage or rupture the plant. If the shock wave from the primary explosion enters the surrounding area, it will disturb any settled dust layers, forming a second dust cloud, and often initiate a much larger secondary explosion. All large scale explosions have resulted from chain reactions of this type. ‣ Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport. ‣ Build-up of electrostatic charge may be prevented by bonding and grounding. ‣ Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting. ‣ All movable parts coming in contact with this material should have a speed of less than 1-meter/sec. ‣ A sudden release of statically charged materials from storage or process equipment, particularly at elevated temperatures and/ or pressure, may result in ignition especially in the absence of an apparent ignition source. ‣ One important effect of the particulate nature of powders is that the surface area and surface structure (and often moisture content) can vary widely from sample to sample, depending of how the powder was manufactured and handled; this means that it is virtually impossible to use flammability data published in the literature for dusts (in contrast to that published for gases and vapours). ‣ Autoignition temperatures are often quoted for dust clouds (minimum ignition temperature (MIT)) and dust layers (layer ignition temperature (LIT)); LIT generally falls as the thickness of the layer increases. Combustion products include: ‣ carbon monoxide (CO) ‣ carbon dioxide (CO2) ‣ other pyrolysis products typical of burning organic material. May emit clouds of acrid smoke May emit poisonous fumes. May emit corrosive fumes.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	‣ Clean up waste regularly and abnormal spills immediately. ‣ Avoid breathing dust and contact with skin and eyes. ‣ Wear protective clothing, gloves, safety glasses and dust respirator. ‣ Use dry clean up procedures and avoid generating dust. ‣ Vacuum up or sweep up. **NOTE:** Vacuum cleaner must be fitted with an exhaust micro filter (H-Class HEPA type) (consider explosion-proof machines designed to be grounded during storage and use). H-Class HEPA filtered industrial vacuum cleaners should NOT be used on wet materials or surfaces. ‣ Dampen with water to prevent dusting before sweeping. ‣ Place in suitable containers for disposal.
Major Spills	Moderate hazard. ‣ **CAUTION**: Advise personnel in area. ‣ Alert Emergency Services and tell them location and nature of hazard. ‣ Control personal contact by wearing protective clothing. ‣ Prevent, by any means available, spillage from entering drains or water courses. ‣ Recover product wherever possible. ‣ **IF DRY:** Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. **IF WET:** Vacuum/shovel up and place in labelled containers for disposal. ‣ **ALWAYS:** Wash area down with large amounts of water and prevent runoff into drains.

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	▸ If contamination of drains or waterways occurs, advise Emergency Services.

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

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ Avoid skin contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked. ▸ **DO NOT** allow material to come in direct contact with human skin or eyes. ▸ **DO NOT** allow material to come in contact with exposed food or food contact surfaces. ▸ Suitable PPE must be worn at all times. ▸ Avoid contact with incompatible materials. ▸ When handling, **DO NOT** eat, drink or smoke. ▸ Keep containers securely sealed when not in use. ▸ Avoid physical damage to containers. ▸ Always wash hands with soap and water after handling. ▸ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▸ Use good occupational work practice. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. ▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. ▸ 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. ▸ Minimise dry sweeping to avoid generation of dust clouds. Vacuum dust-accumulating surfaces and remove to a chemical disposal area. Vacuums with explosion-proof motors should be used. ▸ Control sources of static electricity. Dusts or their packages may accumulate static charges, and static discharge can be a source of ignition. ▸ Solids handling systems must be designed in accordance with applicable standards (e.g. NFPA including 654 and 77) and other national guidance. ▸ Do not empty directly into flammable solvents or in the presence of flammable vapors. ▸ The operator, the packaging container and all equipment must be grounded with electrical bonding and grounding systems. Plastic bags and plastics cannot be grounded, and antistatic bags do not completely protect against development of static charges. Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source. ▸ Do NOT cut, drill, grind or weld such containers. ▸ In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.
Other information	Consider storage under inert gas. ▸ Store under an inert gas, e.g. argon or nitrogen. ▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry area protected from environmental extremes. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. For major quantities: ▸ Consider storage in bunded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams}. ▸ Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Glass container is suitable for laboratory quantities ▸ Polyethylene or polypropylene container. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	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 ▸ Avoid strong acids, bases. ▸ Avoid reaction with oxidising agents

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
YSI ASCORBIC ACID 1-2	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
YSI Ascorbic Acid 1-2	Not Available	Not Available

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Exposure controls

Appropriate engineering controls

Enclosed local exhaust ventilation is required at points of dust, fume or vapour generation.
HEPA terminated local exhaust ventilation should be considered at point of generation of dust, fumes or vapours.
Barrier protection or laminar flow cabinets should be considered for laboratory scale handling.
A fume hood or vented balance enclosure is recommended for weighing/ transferring quantities exceeding 500 mg.
When handling quantities up to 500 gram in either a standard laboratory with general dilution ventilation (e.g. 6-12 air changes per hour) is preferred. Quantities up to 1 kilogram may require a designated laboratory using fume hood, biological safety cabinet, or approved vented enclosures. Quantities exceeding 1 kilogram should be handled in a designated laboratory or containment laboratory using appropriate barrier/ containment technology.
Manufacturing and pilot plant operations require barrier/ containment and direct coupling technologies.
Barrier/ containment technology and direct coupling (totally enclosed processes that create a barrier between the equipment and the room) typically use double or split butterfly valves and hybrid unidirectional airflow/ local exhaust ventilation solutions (e.g. powder containment booths). Glove bags, isolator glove box systems are optional. HEPA filtration of exhaust from dry product handling areas is required.
Fume-hoods and other open-face containment devices are acceptable when face velocities of at least 1 m/s (200 feet/minute) are achieved.
Partitions, barriers, and other partial containment technologies are required to prevent migration of the material to uncontrolled areas. For non-routine emergencies maximum local and general exhaust are necessary. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, etc. evaporating from tank (in still air)	0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)

Within each range the appropriate value depends on:

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

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2.5 m/s (200-500 f/min.) for extraction of gases discharged 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.
The need for respiratory protection should also be assessed where incidental or accidental exposure is anticipated: Dependent on levels of contamination, PAPR, full face air purifying devices with P2 or P3 filters or air supplied respirators should be evaluated.
The following protective devices are recommended where exposures exceed the recommended exposure control guidelines by factors of:
10; high efficiency particulate (HEPA) filters or cartridges
10-25; loose-fitting (Tyvek or helmet type) HEPA powered-air purifying respirator.
25-50; a full face-piece negative pressure respirator with HEPA filters
50-100; tight-fitting, full face-piece HEPA PAPR
100-1000; a hood-shroud HEPA PAPR or full face-piece supplied air respirator operated in pressure demand or other positive pressure mode.

Individual protection measures, such as personal protective equipment

Eye and face protection

When handling very small quantities of the material eye protection may not be required.
For laboratory, larger scale or bulk handling or where regular exposure in an occupational setting occurs:
- Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent]
- Face shield. Full face shield may be required for supplementary but never for primary protection of eyes.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

Skin protection

See Hand protection below

Hands/feet protection

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
· Contaminated gloves should be replaced.
As defined in ASTM F-739-96 in any application, gloves are rated as:

Continued...

	· Excellent when breakthrough time > 480 min · Good when breakthrough time > 20 min · Fair when breakthrough time < 20 min · Poor when glove material degrades For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended. It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: · Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. · Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. ▸ Rubber gloves (nitrile or low-protein, powder-free latex, latex/ nitrile). Employees allergic to latex gloves should use nitrile gloves in preference. ▸ Double gloving should be considered. ▸ PVC gloves. ▸ Change gloves frequently and when contaminated, punctured or torn. ▸ Wash hands immediately after removing gloves. ▸ Protective shoe covers. [AS/NZS 2210] ▸ Head covering. Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present. ▸ polychloroprene. ▸ nitrile rubber. ▸ butyl rubber. ▸ fluorocaoutchouc. ▸ polyvinyl chloride. Gloves should be examined for wear and/ or degradation constantly.
Body protection	See Other protection below
Other protection	▸ For quantities up to 500 grams a laboratory coat may be suitable. ▸ For quantities up to 1 kilogram a disposable laboratory coat or coverall of low permeability is recommended. Coveralls should be buttoned at collar and cuffs. ▸ For quantities over 1 kilogram and manufacturing operations, wear disposable coverall of low permeability and disposable shoe covers. ▸ For manufacturing operations, air-supplied full body suits may be required for the provision of advanced respiratory protection. ▸ Eye wash unit. ▸ Ensure there is ready access to an emergency shower. ▸ For Emergencies: Vinyl suit

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.
Class P2 particulate filters are used for protection against mechanically and thermally generated particulates or both.
P2 is a respiratory filter rating under various international standards, Filters at least 94% of airborne particles
Suitable for:
· Relatively small particles generated by mechanical processes eg. grinding, cutting, sanding, drilling, sawing.
· Sub-micron thermally generated particles e.g. welding fumes, fertilizer and bushfire smoke.
· Biologically active airborne particles under specified infection control applications e.g. viruses, bacteria, COVID-19, SARS

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

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 scorbic acid is susceptible to air and light and undergoes oxidative degradation to dehydroascorbic acid and further to inactive products. The degradation is influenced by oxygen, temperature, viscosity and pH of the medium and is also catalyzed by metal ions, particularly Cu2+, Fe2+, and Zn2+. T Air sensitive.

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 (°C)**	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

Continued...

Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Applicable	**Explosive properties**	Not Available
Flammability	Not Applicable	**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 (1%)**	approx. 3
Vapour density (Air = 1)	Not Applicable	**VOC g/L**	Not Available
Heat of Combustion (kJ/g)	Not Available	**Ignition Distance (cm)**	Not Available
Flame Height (cm)	Not Available	**Flame Duration (s)**	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	**Enclosed Space Ignition Deflagration Density (g/m3)**	Not Available
Nanoform Solubility	Not Available	**Nanoform Particle Characteristics**	Not Available
Particle Size	Not Available		

SECTION 10 Stability and reactivity

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

SECTION 11 Toxicological information

Information on toxicological effects

a) Acute Toxicity	Based on available data, the classification criteria are not met.
b) Skin Irritation/Corrosion	There is sufficient evidence to classify this material as skin corrosive or irritating.
c) Serious Eye Damage/Irritation	There is sufficient evidence to classify this material as eye damaging or irritating
d) Respiratory or Skin sensitisation	Based on available data, the classification criteria are not met.
e) Mutagenicity	There is sufficient evidence to classify this material as mutagenic
f) Carcinogenicity	Based on available data, the classification criteria are not met.
g) Reproductivity	There is sufficient evidence to classify this material as toxic to reproductivity
h) STOT - Single Exposure	There is sufficient evidence to classify this material as toxic to specific organs through single exposure
i) STOT - Repeated Exposure	Based on available data, the classification criteria are not met.
j) Aspiration Hazard	Based on available data, the classification criteria are not met.

Inhaled	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. 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. Not normally a hazard due to non-volatile nature of product
Ingestion	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 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 Accidental ingestion of the material may be damaging to the health of the individual. Large doses of calcium channel blocking agents may produce nausea, weakness, dizziness, drowsiness, confusion, slurred speech, a decrease in blood pressure along with reduced cardiac output; death may ensue.
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 causes serious eye irritation.
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.

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	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. Calcium channel blocking agents can cause irregular heart beat, high blood pressure, vomiting, diarrhoea, headache, dermatitis, acne, itching and blood disorders such as anaemia and loss of platelets. Widespread blood swellings and blood clots may occur. Vitamin C increases iron absorption; people which 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.

YSI ASCORBIC ACID 1-2	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50: 11900 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***

YSI ASCORBIC ACID 1-2	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. 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. e acid sequestrants (BASs), including cholestyramine, colestipol, and colesevelam, are widely used in endocrine and gastrointestinal disorders. Their core mechanism involves promoting hepatic cholesterol catabolism into bile acids and reducing serum low-density lipoprotein cholesterol (LDL-C) concentrations, rendering them suitable for patients intolerant to statins or requiring intensified lipid-lowering therapy . Additionally, colesevelam has been applied in diabetes management due to its glucose-lowering effects via pathways such as stimulating glucagon-like peptide-1 (GLP-1) secretion [. In hepatobiliary diseases, BASs mitigate toxic bile acid accumulation, serving as therapeutic options for bile acid diarrhea, cholestatic pruritus, primary biliary cholangitis (PBC), and primary sclerosing cholangitis (PSC) [studies further suggest their potential roles in alleviating inflammatory bowel disease (IBD), irritable bowel syndrome (IBS), non-alcoholic fatty liver (NAFL), and microscopic colitis consistently high reporting rates of gastrointestinal disorders across all three BAS agents, establishing these as core adverse reactions mainly manifesting as diarrhea, constipation, flatulence, and abdominal pain, consistent with drug labeling information and existing clinical trial evidence . These gastrointestinal events are mechanistically linked to BAS pharmacological actions. By binding bile acids in the intestinal lumen, BAS disrupts enterohepatic circulation and stimulates compensatory bile acid synthesis, thereby reducing serum cholesterol levels [. However, this disruption depletes the bile acid pool necessary for lipid emulsification, leading to steatorrhea and subsequent osmotic diarrhea. Reduced luminal bile acid concentrations may attenuate their physiological stimulation of colonic motility via Takeda G protein-coupled receptor 5 (TGR5), potentially contributing to constipation he gut microbiota plays a pivotal role in BAS-induced dysbiosis [. Diminished secondary bile acids (e.g., deoxycholic acid) due to BAS sequestration alter the microbial composition, reducing beneficial taxa while enriching opportunistic pathogens potentially linked to hydrogen sulfide production and abdominal distension [39]. This dysbiotic shift may also impair gut barrier function, increasing intestinal permeability and systemic inflammation—a potential contributor to extraintestinal AEs. \Adverse effects of ion channel modulators range from common, mild issues like dizziness, fatigue, and rash to serious and potentially fatal complications such as hypotension, cardiac arrest, and severe neurological effects. Specific side effects depend on the type of ion channel targeted and the specific drug, but common issues include central and peripheral nervous system effects (dizziness, headache, drowsiness, ataxia) and cardiovascular effects (tachycardia, edema, hypotension). verse effects of ion channel inhibitors can include dizziness, fatigue, and gastrointestinal issues like nausea and constipation. More specific side effects depend on the type of channel and drug, such as headaches and edema with calcium channel blockers, or skin reactions and heart rhythm problems with other inhibitors. Severe effects can include serious heart problems, liver dysfunction, or severe allergic reactions, and may be more likely in patients with certain pre-existing conditions or when combined with other medications.

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

YSI ASCORBIC ACID 1-2	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	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. US EPA, Ecotox database - Aquatic Toxicity Data 4. ECETOC Aquatic Hazard Assessment Data 5. NITE (Japan) - Bioconcentration Data 6. METI (Japan) - Bioconcentration Data 7. Vendor Data***

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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.
Ecotoxicity: Exposure of the general population to oxalic acid / oxalates is expected to occur through consumption of foods in which it is naturally contained, inhalation of contaminated air, and consumption of contaminated groundwater. When assessing the overall exposure to oxalic acid, the residues of ethylene glycol and ethylene oxide must be considered. Metabolites are not expected to contribute significantly to total exposure.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
YSI Ascorbic Acid 1-2	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
YSI Ascorbic Acid 1-2	LOW (LogKOW = -1.85)

Mobility in soil

Ingredient	Mobility
YSI Ascorbic Acid 1-2	LOW (Log KOC = 10)

Other adverse effects

No evidence of ozone depleting properties were found in the current literature.

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. Otherwise: ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product. 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. A Hierarchy of Controls seems to be common - the user should investigate: ▸ Reduction ▸ Reuse ▸ Recycling ▸ Disposal (if all else fails) 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. ▸ **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.

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO

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

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

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

14.7. Maritime transport in bulk according to IMO instruments

14.7.1. 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

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

Product name	Group
YSI Ascorbic Acid 1-2	Not Applicable

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
YSI Ascorbic Acid 1-2	Not Applicable

Continued...

SECTION 15 Regulatory information

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

YSI Ascorbic Acid 1-2 is found on the following regulatory lists

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

Additional Regulatory Information

Not Applicable

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories

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

US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)

None Reported

US. EPCRA Section 313 Toxic Release Inventory (TRI) (40 CFR 372)

None Reported

Additional Federal Regulatory Information

Not Applicable

State Regulations

US. California Proposition 65

None Reported

Additional State Regulatory Information

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (YSI Ascorbic Acid 1-2)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes

Continued...

National Inventory	Status
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
UAE - Control List (Banned/Restricted Substances)	No (YSI Ascorbic Acid 1-2)
Legend:	***Yes = All CAS declared ingredients are on the inventory*** ***No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.***

SECTION 16 Other information

Revision Date	11/30/2025
Initial Date	09/29/2006

SDS Version Summary

Version	Date of Update	Sections Updated
7.1	11/15/2025	Toxicological information - Acute Health (swallowed), First Aid measures - Advice to Doctor, Physical and chemical properties - Appearance, Toxicological information - Chronic Health, Hazards identification - Classification, Disposal considerations - Disposal, Exposure controls / personal protection - Engineering Control, Exposure controls / personal protection - Exposure Standard, Firefighting measures - Fire Fighter (extinguishing media), Firefighting measures - Fire Fighter (fire/explosion hazard), Firefighting measures - Fire Fighter (fire fighting), First Aid measures - First Aid (eye), First Aid measures - First Aid (skin), First Aid measures - First Aid (swallowed), Handling and storage - Handling Procedure, Stability and reactivity - Instability Condition, Exposure controls / personal protection - Personal Protection (other), Exposure controls / personal protection - Personal Protection (Respirator), Exposure controls / personal protection - Personal Protection (eye), Exposure controls / personal protection - Personal Protection (hands/feet), Accidental release measures - Spills (major), Accidental release measures - Spills (minor), Handling and storage - Storage (storage requirement), Handling and storage - Storage (suitable container), Toxicological information - Toxicity and Irritation (Other), Transport information - Transport, Transport Information, Identification of the substance / mixture and of the company / undertaking - Use
8.1	11/29/2025	CAS Number, Toxicological information - Toxicity and Irritation (Other), Identification of the substance / mixture and of the company / undertaking - Use

Other information

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

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

Definitions and abbreviations

- PC—TWA: Permissible Concentration-Time Weighted Average
- PC—STEL: Permissible Concentration-Short Term Exposure Limit
- IARC: International Agency for Research on Cancer
- ACGIH: American Conference of Governmental Industrial Hygienists
- STEL: Short Term Exposure Limit
- TEEL: Temporary Emergency Exposure Limit。
- IDLH: Immediately Dangerous to Life or Health Concentrations
- ES: Exposure Standard
- OSF: Odour Safety Factor
- NOAEL: No Observed Adverse Effect Level
- LOAEL: Lowest Observed Adverse Effect Level
- TLV: Threshold Limit Value
- LOD: Limit Of Detection
- OTV: Odour Threshold Value
- BCF: BioConcentration Factors
- BEI: Biological Exposure Index
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships
- IMSBC: International Maritime Solid Bulk Cargoes Code
- IGC: International Gas Carrier Code
- IBC: International Bulk Chemical Code

- 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

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- 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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